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DISAGGREGATING THE EFFECT OF THE BUSINESS CYCLE
ON THE DISTRIBUTION OF INCOME

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ABSTRACT

This paper disaggregates total household income into a complete set of components and studies the comparative cyclicalities of these components to economic growth. Comparisons of the relative responsiveness to GNP growth of wages, hours of work, and total labor market income of heads and wives, and transfer income sources of households are made across income, race, sex and age groups. This provides a picture of the channels by which economic growth produces income change. Significant differences in elasticities are found to exist both between different income components and between different population groups for the same component. The narrowing income distribution in times of high growth occurs primarily because of large elasticities on head's labor market income among the poor. Both wages and hours show evidence of cyclicalities. The labor market earnings of women -- both wives and household heads -- is far less responsive to growth. Cyclicalities in transfer income varies enormously between population groups and by type of transfer.

I. INTRODUCTION

A great deal of political discussion in recent years has focussed on the extent to which economic growth helps relatively disadvantaged groups in the United States. While some claim that the best thing we can do for the poor is to make the economy grow, others contend that economic growth passes by many low income groups and simply leaves them worse off, relative to the rest of the society.

Previous research concerning the effect of the macro economy on the income distribution has shown that both claims have some validity.¹ At an aggregate level, economic growth appears to have some narrowing effect on the income distribution. But there are specific demographic groups that seem less responsive to GNP growth, in particular, elderly and female-headed households.² On the other hand, some groups seem to respond strongly to economic growth, in particular, young and black male-headed households. Unfortunately, these studies have investigated the cyclicity of income change using only very aggregate income measures. No attempt is made to investigate which components of income respond most strongly to the economy and which are least affected.

In contrast, there are two alternative research approaches which have focussed on more disaggregate cyclical effects. One group of studies has disaggregated the components of the cycle and looked at the effects of unemployment and/or inflation on the aggregate resources of various population groups.³ A second group of studies has explored the cyclicity of specific income components, such as male wage rates or wives' labor force participation.⁴ While these studies provide a detailed analysis of a particular economic variable, they are rarely

interested in comparing cyclical effects between income groups, or in looking at how the cyclicalities of a particular component affects the cyclicalities of aggregate income.

In contrast to previous research, this paper disaggregates total household income into a complete set of components, and studies the comparative cyclicalities of those components to economic growth. This analysis is done across income groups and by race, sex and age groupings. The research is designed to provide a more comprehensive picture of the channels by which economic growth produces income change, providing comparative information on the relative responsiveness of major income components both within and across demographic groups. In essence, this study tries to find a methodological middle ground between complete income aggregation (the hallmark of most income distribution studies) and micro-data research, which tends to concentrate on particular variables within given populations. The results presented here are interesting not just because they provide new empirical evidence on the effect of the business cycle on income distribution, but also because they allow comparative statements to be made about the magnitude of cyclical effects across a range of variables and populations.

The results of this research have many policy implications. They indicate which income sources and which population groups are most hurt in recessions, or are least likely to respond to general economic stimulation. This should aid the design and targetting of social welfare programs that attempt to cushion income levels in recessions or that try to stimulate particular types of income growth.

II. DEFINING THE PROBLEM

Before describing the data or the methodology of this study in more detail, let me first define the components of income which this research investigates, and second define the population groups which will be of interest. This section will end with an outline of the questions that will be investigated using these income components within these groupings.

For any household in any given year, total household income can be expressed as

$$(1) \quad \text{Inc} = \text{LIncH} + \text{LIncW} + \text{Transfers} + \text{OthInc},$$

where LIncH represents the labor income of the household head and can be written as

$$(2) \quad \text{LIncH} = \text{AHE} * \text{Hours},$$

where AHE represents average hourly earnings and Hours represents annual hours of work.⁵

Similarly, LIncW in equation 1 represents labor income of the wife and can be written as

$$(3) \quad \text{LIncW} = \text{AHEW} * \text{HoursW},$$

where AHEW and HoursW represent average hourly earnings and annual hours of work of the wife.

Transfers in equation 1 represents total transfer income from all sources. It can be further decomposed into

$$(4) \quad \text{Transfers} = \text{AFDC} + \text{ChSup\&A} + \text{SocSec} + \text{OthRetInc} + \\ \text{U\&WComp} + \text{OthTrans},$$

where AFDC represents income from Aid to Families with Dependent Children, the primary welfare program available to low income households

with children. ChSup&A represents child support or alimony from private sources, while SocSec represents income from the Social Security program. OthRetInc stands for other retirement income, including all pension funds or annuities exclusive of those received from Social Security. U&WComp represents income from Unemployment or Worker's Compensation programs. OthTrans is all other transfer income, and includes cash income from other welfare programs,⁶ help from relatives, or other sources of transfer income.

OthInc in equation 1 is the residual category for total income and includes all income not contained elsewhere. This is asset income, rents, dividends, and interest payments. The category also contains the labor market earnings of any household member other than the head or the wife.⁷ Equations (1) through (4) present the components of income and of income change on which the rest of this paper will focus.

The above equations are written for an individual. But as noted earlier, our interest is in the behavior of particular groups of individuals in the population. The twelve household groups which will be investigated can be divided into three major categories:

<u>Household Income Groups</u>	<u>Household Race/Sex Groups</u>	<u>Household Age Groups</u>
Poor	Black Female Heads	Elderly (Age>65) Heads
Bottom Quartile	White Female Heads	Young (Age<24) Heads
Second Quartile	Black Male Heads	Middle (65 ≥ Age ≥ 24) Heads
Third Quartile	White Male Heads	
Top Quartile		

While most of these categories are self-explanatory, two comments need to be made. "Poor" is defined as all households whose total income is less than 125% of a given "Income/Need Standard." This standard is

very close to (although not completely identical with) the official Census definition of the poverty line.⁸ The 125% number is selected because my data set (the Panel Study of Income Dynamics, discussed more fully below) consistently finds more household income than the Census. This is the accepted way of defining a poverty standard for this data that identifies approximately the same population as the standard Census definition of poverty.⁹ Note also that "Poor Households" need not be a subset of "Bottom Quartile Households." Some large families may have income levels that place them within the second quartile, but also have need levels large enough to place them in the Poor category as well.¹⁰

Focussing on the components of income defined above for each of the 12 population groups, I am interested in three primary questions:

(1) On average, how do these income components differ between these populations? What is the mean level of each component, and what is the mean share of each component in total income? What secular income changes occur for each population, exclusive of macroeconomic effects?

(2) How do these components change as the economy grows? What is the comparative elasticity of each income component to GNP growth within each population? Different measures of change will be used to derive a range of elasticity estimates.

(3) Are there changes in the variances of these income components as GNP changes? Many people claim that income variances within groups are likely to widen as the economy grows. This "bifurcation" hypothesis claims that only some members of a group are able to take advantage of economic growth. In particular, this story has frequently been told for

black men. If I find evidence that the variance of income components widens for a particular group over the cycle, I will interpret this as supporting the bifurcation hypothesis. In contrast, others claim that economic growth allows those who are behind to "catch up." The unemployed get jobs, and the underemployed work more hours. This might imply that variances among some groups will decrease during economic growth, as the "worse off" have an opportunity to earn more income. The variance tests will allow me to distinguish between these hypotheses.

III. DATA

The data used in this study are from the Panel Study of Income Dynamics (PSID), collected by the Survey Research Center at the University of Michigan. I use the survey years 1970 to 1982, which provide data on annual household income from 1969 to 1981. Using the household tape, I extract all the variables necessary to calculate the income components described in equations (1) through (4) (along with a variety of demographic variables) for every household over the entire 13 years. Working with a data set of this size always raises numerous empirical issues. Information on how problems of data inconsistency, household splitoffs, and weighting were handled is available from the author upon request.

The advantage of the PSID is that it provides a continuous history on income changes within the same household, allowing one to calculate how changes in aggregate economic growth translate into changes in household income. However, while there are clear advantages to observing the same household over time, there is a major problem in trying to follow households for several years. Only a small percentage

of households fall into the same income or demographic category for an extended period. In particular, female-headed households are formed and dissolve frequently; low income households move in and out of poverty status; young household heads grow older; and so on. This paper is not concerned with the long-term dynamics of income change for given households. My concern is with the effect of changes in economic growth on income components of households within each of these categories in any year. As a result, rather than following the same households over the entire time period, I select 12 "adjacent year" samples, each sample containing all those households whose head remains the same for a two-year period. These range from a 1969/1970 sample to a 1980/1981 sample. Obviously, the 1969/1970 sample looks a great deal like the 1970/1971 sample, and includes many of the same households. But it is not exactly identical, as some changes in head do occur over these years. (The weighted samples look virtually identical, as they should when the weights are correct.)

Thus I have 12 samples, each containing data on two consecutive years for the same households. I can separate each of these samples into the 12 population groups defined above, where the household is classified according to its total income in the first year of each two-year period, or by the race, sex or age of its head. Then, for any two-year period, for any population, I can calculate the means and variances on all income variables for both years and the mean differences between years. Putting together the data from all twelve samples provides a 12-year time series on mean changes in each income component among all members of each population group. Thus, for every two-year period, for

every income component, and for every population group, I can derive estimates of means, mean changes, shares, variances, and other variables of interest.¹¹ These variables can then be related to changes in the general economic growth rate.¹²

III. OBSERVING THE DATA

A. MEAN INCOME COMPONENTS ACROSS POPULATIONS

Before estimating the effect of business cycles, this section will investigate the income patterns that exist between the 12 income, age, and race/sex population groups. Equations (1) through (4) define a set of income components that compose total income for any given individual. To calculate means of these income components for an entire population it is necessary to distinguish between the mean level of an income component available among those who receive it, and the mean number of recipients of that component.

In population group j at time t the mean level of any income component, X , among those who receive it is

$$(5) \quad \bar{X} = \sum_{i=1}^{n_x} X_i / n_x,$$

where n_x is the number of households in group j in year t who receive some income from income source X . (For ease of notation, both the j subscript, indicating population group, and the time subscript, indicating year, have been suppressed for the time being. All variables are assumed specific to a given year and population unless otherwise noted.) Thus, when $X = \text{LIIncH}$ (labor income of the head), $\bar{\text{LIIncH}}$ is the average level of labor income received by those household heads with labor income. This implies that mean income, $\bar{\text{Inc}}$, for any year t for any group j can be written as

$$(6) \quad \overline{\text{Inc}} = (\% \text{LIncH}) * \overline{\text{LIncH}} + (\% \text{LIncW}) * \overline{\text{LIncW}} + (\% \text{Tr}) * \overline{\text{Transfers}} \\ + (\% \text{Oth}) * \overline{\text{OthInc}},$$

where (%X) is the percent of group j in this year for whom income component X is non-zero. If group j has n members and n_x of them receive income component X, then $\%X = n_x/n$. I will look at both the mean level of each income component among its recipients and at the percent of recipients in the total population.

Income shares among the components of total income can be calculated as the mean of individual income shares across the population. The mean share of total income due to component X for any year t for any group j is

$$(7) \quad \text{SHARE}(X) = \sum_{i=1}^n (X_i / \text{Inc}_i) / n,$$

where n is the number of households in group j in year t.

Mean levels of income components and shares across all 12 years for each population are estimated by averaging the yearly means for each variable across the 12 years. Denoting this "mean of the means" with a double bar, this implies that for each group j the average level of any income component X for the entire data set is

$$(8) \quad \overline{\overline{X}} = \sum_{t=1}^{12} \overline{X_t} / 12.$$

This calculation can be done for all annual means of income components and income shares.

Table 1 shows the components of total income averaged over the entire 12 year period for all 12 population groups in which I am interested. Shown are the mean (over the 12 years) of the yearly mean for each variable for each population group, as described in equation 8. As indicated above, the mean of each component is calculated only for

those individuals who report receiving positive income from that source. Shares are calculated in the manner defined in equation 7.

Part A of Table 1 shows the mean of total income for each group and the share breakdown into its four main components. Part B shows the percent of households with labor income from the head, and the components of that labor income calculated among those households which receive labor income from the head. Part C shows the percent of households with labor income from a wife, and the components of wife's labor income calculated from among those households with a working wife. Part D shows the percent of households receiving transfer income, the mean transfer income among those who receive it, and the share of each of its components among recipients. Some interesting patterns emerge in this table.

First, looking at Part A, it is clear that labor income share increases dramatically as income rises (from 41.1% in the bottom quartile to 80.4% in the top quartile). This is due to an increase in the level of both head's and wife's labor income across income quartiles and an increase in the probability that the head and wife will work. Low labor income shares among low income households are hardly surprising. Among the poor, 54% of the households are female-headed (a group with traditionally lower earnings and labor market participation), while 57% report themselves as having some health problem that interferes with work. Among the top quartile, only 4% of the households are female-headed, and only 15% report such health problems. The increase in the share of wife's labor income across income levels is due to the increase in level of income earned by wives who work, an increase

Table 1

COMPONENTS OF INCOME
(Averages based on 1969-1981 data, 1981 dollars)

Part A: Components of Total Mean Income

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Percent of Sample	12.4%	25.0%	25.0%	25.0%	25.0%	5.0%	19.7%	8.7%	66.6%	15.8%	7.8%	76.4%
Total Mean Income (Std Dev)	\$6,020 (2,339)	\$7,153 (1,807)	\$16,473 (1,743)	\$26,698 (2,142)	\$50,274 (17,312)	\$10,049 (3,769)	\$14,054 (7,223)	\$22,462 (12,404)	\$29,946 (14,902)	\$14,936 (12,654)	\$13,489 (5,095)	\$28,431 (13,826)
Share of Total Income Due to:												
Head's Labor Income	32.6%	38.6%	61.1%	68.6%	65.6%	39.1%	43.3%	61.6%	64.0%	10.3%	73.0%	67.0%
Wife's Labor Income	2.9	2.5	7.2	11.7	14.8	---	---	13.4	11.9	3.5	8.3	10.3
Transfer Income	56.5	50.1	19.9	7.9	3.1	48.3	37.5	16.6	13.4	65.2	14.1	11.5
Other Income	8.0	8.8	11.8	11.8	16.5	12.6	19.2	8.4	10.7	21.0	4.6	11.2

Part B: Components of Head's Labor Income

Percent of Heads with Labor Income	52.2%	58.2%	82.3%	93.5%	97.3%	60.9%	65.8%	86.5%	89.1%	33.9%	94.5%	91.9%
Head's Labor Income Mean (Std Dev)	\$4,343 (2,229)	\$5,274 (2,134)	\$12,379 (3,318)	\$19,602 (4,459)	\$33,563 (12,811)	\$7,309 (2,753)	\$10,428 (5,361)	\$17,175 (10,920)	\$22,252 (10,350)	\$6,994 (7,972)	\$10,449 (3,820)	\$21,248 (10,193)
Average Hourly Earnings Mean (Std Dev)	4.04 (2.54)	4.49 (3.06)	6.99 (3.03)	9.68 (3.22)	15.25 (6.58)	5.11 (1.76)	6.68 (3.78)	8.68 (5.56)	10.78 (5.32)	8.23 (8.56)	6.01 (1.92)	10.25 (4.96)
Annual Hours Mean (Std Dev)	1,278 (539)	1,398 (547)	1,929 (487)	2,146 (437)	2,305 (425)	1,437 (375)	1,570 (522)	2,011 (440)	2,131 (496)	961 (595)	1,757 (449)	2,110 (462)

Table 1 -- Continued

Part C: Components of Wife's Labor Income

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Percent Married	32.5%	29.9%	59.5%	78.7%	91.0%	---	---	79.4%	86.7%	51.1%	40.9	70.1
Percent with Working Wives	10.6%	9.4%	27.1%	45.5%	59.8%	---	---	48.5%	46.8%	11.9%	28.7%	41.1%
Wife's Labor Income Mean (Std Dev)	\$2,227 (1,153)	\$2,302 (1,207)	\$4,555 (2,115)	\$7,002 (3,017)	\$11,529 (4,814)	---	---	\$7,293 (3,121)	\$8,273 (4,294)	\$6,915 (4,826)	\$5,885 (2,265)	\$8,381 (4,213)
Average Hourly Earnings Mean (Std Dev)	3.27 (1.17)	3.56 (2.00)	4.58 (2.32)	5.75 (2.24)	8.26 (3.78)	---	---	5.48 (2.24)	6.59 (3.36)	5.77 (3.40)	4.87 (1.55)	6.60 (3.27)
Annual Hours Mean (Std Dev)	793 (367)	810 (418)	1,103 (439)	1,284 (450)	1,453 (448)	---	---	1,384 (397)	1,277 (465)	1,208 (597)	1,202 (342)	1,301 (456)

Part D: Components of Transfer Income

Percent Receiving Transfers	74.9%	73.0%	49.0%	32.7%	20.2%	72.6%	68.1%	39.6%	35.0%	95.8%	46.5%	32.8%
Total Transfer Income Mean (Std Dev)	\$3,672 (1,324)	\$4,159 (1,697)	\$5,839 (3,343)	\$5,574 (3,946)	\$5,905 (4,507)	\$4,309 (1,573)	\$4,492 (2,337)	\$3,948 (1,999)	\$5,740 (3,727)	\$7,138 (3,378)	\$2,181 (1,256)	\$4,271 (2,854)
Share of Total Transfer Income Due to:												
AFDC	16.1%	9.1%	4.1%	2.4%	1.0%	29.6%	5.8%	6.3%	1.4%	.1%	15.7%	9.2%
Child Support or Alimony	3.3	2.9	8.1	7.4	7.0	6.1	13.0	.3	.9	.1	3.1	10.0
Social Security	44.7	53.1	38.6	27.0	25.8	26.4	48.6	35.7	41.5	70.7	10.5	23.1
Other Retirement Income	8.2	11.3	21.6	27.7	33.2	5.7	15.4	17.2	24.0	12.6	2.8	18.7
Unemployment or Worker's Compensation	3.6	4.4	11.1	17.0	14.5	3.0	3.7	14.4	13.5	.6	20.6	14.9
Other Transfer Income	24.1	19.3	16.4	18.4	18.5	29.2	13.5	26.0	18.7	6.9	47.3	24.1

in the percent of wives who work, and an increase in the percent of heads who are married. (See the top of Part C.) Share of total income from transfers decreases dramatically over the income scale, while the share of "other income" increases.

Figure 1 shows how the mean incomes of these groups relate to each other. Mean income for the entire population is \$25,128, and the quartile breaks are at \$11,763, \$21,332, and \$32,859. While many people are grouped near the mean, there is clearly a large and extended tail in the top quartile.

Like low income families in general, black and white female-headed households receive a relatively low percentage of their income from the labor market, as do the elderly. In contrast, black males and the young rely heavily on the labor market. We would expect, a priori, that growth in the economy would initially help those groups who are closely tied to the labor market more than it helps others. As noted above, previous research has indicated that female and elderly-headed households are less responsive to economic changes.

Among the poor, the very low amount of labor market income received might indicate that this group also is less affected by economic growth. The "trickling down" hypothesis does not look promising when less than 36% of the income of the poor is directly tied to the labor market. In order for the poor to gain relative to other groups, the elasticity of labor income and labor market participation with respect to GNP must be very strong for low income workers.

Part B shows the mean levels and standard deviations for the components of head's labor income. This table indicates first that wage

FIGURE 1
MEAN INCOME LEVELS OF POPULATION GROUPS
 (averages based on 1969-1981, 1981 dollars)

Mean Income for:

A. Poor	\$6,020	F. Black Females	\$10,048	J. Elderly	\$14,936
B. First Quartile	\$7,153	G. White Females	\$14,054	K. Young	\$13,489
C. Second Quartile	\$16,153	H. Black Males	\$22,462	L. Middle-aged	\$28,431
D. Third Quartile	\$26,698	I. White Males	\$29,946		
E. Fourth Quartile	\$50,274				

differentials among groups are greater than hours differentials. For instance, average hourly earnings among the top quartile is 3.4 times greater than average hourly earnings among the bottom quartile. The comparative figure for hours in these groups is 1.6.¹³ This is also true between race and sex groups, where wage levels vary more than hours.

Part C shows mean levels and standard deviations for the components of wife's labor income. Here are basically the same patterns for wife's labor income as were observed within head's labor income, but with smaller differences between the groups. The relative wages of the wives in wealthier households are higher than the wages of wives of the bottom quartile, but the difference is less than is found among head's wages. Thus, while there is some positive correlation between the earnings of husbands and wives (i.e., high-earning husbands have high-earning wives) that correlation is not perfect.

Wives of black males earn higher wages than black female heads, but they work fewer hours. Wives of white heads earn about the same wage as white female heads, but also work less. The elderly are the only group for whom labor income of the wife is about equal to the labor income of the head. But elderly wives earn a lower wage than their husbands, making up the difference by working more hours.

Finally, Part D shows mean transfer levels between the groups and the relative shares due to each of the six components of transfer income. The patterns are predictable, given the nature of these income sources. AFDC is most important for low-income and female-headed households. Child support is most important for middle-income households and women. Social Security is important for all groups, but

particularly for the elderly and low income. Other retirement income is most important among higher-income households. Unemployment and worker's compensation is most important to the middle income and young households.

I was rather surprised by the percent of households receiving some form of transfer income. Among the poor, close to one quarter receive no transfers--a number that I find surprisingly high.¹⁴ Among the top quartile, one fifth of households still receive transfer income, though largely in the form of non-welfare transfers, such as other retirement income.

(B) SECULAR INCOME CHANGES

Table 1 shows the average annual patterns among income components for these groups. However, the focus of this paper is on changes in income. Thus we turn next to looking at average annual income changes among the different populations. The business cycle effects are those general income changes related to the macroeconomy that occur in addition to the underlying average income changes which these populations experience in any given year.

For the population as a whole over these 12 years, real median income was effectively stagnant.¹⁵ Thus, one would expect mean changes over this time period to be zero, unless there are secular income changes occurring within particular groups. For example, one might expect that there will be regression towards the mean, so that on average low income households in any given year will see income improvement while richer households experience income loss. Among the elderly one might on average expect income decreases, while among the

young one would expect increases. It is important to remember that this data set is designed to measure the mean changes for individuals in each group in each year -- not the mean change for the same individual over the years. Thus, the mean changes reported here are the average annual changes for any household in a given population group during this 12 year period.

Mean changes in income components can be calculated for any population group over any two-year period using the 12 two-year samples. The mean change between any two years t and $t+1$ for population j is

$$(9) \quad \text{CHANGE}(X) = \frac{\sum_{i=1}^n (X_{i,t+1} - X_{i,t})}{n} \\ = (n_2/n) * \overline{X}_{t+1} - (n_1/n) * \overline{X}_t,$$

where n is the total number of households in group j , n_1 is the number of those households receiving income component X in year t , and n_2 is the number of households in the same sample receiving income component X in year $t+1$. For ease of notation I will write

$$(9a) \quad \text{CHANGE}(X) = \Delta X_{t+1,t}$$

The mean secular change averaged across all 12 two-year periods is then

$$(10) \quad \Delta X = \frac{\sum_{t=1}^{12} \Delta X_{t,t+1}}{12}.$$

The share of total income change attributable to a change in component X is the mean change share,

$$(11) \quad \text{ChSHARE}(X) = \frac{\sum_{i=1}^n [(X_{i,t+1} - X_{i,t}) / (\text{Inc}_{i,t+1} - \text{Inc}_{i,t})]}{n}$$

Table 2 shows these annual average changes in the components of total income for each population group. The mean changes in Table 2 are calculated according to equation (10), and the components of income change are based on equation (11).

Table 2

COMPONENTS OF MEAN ANNUAL INCOME CHANGE
(Based on 12 2-year samples from 1969/1970 to 1980/1981, 1981 dollars)

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Total Income												
Mean Δ	\$2,150	\$1,558	\$1,025	\$474	-\$1,825	\$20	-\$243	\$249	\$499	-\$277	\$1,620	\$277
Mean % Δ	35.8%	21.8%	6.3%	1.8%	-3.6%	0.3%	-1.7%	1.1%	1.7%	-1.8%	12.0%	1.0%
Head's Labor Income												
Mean Δ	\$1,172	\$855	\$456	-\$1	-\$1,198	\$140	\$127	-\$58	-\$1	-\$484	\$1,436	-\$21
Mean % Δ	27.0%	16.2%	3.7%	-.02%	-3.5%	1.9%	1.3%	-.3%	-.04%	-7.1%	13.8%	-.1%
Wife's Labor Income												
Mean Δ	\$133	\$121	\$213	\$75	-\$328	---	---	\$46	\$23	-\$110	\$219	\$26
Mean % Δ	6.1%	5.3%	4.7%	1.1%	-2.8%	---	---	.7%	.3%	-1.6%	3.7%	.3%
Transfer Income												
Mean Δ	\$198	\$146	\$98	\$152	\$190	\$4	\$112	\$131	\$170	\$233	-\$20	\$151
Mean % Δ	5.4%	3.6%	1.7%	2.7%	3.3%	.2%	2.5%	3.3%	3.0%	3.4%	-.9%	3.5%
Share of Total Income Change Attributable to: ^{a/}												
Change in Head's Labor Income	55.3%	54.8%	42.3%	-.7%	-68.4%	597.1%	60.4%	-14.4%	1.3%	-184.7%	81.4%	-4.3%
Change in Wife's Labor Income	6.9	10.2	27.3	32.2	-13.8	---	---	40.5	22.5	-38.4	23.5	31.6
Change in Transfer Income	10.5	9.8	7.2	25.1	8.5	-41.2	4.1	45.5	30.1	72.3	-1.4	40.5
Change in Other Income	27.3	25.2	23.2	43.4	-26.3	-455.9	-164.5	28.5	46.1	50.8	-3.5	32.2

^{a/} Shares of net positive changes sum to 100% (with occasional rounding error.) Shares of net negative changes sum to -100%.

Table 2 reveals a strong tendency for regression to the mean among high and low income groups. Any household that is poor can expect on average that the next year their income will rise \$2150, or 36%. For any household in the top quartile, income is expected on average to decrease \$1825 in any year, or -3.6%. Little average change occurs among the middle two quartiles or among the race/sex groups. The elderly and young show the expected patterns, with the young on average showing income gains in any two-year period while the elderly experience income losses.

The bulk of the changes in total income that are experienced are clearly due to changes in head's labor income. Average changes in wife's income are less closely related to household income patterns and are much smaller. Note that there is a general secular increase in transfer income over this time period. Though we will not explore this further, this is largely due to increases in Social Security income for most groups. (The Social Security system expanded dramatically over these years.)

Table 2 shows that there is quite a bit of dynamic income change occurring among these population groups in any given year, regardless of economic growth conditions. The rich have a tendency to become poorer, while the poor have an even stronger tendency to become richer. Thus, when we now turn to look at the effect of GNP growth on income change, we are really seeking to find effects in addition to those that are occurring secularly. In other words, we want to determine the additional effect of general economic growth on the income dynamics of these population groups.

IV. THE RESPONSIVENESS OF INCOME COMPONENTS TO THE CYCLE

This research requires that a general macroeconomic variable (GNP growth) be related to specific microeconomic concepts, such as wage rates or hours of work. The most obvious response -- to enter GNP growth into micro-data regressions that attempt to estimate wages or hours -- has been shown many times to be ineffective. The range of variation in individual responses is almost always so great that aggregate variables rarely appear to be significant.¹⁶

So the approach in this paper needs to be different. The methodology outlined below is one relatively simple way of combining a great deal of data on individual households into more aggregate variables which are more readily compared with GNP growth rates. In particular, we will aggregate changes in income components within individual households in each population group.

Our primary interest is in the comparative responsiveness of different income sources to economic growth among the 12 populations. This requires estimating relative changes with respect to GNP. This can be done by regressing changes in each income component for each population group against percent change in GNP (and a constant) across the 12 time periods.¹⁷

I choose to use two measures of the relative responsiveness of each income component to GNP. The first is the percent change in a given component induced by a 1% change in GNP. The second is the absolute or level change in a given component induced by a 1% change in GNP. These two measures provide complementary information on the effects of the economic cycle.

The percent change in the level of income component X is calculated over the entire population for each two year period. This means that it explicitly includes both the recipients of X, as well as the nonrecipients in its calculation, thus allowing changes to occur both in the number of recipients and in the level of X among recipients. Define this total percent change for year t and population j as¹⁸

$$(12) \quad \text{PctCh}(X)_t = \sum_{i=1}^n (X_{i,t+1} - X_{i,t}) / \sum_{i=1}^n X_{i,t}.$$

Using the notation defined in equation (9a) above, this can also be written as

$$(12a) \quad \text{PctCh}(X)_t = \Delta X_{t+1,t} / (n_x/n) \bar{X}_t$$

If I regress the percent change in variable X from each of the 12 two-year samples against a constant and the percent change in GNP over these same years, the coefficient on GNP will provide an elasticity estimate. This is the regression

$$(13) \quad \text{PctCh}(X)_t = \alpha_1 + \alpha_2 \text{PctGNP}_t + e_t,$$

where $\text{PctGNP}_t = (\text{GNP}_{t+1} - \text{GNP}_t) / \text{GNP}_t$

and e is a random error term. The coefficient α_2 will indicate how responsive income component X is to general macroeconomic growth and can be interpreted as the percent change in X due to a 1% increase in GNP.¹⁹

However, this percent elasticity has certain limitations. While it is useful in comparing the responsiveness of different income components both between and within population groups, it can appear misleading if viewed alone. When percent changes are calculated off numbers with large base levels, even small percent changes can imply large absolute changes, while the opposite happens when the base level is small. Since the different income components vary widely in their

level values, I present not only the percent change but also the level change associated with changes in GNP.

The level change for income component X for population j in year t is the numerator of the percent change calculation in equation (12):

$$(14) \quad \text{LevCh}(X)_t = \sum_{i=1}^n (X_{i,t+1} - X_{i,t}) / n$$

This measure can also be regressed against the percent change in GNP,

$$(15) \quad \text{LevCh}(X)_t = \beta_1 + \beta_2 \text{PctGNP}_t + u_t,$$

where PctGNP is defined as before and u is a random error term. The coefficient β_2 will measure the mean dollar increase in income component X (among all households in population j) associated with a 1% change in GNP.

Table 3 presents estimates of α_2 and β_2 . (Constants are included in all regressions, but not reported here.) Panels A-1 through D-1 indicate the percent change elasticities of all income components to GNP growth, while panels A-2 through D-2 present the level change elasticities. Part A reports the results for the components of total income, Part B shows the results for the components of head's labor income, Part C shows the elasticities for components of wife's labor income, and Part D shows elasticities for components of transfers.

Part A indicates how the aggregate components of income vary with GNP. There are some striking patterns in this table. First, total income among low income groups show far greater percent increases than among high income groups. As other studies have shown, these results confirm that increases in GNP growth proportionately narrow the income distribution. However, the large percent changes in panel A-1 must be

offset by looking at the level elasticities in panel A-2. Perhaps not surprisingly, absolute dollar changes are much larger among upper income groups. A 1% increase in GNP, leading to a 1.6% increase in income for the average poor household, means an extra \$109 to spend over the year. The top quintile household, whose income increases only .85%, gets an additional \$433 to spend.

Second, there are some groups whose income is quite unresponsive to GNP changes. In particular, female-headed households and the elderly have very low elasticities and gain little from economic growth. On the other hand, black male households and the young have very high elasticities, gaining in relative income. This meshes with the patterns that other researchers have previously reported.

Third, the driving force behind these elasticity patterns for total income is the elasticity of head's labor income. Percent changes are consistently larger for head's labor income than for total income. The only exception is among black female-headed households. Clearly, the smaller share of total income due to labor earnings among low income households (seen in Table 1) is offset by the very high relative elasticities on head's earnings, leading to a net narrowing effect in the income distribution as the economy grows.

Fourth, wife's labor income seems quite unresponsive to macroeconomic change. Almost all groups show small procyclical, but insignificant, effects. Only the wives of black men and young men have labor market income that appears to increase proportionately with the economy. The wives of elderly men actually show a relatively large countercyclical effect.

Table 3

ELASTICITIES OF INCOME COMPONENTS

Part A-1: Percent Change in Components of Total Income Due to a 1% Change in GNP

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Total Income	1.61** (.27)	1.30** (.33)	.97** (.23)	.82** (.14)	.85** (.25)	.42 (.46)	.49* (.30)	1.07** (.26)	.96** (.18)	.64* (.41)	1.14* (.60)	.94** (.16)
Head's Labor Income	3.05* (1.18)	2.27** (.41)	1.44** (.23)	1.24** (.11)	.85** (.20)	.35 (.57)	.76* (.31)	1.26** (.36)	1.16** (.17)	.68 (.86)	1.18* (.56)	1.14** (.15)
Wife's Labor Income	.23 (2.90)	.48 (2.62)	.32 (.62)	.22 (.60)	.30 (.29)	---	---	.86* (.49)	.22 (.32)	-.90 (.75)	1.66 (1.45)	.31 (.30)*
Transfer Income	-.37 (.49)	.09 (.51)	-.86* (.53)	-1.78* (.66)	.55 (.95)	-.82 (.70)	.56 (.56)	-1.59* (1.17)	-.87* (.48)	.78* (.54)	-2.92** (.81)	-1.56** (.40)
Other Income	3.57 (3.67)	3.55* (2.34)	1.70* (1.04)	.67 (1.17)	1.45 (1.14)	2.31* (1.65)	.21 (.90)	1.85 (1.51)	1.79* (.95)	.93 (1.17)	6.68* (3.36)	1.48* (.93)

Part A-2: Level Change in Components of Total Income Due to a 1% Change in GNP

Total Income	\$109** (25)	\$96** (28)	\$160** (35)	\$223** (39)	\$433** (132)	\$43 (46)	\$68 (43)	\$244** (59)	\$285** (54)	\$96 (62)	\$160 (82)	\$266** (46)
Head's Labor Income	82** (21)	71** (16)	146** (20)	230** (22)	280** (67)	13 (25)	54 (21)	189** (53)	231** (33)	9 (24)	125 (52)	225** (30)
Wife's Labor Income	1 (6)	-.1 (5)	4 (9)	8 (19)	22 (21)	---	---	30 (17)	9 (13)	-7 (7)	21 (30)	12 (10)
Transfer Income	-8 (13)	3 (14)	-20* (12)	-29* (12)	8 (10)	-29 (25)	17 (16)	-21 (18)	-15* (7)	52* (35)	-30** (9)	-19** (5)
Other Income	28* (11)	22* (10)	30* (20)	17 (40)	129 (109)	50* (32)	1 (38)	43 (36)	62* (40)	39 (53)	47* (21)	52* (37)

Standard errors in parentheses. Constants included in all regressions but not reported.

*Significant at .1% level.

**Significant at .01% level.

Table 3 -- Continued

Part B-1: Percent Change in Components of Head's Labor Income Due to 1% Change in GNP

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Average Hourly Earnings	2.57* (1.18)	1.55* (.70)	.85* (.40)	.64* (.31)	.65* (.30)	.35 (.58)	.62* (.46)	.62 (.58)	.81** (.25)	-.78 (1.40)	.73* (.45)	.86** (.22)
Annual Hours	1.25* (.91)	1.08** (.33)	.75** (.18)	.52** (.13)	.24** (.07)	.67* (.48)	.68** (.22)	.63* (.28)	.53** (.07)	.21 (.68)	.86** (.23)	.55** (.09)

Part B-2: Level Change in Components of Head's Labor Income Due to a 1% Change in GNP

Average Hourly Earnings	\$.06* (.02)	\$.04* (.02)	\$.05* (.02)	\$.06* (.03)	\$.10* (.04)	\$.01 (.02)	\$.03* (.02)	\$.05 (.04)	\$.08** (.02)	\$.02 (.04)	\$.04* (.03)	\$.08* (.02)
Annual Hours	9* (4)	9** (2)	12** (3)	11** (3)	5** (1)	6* (4)	7** (2)	11* (5)	10** (1)	1 (3)	14** (4)	11** (2)

Part C-1: Percent Change in Components of Wife's Labor Income Due to a 1% Change in GNP

Average Hourly Earnings	4.09* (2.22)	3.70* (2.03)	2.69* (1.04)	-.86 (.73)	.26 (.56)	--- (1.08)	--- (.35)	1.12 (1.08)	.34 (.35)	.94 (1.17)	1.67* (.90)	.32 (.40)
Annual Hours	-1.02 (1.84)	.33 (1.45)	-.12 (.58)	.24 (.59)	-.16 (.34)	--- (.50)	--- (.31)	.26 (.50)	-.03 (.31)	-.58 (.63)	1.08 (1.07)	.001 (.32)

Part C-2: Level Change in Components of Wife's Labor Income Due to a 1% Change in GNP

Average Hourly Earnings	\$.01* (.01)	\$.01* (.01)	\$.03* (.01)	\$.02 (.02)	\$.01 (.03)	--- (.03)	--- (.01)	\$.03 (.03)	\$.01 (.01)	\$.01 (.01)	\$.02* (.01)	\$.01 (.01)
Annual Hours	-1 (2)	.2 (1)	-.3 (2)	1 (3)	-1 (3)	--- (2)	--- (2)	2 (3)	-.1 (2)	-1 (1)	3 (4)	.03 (2)

Standard errors in parentheses. Constants included in all regressions but not reported.

*Significant at .1% level.

**Significant at .01% level.

Table 3 - Continued

Part D-1: Percent Change in Components of Transfer Income Due to 1% Change in GNP

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
AFDC	-1.95* (1.02)	-2.12* (1.11)	-4.51* (2.48)	-2.04 (3.77)	-7.58 (7.11)	-2.05* (1.46)	-2.84* (.96)	-1.17 (4.42)	-5.01 (4.88)	-19.50 (19.53)	-9.30* (5.72)	-2.07* (1.10)
Child Support or Alimony	.66 (2.20)	1.81 (1.83)	-.52 (1.46)	-1.10 (2.78)	4.00 (4.09)	-5.36 (5.88)	1.72* (.85)	-15.19 (18.38)	2.26 (10.24)	113.47* (80.94)	-19.91** (6.91)	.77 (1.08)
Social Security	1.92* (.95)	1.12 (1.17)	-.13 (1.60)	-.38 (2.73)	4.42 (3.62)	1.94 (1.62)	1.13 (1.39)	1.90* (1.43)	.35 (1.93)	.97 (1.29)	-13.12 (23.62)	.42 (2.43)
Other Retirement Income	-.13 (2.13)	.25 (.77)	1.18 (1.32)	1.25 (1.19)	3.75* (1.72)	-.17 (3.98)	2.00* (1.07)	.70 (2.50)	1.50* (1.14)	1.30* (.72)	42.72* (27.53)	2.18* (1.47)*
Unemployment or Worker's Compensation	-11.09** (4.05)	-12.29** (2.08)	-7.03** (1.35)	-20.32** (3.03)	-19.66** (6.72)	-4.47 (8.56)	-7.60** (2.93)	-16.44** (6.05)	-15.72** (2.90)	-8.94 (38.46)	-24.71** (4.69)	-11.96** (1.87)
Other Transfer Income	-1.72 (1.70)	-.64 (1.74)	-5.57* (3.36)	-8.42* (4.69)	-3.34 (5.22)	-1.70 (2.14)	-1.44 (3.17)	-4.14* (2.65)	-5.76* (3.43)	-4.54 (5.65)	1.30 (2.47)	-4.58* (2.07)

Part D-2: Level Change in Components of Transfer Income Due to 1% Change in GNP

AFDC	\$-13* (6)	\$-7* (3)	\$-5* (2)	\$-.1 (1)	\$-1 (1)	\$-28* (17)	\$-6** (2)	\$-3 (8)	\$-1 (1)	\$-1 (1)	\$-10* (5)	\$-3* (1)
Child Support or Alimony	.3 (2)	1 (1)	-.1 (2)	-.1 (2)	1 (2)	-2 (7)	7* (3)	-2 (.5)	1 (1)	1* (1)	-3* (1)	1 (1)
Social Security	23* (11)	22 (17)	-7 (17)	-4 (13)	10* (7)	16 (12)	17 (17)	13* (9)	9 (14)	46 (47)	-4 (7)	4 (7)
Other Retirement Income	-1 (4)	1 (3)	10 (10)	9 (8)	19* (8)	-3 (8)	12* (7)	3 (9)	11* (7)	28* (15)	4 (6)	8* (5)
Unemployment or Worker's Compensation	-8** (3)	-13** (3)	-14** (3)	-23** (4)	-9** (3)	-1 (4)	-7** (2)	-21* (8)	-17** (2)	-9* (3)	-28** (6)	-14** (2)
Other Transfer Income	-10 (10)	-2 (9)	-19 (15)	-19 (14)	-13 (12)	-12 (18)	-7 (12)	-12* (8)	-16 (13)	-16 (34)	10 (11)	-14 (7)

Standard errors in parentheses. Constants included in all regressions but not reported.

*Significant at .1% level.

**Significant at .01% level.

Finally, transfer income shows mixed effects. Among the poorest groups transfers appear relatively unresponsive to GNP growth. Among more middle income groups, including male-headed households and young and middle-aged households, transfer income is strongly countercyclical, as one might expect.

Part B looks at the cyclicalities of the components of head's labor income. Notice that the large percent changes in head's labor income among low income groups is due to higher elasticities of both hourly earnings and hours of work. Among the poor a 1% increase in GNP increases wages 2.57%, or 6 cents an hour, and increases annual hours of work by 1.25% or 9 hours. Both of these effects decrease as income rises. Female-headed households -- black and white -- have the lowest elasticity of earnings.

These results are somewhat in contrast to many of the theories of fixed wage/variable employment contracts which are often used to describe the labor market, and with macroeconomic studies indicating that aggregate real wages are largely unaffected by cyclical change.²⁰ At least within this data set, both wages and hours move over the cycle, although the changes in hours are estimated with greater precision. However, this finding is not singular. Estimation by Bils (1984) with the young men's sample from the NLS finds significant aggregate wage cyclicalities. Raisin (1979, 1983) has also found wage cyclicalities among some groups of men in the PSID. Unlike most previous studies, this paper uses a measure of wages which includes all labor market income (including overtime and second jobs). It also imbeds changes in and out of the labor market.²¹ Both of these will increase the cyclicalities in my

wage measure. In general, the relation between wages and the business cycle is still an area open to new research.

Part C shows the components of wife's labor income and the patterns here are very different from head's earnings. Some wives appear to gain income over the cycle through large procyclical wage effects. Average hourly earnings of wives show strong percent increases among wives of low income and young heads, though these effects drop off rapidly at higher income levels. However, this translates into relatively small changes in wages,²² so that the level change in wages is approximately the same for women across all income categories. This further underscores the fact that women seem to be in jobs which are unresponsive to cyclical effects, protecting them against downturns, but also preventing them from gaining during upturns.

Cyclical effects on wives' annual hours are generally small. Past research has attempted to determine whether discouraged or added worker effects dominate labor supply behavior among married women.²³ In Table 3, these two effects appear to cancel each other out, with two exceptions. Wives in poor households appear to be added workers (a 1% increase in GNP leads to a 1.02% increase in hours worked.) Wives of young heads seem to have an opposite response, increasing participation as the economy expands. However, none of these effects are well-determined.

Finally, Part D shows cyclical elasticities for the components of transfer income. Receipt of transfers is mildly countercyclical for low income groups and strongly countercyclical for richer groups. AFDC is negatively correlated with the cycle, while child support and alimony,

along with other retirement income and social security, are procyclical. (As noted above, this is partly due to legislative changes, which coincided with business cycle effects.) Unemployment compensation is strongly negatively correlated with GNP growth, particularly among young and white male households. For the elderly, who rely heavily on social security income, there is little correlation between this income source and the business cycle, although other retirement income is strongly procyclical for them. Black female-headed households seem to experience more counter-cyclicity in transfers than white female-headed households, although both rely heavily on a very similar mix of transfers. The young, black male-headed households, and the upper quartiles appear to face the greatest cyclicity in their transfer components. In absolute levels, changes in unemployment and worker's compensation and in social security are clearly the most significant transfer changes occurring over the cycle for most groups.

The regression results reported in Table 3 come from a simple specification, containing just a constant and the percent change in GNP. A few more complex specifications have been tried. A test of the symmetry of cyclical effects was run, separating the elasticity effects in the years in which GNP increased from the years in which it decreased. For no variable or population group did this produce a significantly different result from those reported here.

More informative was the addition of a nonlinear term, the square of the percent change in GNP. This was insignificant for all except female workers. For female household heads and for the wives of elderly and poor households, the nonlinear term had a significant negative

effect on labor market income, primarily via significant negative effects on hours of work. This appears to indicate that these women, while gaining from the initial stages of a cyclical upturn, do not continue those gains at higher growth levels. Their ability to profit from continued economic growth falls off rapidly. These results are consistent with the claim that female heads and wives often have non-market demands on their time (such as children) that prevent them from making large hours increases when employment opportunities expand.

The estimates in Table 3 combine the effects of cyclical changes in labor market participation (or transfer income reciprocity) with the cyclical changes in levels of income among participants. To understand how these two effects break down, elasticities on labor market participation and transfer income reciprocity rates alone are presented in Table 4. Reported are the elasticities for the percent of the population in each designated category to a 1% change in GNP. For instance, Table 4 indicates that among the poor, a 1% increase in GNP increases the percent of households with working heads by .5, the percent of households with working wives by .42, and decreases the percent of households with transfers by .3.

The primary conclusion from Table 4 is that changes over the cycle in the percent of households with working heads or wives are generally small and not highly significant. Approximately 1/2 of 1 percent of the poor and black female-headed households gain a working head when the economy grows 1%. The effects for other group are much smaller. (Although, surprisingly, they are significant among top quartile, white male, and middle-aged households.) Among wives, added or discouraged

Table 4

ELASTICITIES OF LABOR FORCE PARTICIPATION RATES AND TRANSFER INCOME RECIPIENCY DUE TO 1% CHANGE IN GNP^{a/}

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Percent of Households with Head Working	.48 (.47)	.34* (.21)	.16 (.17)	.002 (.09)	.12* (.06)	.52* (.29)	.14 (.21)	.07 (.15)	.13* (.06)	-.31 (.74)	.17 (.15)	.17** (.04)
Percent of Married Households with Wife Working	.42 (1.42)	.66 (1.03)	.45 (.46)	-.22 (.56)	-.42* (.29)	----	----	.29 (.45)	-.16 (.36)	-.36 (.62)	.33 (.40)	-.13 (.38)
Percent of Households with Transfer Income	-.30 (.26)	-.19 (.21)	-1.21** (.33)	-3.20** (.82)	-1.86* (1.14)	-.38 (.33)	-.36 (.33)	-2.65* (1.28)	-1.51** (.44)	.18* (.13)	-1.11 (.96)	-1.97** (.55)

Standard errors in parentheses. Constant included in all regressions but not reported.

*Significant at .1% level.

**Significant at .01% level.

^{a/}Reported coefficients represent the change in percent of households due to a 1% change in GNP.

worker effects appear for different groups, but they are small and largely insignificant. There is a tendency for wives of low income groups to be added workers while wives of high income groups are discouraged workers, a finding consistent with the research cited above.

The percent of households receiving transfer income shrinks with GNP growth. These effects are especially large among higher income groups. Reciprocity of transfer income among poorer households is only very mildly countercyclical.

Table 4 indicates that the elasticity effects presented in Table 3 are largely the result of changes in the levels of hours and wages among workers, or the level of transfers among recipients. While cyclicity in labor force participation and transfer reciprocity occurs, it is relatively small for most groups.

V. VARIANCE ELASTICITIES

The results in Table 3 indicate that there are significant differences in the response of income among these 12 populations to macroeconomic change. This section investigates whether there are further divergences among income components within each population group over the cycle, by looking at the change in the coefficient of variation of these income components as GNP changes. As noted above, there are reasons to believe that variance in some groups will increase with growth (a bifurcation among groups), and other arguments that indicate variances will decrease (the bottom catches up.) I use the coefficient of variation to measure this effect since it is invariant to changes in the mean.²⁴

The coefficient of variation can be calculated in a straightforward manner for each income component among all individuals in each population group in each two-year sample. The coefficient of variation of income component X for population j in year t is

$$(16) \quad CVar(X)_t = [\sum_{i=1}^{n_x} (X_{i,t} - \bar{X}_t)^2 / n_x]^{1/2} / [\sum_{i=1}^{n_x} X_{i,t} / n_x],$$

where n_x households in group j in this year receive income component X.

The percent change in the coefficient of variation is calculated within each two year sample using its value for each year,

$$(17) \quad CVarCh(X)_t = [CVar(X_{t+1}) - CVar(X_t)] / CVar(X_t).$$

The percent change in the coefficient of variation of X as GNP changes is determined in the regression equation

$$(18) \quad CVarCh(X)_t = \gamma_1 + \gamma_2 PctGNP_t + v_t,$$

where PctGNP is defined as before and v is a random error term. Table 5 presents my estimates of γ_2 , showing the percent change in the coefficient of variation resulting from a 1% change in GNP for each income component.

The dominant conclusion from Part A of Table 5 is that short term cyclical growth not only narrows the income distribution between these population groups, but also narrows the income dispersion within these groups. Among almost all groups a significant decrease in the coefficient of variation of total income occurs as the economy grows. Black females alone show a small and insignificant change. (White females also show a relatively small change, although it is significant.) The poor show a larger, but poorly estimated effect.

The channel by which this narrowing occurs is also clear. The dispersion in labor market income of the head narrows significantly with

Table 5

ELASTICITIES FOR THE COEFFICIENT OF VARIATION OF INCOME COMPONENTS

Part A: Mean Elasticities for the Coefficient of Variation of Total Income Components

	Poor	Bottom Quartile	Second Quartile	Third Quartile	Top Quartile	Black Females	White Females	Black Males	White Males	Elderly (Age>65)	Young (Age<24)	Middle (65>Age>24)
Total Income	-.94 (.90)	-.90** (.21)	-.90** (.21)	-.82** (.15)	-.92** (.26)	-.44 (.45)	-.52* (.31)	-1.03** (.28)	-.93** (.17)	-.71* (.42)	-.97* (.50)	-.92** (.15)
Head's Labor Income	-1.98** (.72)	-1.04** (.25)	-1.20** (.32)	-1.42** (.16)	-.75** (.22)	.14 (.50)	-.60* (.39)	-1.21** (.31)	-1.02** (.17)	-.80 (1.07)	-.86* (.45)	-.98** (.16)
Wife's Labor Income	-.40 (1.63)	-.22 (.82)	.15 (.39)	-.61* (.32)	-.65* (.27)	---	---	-.70* (.44)	-.38* (.26)	.19 (1.09)	-.61 (.69)	-.43* (.21)
Transfer Income	.43 (.61)	-.28 (.53)	-.12 (.40)	-.38 (.65)	-1.68* (.70)	.38 (.69)	-.77* (.46)	-.44 (.86)	-.29 (.46)	-.55 (.42)	1.69* (1.06)	-.05 (.36)

Part B: Mean Elasticities for the Coefficient of Variation of Components of Head's Labor Income

Average Hourly Earnings	1.02 (1.46)	-.66 (1.53)	-.51 (.73)	-.51* (.21)	-.45 (.43)	.18 (.57)	-.43 (.45)	-1.54* (.76)	-.30 (.29)	.11 (2.03)	.01 (.33)	-.56** (.20)
Annual Hours	-.79* (.44)	-.52* (.27)	-.66* (.26)	-.66** (.13)	-.08 (.16)	.07 (.38)	-.45 (.37)	-.71** (.17)	-.40** (.10)	-.57 (.62)	-.83** (.27)	-.33** (.07)

Part C: Mean Elasticities for the Coefficient of Variation of Components of Wife's Labor Income

Average Hourly Earnings	.35 (1.10)	.03 (2.04)	-3.04* (1.12)	.40 (.54)	-.79 (.59)	---	---	-1.76* (.88)	-.32 (.48)	-.87 (1.47)	-.61 (.75)	-.66* (.39)
Annual Hours	.10 (1.53)	.01 (.81)	.39 (.46)	-.69** (.18)	-.17 (.21)	---	---	-.44 (.60)	-.17 (.14)	.23 (1.17)	-.76 (.65)	-.20* (.12)

Standard errors in parentheses. Constant included in all regressions but not reported.

*Significant at .1% level.

**Significant at .01% level.

the cycle for all groups except the elderly and black female heads. Wife's labor market income shows few effects -- only among wives in upper income groups and among wives of white males and middle-aged is there significant narrowing. (These results are consistent with the results above which indicated that female heads and wives in low-income households benefit less from the cycle. The worst off among these groups seem unable to take advantage of economic growth to "catch up" and narrow the income distribution within the group.)

If we look at Parts B and C in Table 5 it is further clear that the narrowing in the coefficient of variation that occurs in labor market income seems to be occurring almost exclusively through changes in annual hours. The distribution of hours narrows significantly among those groups who show changes in labor income dispersion, but the distribution of wages does not. While the relative narrowing between groups occurred because of greater cyclicity in both wages and hours among low-income groups, the narrowing dispersion of income within groups appears predominantly due to household heads working more hours.

Elasticities of the coefficient of variation among components of transfer income are not reported here, largely because virtually no significant effects appear and few patterns are visible.

Thus among most groups I find evidence of a narrowing distribution in their labor market income as the economy grows, occurring due to narrowing in the distribution on annual hours. The groups for whom this effect is weakest are female heads and elderly households. Distributional patterns both between and within population groups change with macroeconomic cycles.

V. CONCLUSIONS

This study has decomposed total income among population groups into its various components and then studied the manner in which these components change with economic growth. Among the major conclusions are the following:

(1) There are large differences in the components of income received by different income, race, sex and age groups. Aggregate income statistics hide very significant differences in earning and income patterns between different population groups.

(2) There is a great deal of dynamic income change that occurs within certain population groups, exclusive of cyclical effects. Income groups show regression toward the mean, although this is stronger for low income groups than for high income groups. Elderly households expect to lose income while young households expect to gain. The bulk of secular income change across years occurs due to changes in the labor market income of household heads.

(3) This study confirms that the income distribution narrows in times of economic growth. This occurs despite the fact that low income groups have a very low share of labor-market income compared to high-income quartiles. The narrowing occurs because the cyclicity of household head's labor market income among low income groups is very strong and overcomes the differential in shares.

(4) The procyclicality in head's labor market incomes is consistently stronger than procyclicality in total income for almost all groups. Underlying this, I find that both wages and hours show procyclical effects for household heads, a result that is probably due to the inclusive definition of labor income which is used to define average hourly earnings.

(5) Wive's labor market income is found to be far less responsive to macroeconomic change than their husband's. While wive's wages are procyclical, their hours show little change with the cycle, except among a few groups.

(6) Female household heads show less cyclicalities than any other group across a range of their income components. Black women in particular show only small responses to economic growth. In fact, a major conclusion of this study is that women's labor market earnings in general move far less with the general economy than do men's. Their initial elasticity response is lower and it falls off rapidly as economic growth continues.

(7) Transfer income is counter-cyclical for most middle income groups. Lower income groups show little change in their transfers over the cycle. However cyclicalities vary greatly by the type of transfer. Unemployment and worker's compensation and AFDC are very counter-cyclical. Social security appears procyclical, perhaps because of the timing of program expansions. For low income groups, cyclicalities in government transfers is more important, while for high income groups, cyclicalities in other transfers (child support or other retirement income) is more important.

(8) Income dispersion (as measured by the coefficient of variation) narrows within almost all groups, primarily because the dispersion of annual hours among household heads narrows. This implies that the worst off among these groups catch up relative to the rest of the population by taking advantage of greater employment opportunities. Female and elderly heads and wives show less evidence of this within-group income narrowing than do other population groups.

While this research uncovers a number of interesting patterns, it also raises a host of additional questions. Further exploration is needed of the causality behind many of the effects seen here. In particular, it would be interesting to focus more on the consistent non-responsiveness of women's labor market income (both female head's and wife's) to the cycle. Also a closer investigation needs to be done of the comparative wage and hours cyclicalities found here. In addition, further analysis of some of the cyclical effects among the components of transfer income would be of interest, including research on why similar transfers appear to respond differently over the cycle for different population groups.

Finally, this study says nothing about the effects of changes in long-term secular growth rates within the macroeconomy. Over the time period of this study, no secular growth is apparent. However, the response of different groups in the population to short-term economic growth may be expected to have some correlation with their response to long-term growth. If so, it is clear that a higher long-term growth rate for the U.S. economy would narrow the income distribution and help a significant number of currently low-income households. (An effect often referred to as "trickling down.") However, it is also true that these benefits would not be equally spread among the low income population. Especially among female household heads -- a group that has received a great deal of attention due to their high poverty rates -- economic growth alone is far from a panacea or solution.

FOOTNOTES

1. For a review of this literature, see Blank and Blinder (1984).
2. Among others see Beach (1977), Thornton, et. al. (1978) or Hirsch (1980).
3. Most recently, see Gramlich and Laren (1984) or Blank and Blinder (1984).
4. For instance, see Mincer (1962), Raisain (1979, 1983), or Lundberg (1985).
5. Of course, I could further decompose Hours into Hours per Week and Weeks per Year. This is not done because the data available on these two variables in my data set (the PSID) is more suspect than the data on AHE and Hours. For many individuals, it is missing.
6. The largest welfare program in the "other" category is Supplementary Security Income (SSI). SSI is created at the Federal level in the middle of my data. Prior to its emergence many households received transfers from a variety of state-run programs, which cannot be separately identified. It was easiest to leave all of this in the "other transfers" category. Compared to Social Security and AFDC, SSI is a less significant program.
7. Of course, one could separate these other labor market earnings from this category. But there is a limit to the number of variables easily examined in one paper. I choose to aggregate these components, finding that the difference between head and spouse earnings and transfers is of the most interest.
8. For a full explanation of the difference, see The User Guide to the PSID (1984).
9. For instance, this definition is used by Bane and Ellwood (1983) in their study of the dynamics of poverty status using the PSID.
10. Placement of households within each income quartile is done solely on the basis of their relative income level and does not consider need.
11. Realize that this data set is somewhat different from many others. Typically, one either has extensive cross-sectional data for one year only (such as a CPS survey) or one has aggregate mean data from different random samples taken each year (such as annual wages or unemployment rates.) In contrast, my data set allows one to estimate changes between years among the same households. But successive changes come from different cross sections, weighted to appear as identical random samples of the population.

12. This study makes no attempt to separately identify permanent and transitory income effects. For instance, households could be grouped by income according to their permanent, rather their current, income. This is not done for two reasons. First, I am interested in knowing the effect of cyclical changes on the **apparent** income distribution. Among those whose income grows when the macro economy improves there will be some who are experiencing long-term income growth and others who are simply recovering from a short-term income fluctuation. It is left to future research to separately estimate the extent of these two effects. Second and more practically, there are serious empirical problems in satisfactorially estimating permanent income levels for households that change headship and composition frequently. The groups in which I am most interested -- low income or female-headed -- are precisely those for whom this problem is most acute.
13. One way of interpreting these numbers is that the labor supply functions governing behavior of workers at different income levels are different. Low income household heads supply more hours of work at their mean wage rates than do higher income households.
14. Of course, underreporting of transfer income may affect these numbers.
15. According to U.S. government figures, median family income (in 1981 dollars) in 1969 was \$23,482. In 1981 it was almost unchanged at \$23,282.
16. For instance, many researchers regularly attempt to enter state or even county unemployment rates into micro-data labor force participation estimates. Although one might believe that unemployment rates should affect household labor force decisions, the coefficients on these aggregate unemployment rates rarely appear different from zero.
17. Of course, GNP is not the only possible measure of cyclicality. In particular, some studies have used changes in unemployment rates. I choose to use GNP for two reasons. First, most of the "trickling down" theories explicitly refer to macroeconomic growth as the primary channel by which the income distribution is affected. GNP growth is the most frequently used measure of this. Second, the unemployment rate over these 12 years experienced a significant amount of change due to shifting demographic patterns, producing a steady increase in the average underlying rate of unemployment between 1969 and 1981. This means that unemployment changes imbed both demographic and cyclical effects, making them a less attractive measure of cyclical change.
18. Rather than using the percent change of the means, realize that I could calculate the mean of the percent changes. However, this would create difficulties, as nonrecipients in year t would have zeros in the denominator.
19. Rather than use mean income components for each population group as

my dependent variables, I could regress individual household observations against aggregate GNP changes. Rather than 12 observations, I would then have many thousands. However, this alternative is costly to implement and both estimating techniques should produce identical coefficients since OLS fits a line through the means. The standard errors will vary, and it is impossible to say a priori which set of standard errors will be lower. Under reasonable assumptions one could expect that the standard errors on my estimates will be larger, implying that my significance levels may be understated relative to a fully efficient estimator.

20. For instance, Altonji and Ashenfelter (1980) find that wages appear to follow a random walk. Geary and Kennan (1982) reach similar conclusions.
21. The wage measure used here is the ratio of all labor market income over annual hours of work. Explicit wage rates are not available for the entire sample during the 12 years which I am analyzing.
22. Recall that the level elasticity is the expected level change due to a 1% increase in GNP calculated over the entire population. Since many wives do not work, these expected level changes are quite small. This also means the base of the percent change calculation is small, so small absolute changes in levels can produce large percent changes.
23. The classical work on the cyclicalities of wife's income is Mincer (1962), who finds almost no cyclical effects. On the other hand, quite a few cross-sectional studies have found strong negative relationships between wife's participation and husband's earnings. Most recently, see Ransom (1982) and Lundberg (1985). My results, showing large added worker effects only among poor wives, is consistent with this other research.
24. As Table 2 indicated, there are consistent changes in the mean of some of these income components for certain populations over a two-year period. (For instance, among the young, income grows on average.) In general, the coefficient of variation measures the dispersion of the variable in each year, without being affected by these mean changes.

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