POVERTY, NON-WHITE POVERTY, AND THE SEN INDEX

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This paper investigates the impact of economic growth, and more specifically robust economic growth along with other macroeconomic determinants, on poverty levels using both the U.S. official measure of poverty and an estimated time series of Sen indices of poverty. The results reveal that the period of robust economic expansion that the U.S. economy experienced during the 1990s did not have a significant impact on poverty using either measure. In addition, we find that the impact of growth and other macro controls is dramatically different when a subset of the poverty population, namely non-white poverty, is investigated. The percentage of households headed by women is shown to be a significant factor in examining poverty for this subgroup.

INTRODUCTION

Over the past forty years a considerable amount of resources has been devoted to the investigation of the link between economic growth and poverty. Over this time period poverty has fallen dramatically, while the macroeconomy has seen periods of recession and robust growth. The relationship between robust economic growth and poverty has been one of great concern to policy makers and academics alike.

Early works by Anderson (1964) and Aaron (1967) showed that there was an inverse relationship between poverty and growth. During the 1960s real GDP increased by nearly 46 percent with poverty falling by a half. Coupled with government initiatives to end poverty, researchers were convinced that government polices aimed at increasing economic well being would end poverty. However, beginning in the late 1970s, this relationship became less clear.

The 1970s saw a shift in the paradigm that said that economic growth alone would bring about the end of poverty. Thornton *et al*. (1978, 1980) and Hirsch (1980) began to reexamine the relationship between growth and poverty and questioned whether the "trickle down" theory of anti-poverty policy had run its course.

The 1980s saw a return of robust economic growth. Real per capita GDP rose by nearly 27 percent during the expansion of this period. There was not the same

anti-poverty kick associated with the expansion of the 1980s that accompanied the expansion of the 1960s. In fact, poverty fell by approximately 16 percent during this period.

Blank (1991), Blank and Card (1993), and Cutler and Katz (1991) all speculated that there was something different occurring during the 1980s expansion that did not occur during the earlier expansion of the 1960s that was robbing robust economic growth of its poverty fighting attributes. The authors speculated that real wages of those persons in the lowest quintile of the population had been stagnant during the 1980s and that this caused poverty to be more intractable during the period. Work by Powers (1995) also examined the relationship between the macroeconomy and poverty.

After the long and sustained period of robust growth that occurred during the 1990s researchers were very interested to see how poverty would be affected by this latest expansion. Haveman and Schwabish (2000) posited that the latest expansion of the 1990s more so resembled that of the 1960s and said ". . . our estimates suggest that the weakened economic growth-poverty relationship may have been an aberration of this period [the 1980s] and that the expected relationship of the 1960s has again been reestablished in the 1990s."

LeBlanc (2000) examines the relationship between economic growth in the macroeconomy and poverty and finds that this relationship is tenuous at best and should be bolstered by policies targeting wage and education programs. In addition, the author finds these results to be very sensitive to the distributional features of those in poverty.

Our paper will also examine the changes that occurred in the poverty rate using time series analysis that includes the most recent expansion of the 1990s. Our findings show that the expansion of the 1990s more closely resembles that of the 1980s than that of the 1960s taking into account the fluctuations in real wages that occurred over the period. In addition, we show how this relationship could have been overlooked by previous researchers by using a distribution sensitive measure of poverty, such as a Sen index. In essence we show that although overall poverty has fallen since the late 1950s the composition of those left in poverty has changed dramatically.

The rest of the paper is organized as follows: the next section contains a brief discussion of the issues surrounding the best poverty measure to use in this type of analysis. We then present the econometric model used and discuss the results. The final section has concluding remarks and discusses the policy implications of the paper.

A DISTRIBUTION SENSITIVE MEASURE OF POVERTY

Before we discuss the specifics of the model used and the results, we present a brief discussion of the Sen index of poverty and its merits over other measures such as the U.S. official measure of poverty.

Official U.S. government poverty statistics were developed by Orshansky (1965a, 1965b) and her colleagues at the Social Security Administration. These data are available from 1959 forward and are updated annually. Poverty is defined in absolute terms to measure the "headcount" of persons with equivalence scale

adjusted incomes below what is generally referred to as the Orshansky poverty line. Sen (1976) noted that this headcount measure of poverty was lacking because it neglected other important features of poverty such as the distribution of income of those in poverty.

Sen (1976) suggested that along with measuring headcounts of persons in poverty a more comprehensive measure of poverty should incorporate the average level of income of those persons in poverty and how far this level is below the poverty threshold. In addition, he stated that this measure should also measure the income inequality of the poor. In essence, this distribution sensitive measure of poverty says that a transfer of income among persons in poverty should effect the poverty index.

If only the number of persons in poverty matters, as with the U.S. official measure of poverty, then a policy maker could simply redistribute income from those persons in poverty with the lowest income to those persons slightly below the poverty line. In this way those persons near the poverty threshold would be lifted out of poverty, meaning that the number of persons in poverty would have fallen. However, this measure would be totally insensitive to the increased level of deprivation of those left below the threshold.

Sen's index of poverty not only incorporates the official headcount of poverty but also is sensitive to the income shortfall of the poor.[1] In other words, it would measure the poverty gap of the poor. In addition, it includes a measure of the income inequality of the poor. To incorporate all relevant features of this distribution sensitive measure of poverty Sen suggested a weighting of components such as:

$$(1) \qquad S = H\left[I + (1-I)G_p\left(\frac{q}{q+1}\right)\right]$$

where H is the headcount poverty ratio, I is the ratio of the average income shortfall-to-the poverty line (hereafter referred to as the income gap of the poor or poverty gap), G_P is the Gini coefficient of income among the poor, and q is the number of people below the poverty threshold.

Generally, the income gap is measured as the sum of all shortfalls of families in poverty. Our estimated measure is a bit less comprehensive. As stated above, this estimate is the average shortfall from the poverty line of families. Both the estimated income gap and the Gini coefficient of the poor are new estimated time series which should add greatly to this investigation.

THE BASIC MODEL

We first investigate the impact of macroeconomic control variables on the change in the official headcount measure of poverty. We then compare these results when we use a Sen index of poverty instead of the official headcount measure. The

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[1]The first discussion of a distribution sensitive measure of poverty was Watts (1968) although researchers primarily focus on the Sen index because of its intuitive appeal. Another index of this nature was introduced by (Foster *et al.*, 1984). See Zheng (1997) for a survey of all distribution sensitive measures of poverty.

controls used are similar to those used in Formby *et al*. (2001) with the exception of a modified measure of transfer payments and a time series that is extended to the year 1999.

Our measure of economic growth is the year-to-year change in the Department of Commerce's new GDP series that is calculated using the chain rule for the implicit price deflator. We also include a measure that accounts for the change in the structure of American families, the percentage change in female family heads, which is estimated from the March CPS tapes.

As has been stated by Blank (1991, 1993), Cutler and Katz (1991), Haveman and Schwabish (2000), and various other authors writing in this area, there should be some control for the business cycle or macroeconomic performance. We include the male unemployment rate over the same period to account for this. This measure has been shown to yield more robust estimates as opposed to that of the overall unemployment level.

The last control variable that is included is a measure of per capita welfare benefits as measured by the Social Security Administration's time series *Social Welfare Expenditures under Public Programs*.[2] This variable is included to control for the emergence and growth of the welfare state in America. The growth of per capita welfare expenditures could increase welfare dependency and diminish the poverty-reducing effects of economic growth across time.

LeBlanc (2000) reported that economic growth alone will not be sufficient to permanently and significantly alleviate poverty. In addition, LeBlanc shows that certain segments of the poor are even less likely to benefit from policies geared toward increasing growth, such as certain racial demographic groups, namely black female headed households.

We begin by examining the effects of the macroeconomic control variables on both the official U.S. poverty measure and the Sen index of aggregate poverty using the basic equation:

$$(2) \qquad \Delta\text{Poverty} = \alpha + \beta_1\%\Delta\text{GDP} + \beta_2\%\Delta\text{Female} + \beta_3\%\Delta\text{Transfers} + \beta_4\text{Unemployment}.$$

To this basic model we will add growth and time interaction dummy variables to allow us to examine the effects of robust economic growth on poverty. The construction of these dummy variables will allow us to compare robust economic growth periods to each other while using periods of flat or declining growth as the reference periods. Our choice of growth periods correspond to those periods recognized by the National Bureau of Economic Research (NBER).

The results are presented in Table 2. For estimates using the official U.S. poverty measure we have four econometric specifications. These are presented in columns 1, 3, 5, and 7 of Table 2. The same set of econometric specifications are analyzed with the Sen index as the dependent variable. These are also presented

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[2]The series includes all government transfers (state, local and federal) to low income families including medical benefits and other non-cash transfers such as food stamps and school lunch subsidies. For a discussion of this statistical series see the Social Security Bulletin, July 1995. To express total social welfare expenditures in per capita terms we divide by the aggregate population.
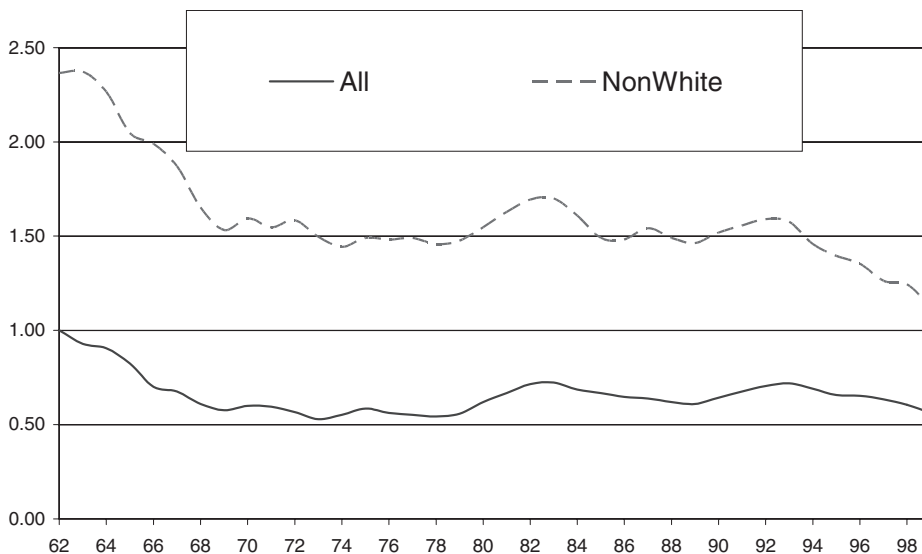
Figure 1. U.S. Poverty Headcounts, 1962–99

Note: Year 1962 normalized to 1. Data from March CPS and author estimates.

in Table 2 in columns 2, 4, 6, and 8. Figure 1 shows the time series for official U.S. poverty while the Sen index is illustrated in Figure 4.

By presenting all specifications in Table 2 comparisons can be made regarding the impact of various macroeconomic controls on poverty when different measures of poverty are used. We will highlight some of the more interesting differences below.

The best models to examine are the ones with the full specifications presented in columns 7 and 8 of Table 2. Only three variables were statistically significant, for both models, at the standard levels. Those variables were economic growth over the entire period, male unemployment over the entire period, and the interaction of growth with a time dummy variable for the period 1962 through 1972.[3] Contrary to conservative writings, such as Rector and Lauder (1995), there does not appear to be any significant impact on either measure of poverty, of increased transfer payments over the period. In addition, the change in the composition of the American family, with an increase of female headed households, is not statistically significant in explaining poverty in either specification.

What has been shown to be significant is economic growth. This finding has been supported by works as early as Anderson (1964) and more recently by Blank (1997), Haveman and Schwabish (2000), and Formby *et al.* (2001). Growth is found to be highly statistically significant in both models 7 and 8. The size of the estimated coefficient is smaller for the Sen (−0.12181) index than for the official U.S. poverty measure (−0.17243), however. Translating these estimates into percentage terms reveals that by using the U.S. Headcount measure of poverty, 33

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[3]Except for male unemployment being statistically significant in model 8 these results are consistent with those of Formby *et al.* (2001).

TABLE 1

Changes in GDP, Unemployment, and Real Wages

	Percentage Change		
	1962–72	1983–89	1992–99
Per capita real GDP	45.8	26.6	29.0
Unemployment	−38.6	−47.7	−43.5
Real wages	21.1	0.5	7.3

percent of the reduction in overall poverty could be attributed to economic growth. Using the Sen index of poverty, 29 percent of overall poverty reduction could be attributed to economic growth.

As was shown in Blank (1991, 1997) the male unemployment rate has been shown to have a positive and statistically significant impact on poverty. We confirm this result and find that it is true regardless of poverty measure. The difference, once again, between the two estimated coefficients in models 7 and 8 is the size. These results are all consistent with the previously cited works.

The impact of %ΔGDP was shown to be negative and statistically significant over the entire period. The question that researchers seek to answer is whether there is an "extra boost" from robust economic growth in reducing poverty above that caused by regular sustained growth. With the negative and significant impact of growth on poverty during the 1960s expansion, researchers speculated that we could "grow" ourselves out of poverty. Enders and Hoover (2001) showed that by using a nonlinear "threshold" technique, it is possible to predict what level of robust growth is necessary to have a significant impact on poverty.

This relationship seemed to falter during the expansion of the 1980s. Although we experienced a period of sustained robust growth, there was no extra boost during this expansion. As was mentioned earlier, Blank (1991) speculated that the difference in the poverty reducing aspects of the two expansions could be explained by what was happening with real wages over the periods. Comparing economic indicators over the two periods, it was clear that real wages for the those persons in the lowest paying industries had stagnated during the expansion of the 1980s.

There has been a great deal of speculation about the recent economic expansion of the 1990s and its impact on poverty. Would the expansion of the 1990s be more like the expansion of the 1960s which saw official U.S. poverty fall by nearly 46 percent or would it be more like the expansion of the 1980s which saw poverty fall by nearly 16 percent but didn't seem to carry the extra boost expected by an expansion? If real wages were the main explanatory factor in linking economic growth to poverty, the 7.3 percent increase in real wages during the 1990s expansion should correspond to a decrease in poverty more so corresponding to the expansion of the 1980s than the 1960s.[4] The latest expansion of the 1990s saw poverty fall by slightly more than 20 percent which would seem to indicate that

[4]Real wages are extracted from the National Income and Product Accounts and reflect the wages in the 10 lowest paying industries (i.e. fishing, apparel, retail trade etc.). These persons account for approximately 25 percent of the U.S. workforce.

TABLE 2

OVERALL POVERTY; THE EFFECTS OF ECONOMIC GROWTH AND OTHER DETERMINANTS OF AGGREGATE POVERTY IN THE UNITED STATES, 1962–99

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Δ Official Headcount (1)	Δ Sen Index (2)	Δ Official Headcount (3)	Δ Sen Index (4)	Δ Official Headcount (5)	Δ Sen Index (6)	Δ Official Headcount (7)	Δ Sen Index (8)
Intercept	-0.66505*** (0.0782)	-0.31631 (0.2671)	-0.40531 (0.2759)	-0.04970 (0.8510)	-0.51281 (0.1939)	-0.13509 (0.6285)	-0.40789 (0.3177)	-0.06808 (0.8149)
% ΔGDP	-0.23615* (0.0000)	-0.17675* (0.0000)	-0.20626* (0.0000)	-0.14607* (0.0000)	-0.18918* (0.0001)	-0.13250* (0.0001)	-0.17243* (0.0005)	-0.12181* (0.0005)
% Δfemale heads	0.05973 (0.1367)	0.06146** (0.0484)	0.045485 (0.2353)	0.04684*** (0.0924)	0.038044 (0.3325)	0.04093 (0.1491)	0.02960 (0.4611)	0.03554 (0.2216)
% Δtransfers	-0.00291 (0.4451)	-0.00345 (0.2410)	-0.00036 (0.9237)	-0.00082 (0.7604)	-0.00079 (0.8353)	-0.00117 (0.6690)	-0.00120 (0.7547)	-0.00143 (0.6052)
Male unemployment	0.19017* (0.0007)	0.11295* (0.0066)	0.14916* (0.0068)	0.07085*** (0.0645)	0.16716* (0.0052)	0.08515** (0.0401)	0.15814* (0.0087)	0.07939*** (0.0592)
% ΔGDP: 1962–72			-0.08357** (0.0347)	-0.08578* (0.0035)	-0.09409** (0.0245)	-0.09414* (0.0024)	-0.12026** (0.0181)	-0.11085* (0.0032)
% ΔGDP: 1983–89					-0.04210 (0.3803)	-0.03344 (0.3310)	-0.06595 (0.2260)	-0.04867 (0.2137)
% ΔGDP: 1992–99							-0.05494 (0.3398)	-0.03509 (0.3952)
Adjusted R²	0.71	0.68	0.74	0.75	0.74	0.75	0.74	0.75
D-W	1.966	1.68	1.99	1.85	2.00	1.84	2.07	1.90

Notes:
p-values (in parentheses).
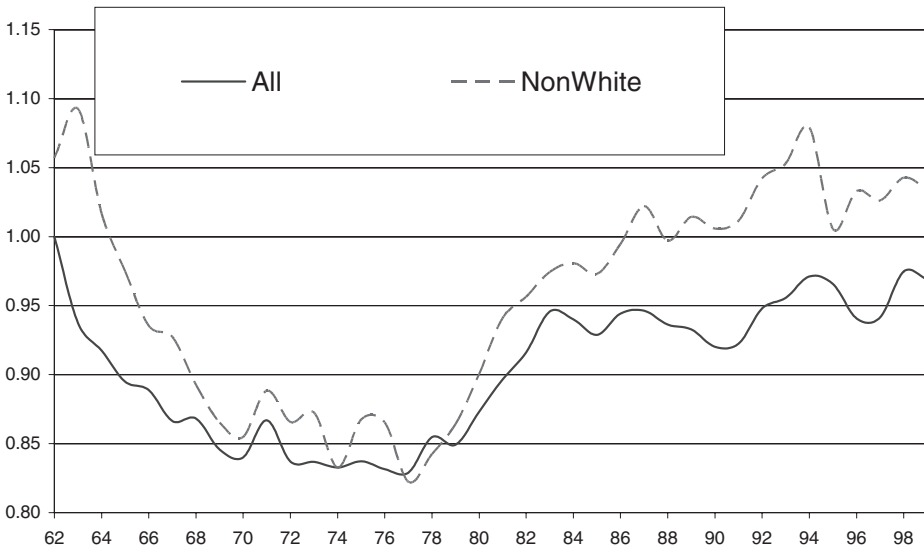*, **, ***denote significance at 1, 5, and 10 percent levels.

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Figure 2. U.S. Poverty Income Gap, 1962–99

Note: Year 1962 normalized to 1. Data from March CPS and author estimates.

this expansion also failed to have the extra boost associated with robust economic growth.

This casual observation is confirmed econometrically in Table 2. For both models 7 and 8 we note that estimated coefficients for the interaction of economic growth and time for the expansion of the 1990s were insignificant. This result is consistent with that of Haveman and Schwabish (2000) who also report that the expansion of the 1990s had an insignificant estimated coefficient. Defina (2002) also examined the latest expansion of the 1990s cautioning against overreliance on lower unemployment rates in reducing poverty.

In essence, we believe the latest expansion of the 1990s to be more like that of the 1980s despite the up-turn in real wages for low wage workers. The measures that comprise the Sen index, namely the Income Gap and the Gini Coefficient help to shed light on what has changed in regards to the compositional make-up of those in poverty. As illustrated in Figure 2, since 1977 there has been a steady increase in the income gap of the poor that continued through the sample period.[5] Although some people have been helped by economic growth, even the extra boost of robust growth has not been enough to help those left over which could be characterized as the "hardcore" poor. Freeman (2001) states that while poverty did fall during the 1990s there is a poverty subculture of between 6 and 8 percent that can not be helped by traditional poverty fighting policies.

Robust economic growth in the 1960s was effective in skimming the top and lifting up those close to the poverty line. As Figure 1 illustrates, throughout the period of the 1960s and well into the 1970s the income gap of the poor was declining. Showing that those close to the poverty threshold were being lifted up and

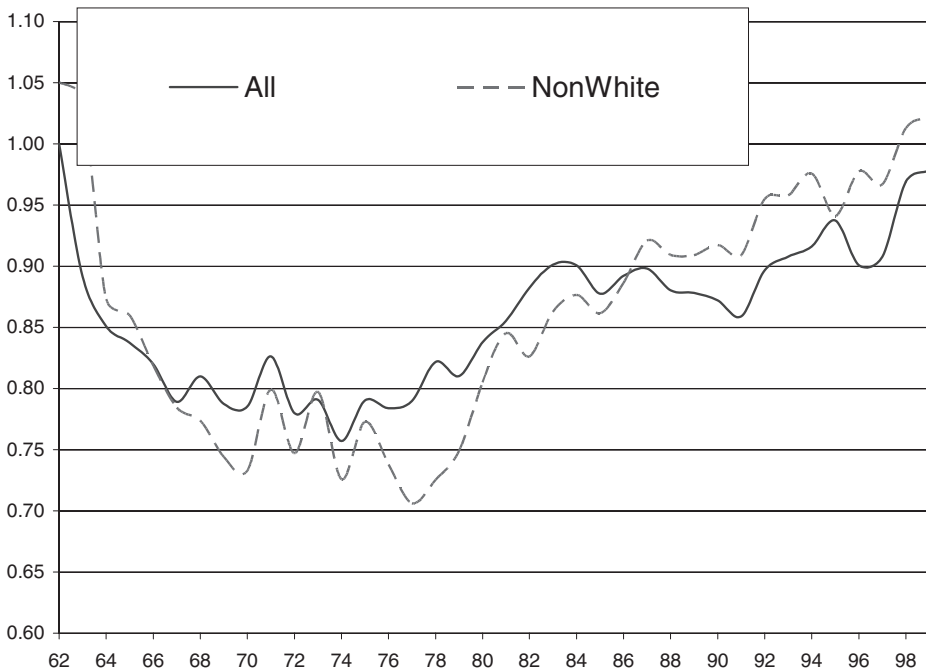[5]Income Gaps are indexed so that the year 1962 is normalized to 1.

Figure 3. Gini Among Poor, 1962–99

Note: Year 1962 normalized to 1. Data from March CPS and author estimates.

those beneath were being drawn ever closer to the threshold. In the late 1970s that all changed when the income gap started increasing.

This is reinforced by examining Figure 3. During the period of the 1960s the Gini coefficient for the poor was falling meaning that the distribution of income of those in poverty was becoming increasingly more uneven. This index began to rise even earlier than the income gap. Around 1974 the Gini coefficient of those in poverty began to rise and continued to rise throughout the 1980s and 1990s. By 1999, which is the last year that we were able to obtain reliable data, the Gini coefficient for the poor had almost reached 1962 levels. It would appear that even robust growth could not counter these trends.

NON-WHITE POVERTY

Until now our investigation has focused on overall poverty. We now will focus our attentions on a subset of the poverty population, namely that of non-white poverty.[6] In order to have a time series that would be consistent throughout the entire sample period we use non-white persons since earlier classifications of race were not as delineated among those persons of different races. Researchers, such as Smith and Welch (1989) and LeBlanc (2000) have examined how changes in poverty levels have been associated with changes in national demographics, namely for blacks.

[6]Non-white refers to Hispanic (not white), Black, Asian/Pacific islander, and other.
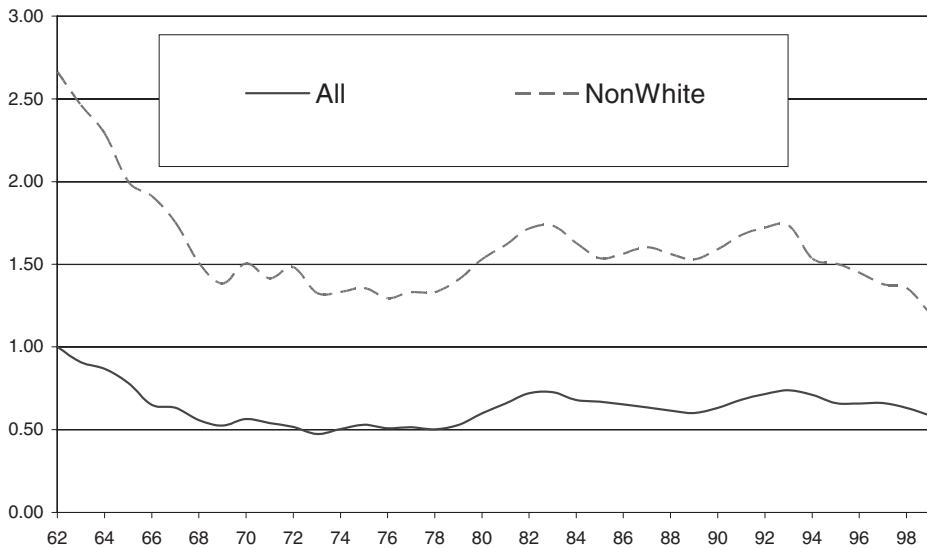
Figure 4. U.S. Poverty Sen, 1962–99

Note: Year 1962 normalized to 1. Data from March CPS and author estimates.

We will have two primary questions: (1) Do macroeconomic control variables effect this subset of the poverty population as they do the entire population? (2) Are these results sensitive to the distributional aspects of the subset when measured using a Sen index of poverty?

Relative to their starting point, this group has seen a tremendous fall in their poverty rate over the sample period (see Figure 1). In 1962, this group had a poverty rate that was more than two and one half times greater than the overall poverty rate. By 1999 that ratio had closed to slightly more than twice as great.

Table 3 uses the same specifications outlined for Table 2. The dependent variables now are the Official U.S. poverty measure for non-whites and a distribution sensitive Sen measure for the same group.

In some areas this groups' poverty response is similar to that of the entire population and in other regards there are some striking differences. In addition to those findings we will also discuss the differences that exist when the U.S. poverty measure is compared to the Sen index, for this group.

In Table 2, model 7 the three statistically significant factors on poverty were economic growth, the male unemployment rate, and the robust growth of the 1960s. These same factors are again significant for the non-white subset but there was an additional variable that was statistically significant, namely, the percentage of households headed by females. As stated by LeBlanc (2000), when demographic groups are extracted from the entire poverty population, it is clear that some segments are over-represented among the poor and the impacts of polices designed to reduce poverty can have dramatic implications for them.

While the estimated coefficient on %ΔGDP was −0.17243 for the entire population, the same effect for the non-white subset was a smaller statistically significant −0.15764. As mentioned previously, the scale of the coefficients is an

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TABLE 3
Non-White Poverty: The Effects of Economic Growth and Other Determinants of Aggregate Poverty in the United States, 1962–99

	Model 1 Δ Official Headcount (1)	Model 2 Δ Sen Index (2)	Model 3 Δ Official Headcount (3)	Model 4 Δ Sen Index (4)	Model 5 Δ Official Headcount (5)	Model 6 Δ Sen Index (6)	Model 7 Δ Official Headcount (7)	Model 8 Δ Sen Index (8)
Intercept	-2.32913**	-1.27677	-1.88154***	-0.87992	-2.30507**	-1.01817	-1.96502	-0.66521
	(0.0414)	(0.1390)	(0.0935)	(0.2913)	(0.0604)	(0.2671)	(0.1397)	(0.5207)
% ΔGDP	-0.33851*	-0.32801*	-0.23951**	-0.24023*	-0.18515**	-0.22249**	-0.15764***	-0.19393***
	(0.0028)	(0.0003)	(0.0453)	(0.0092)	(0.0621)	(0.0311)	(0.0578)	(0.0706)
% Δfemale heads NW	0.25807***	0.09727	0.28592**	0.12195	0.27794**	0.11935	0.25681***	0.09741
	(0.0732)	(0.3698)	(0.0429)	(0.2413)	(0.0498)	(0.2587)	(0.0783)	(0.3683)
% Δtransfers NW	-0.00680	-0.01131	0.011813	0.00519	0.01432	0.00601	0.01235	0.00397
	(0.7658)	(0.5195)	(0.6277)	(0.7769)	(0.5603)	(0.7478)	(0.6207)	(0.8332)
Male unemployment NW	0.23378*	0.16669**	0.18571**	0.12407***	0.22220**	0.13598***	0.20088***	0.11385
	(0.0099)	(0.0158)	(0.0397)	(0.0662)	(0.0264)	(0.0705)	(0.0564)	(0.1476)
% ΔGDP: 1962–72			-0.22973***	-0.20369**	-0.26718***	-0.21592**	-0.31848**	-0.26917**
			(0.0763)	(0.0388)	(0.0517)	(0.0398)	(0.0466)	(0.0275)
% ΔGDP: 1983–89					-0.13903	-0.04538	-0.17946	-0.08734
					(0.3612)	(0.6941)	(0.2791)	(0.4839)
% ΔGDP: 1992–99							-0.12467	-0.12940
							(0.5053)	(0.3626)
Adjusted R^2	0.43	0.45	0.47	0.51	0.47	0.50	0.46	0.50
D-W	1.808	1.683	1.960	2.091	2.00	2.115	2.05	2.218

Notes:
p-values (in parentheses).
*, **, ***denote significance at 1, 5, and 10 percent levels.

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inadequate measure. Translating these into percentage changes in poverty yields decreases of approximately 33 and 43 percent for overall and non-white poverty, respectively. In other words, 33 percent of the decrease in overall poverty was attributable to economic growth.

In addition, unemployment seemed to have a larger positive impact on non-white poverty. The estimated coefficient on unemployment for the entire poverty population was 0.15814. For the non-white cohort the estimated coefficient was 0.20088. In percentage terms an increase in the unemployment rate by 1 increased poverty by 0.29 for overall poverty and 0.39 for non-whites. This finding is consistent with that of Hoover and Wallace (2003).

One of the more striking differences in model 7 of Tables 2 and 3 is the impact that the robust growth of the 1960s had in the two samples. The statistically significant estimated coefficient on the 1960s expansion was much larger for overall poverty than the non-white cohort. Once again, translating these coefficients into percentage changes, reveals that the robust growth of the 1960s had a 21 and 35 percent impact on reducing poverty for non-white and overall poverty, respectively. While poverty fell dramatically over the entire sample period and non-white poverty fell even more dramatically, by 1972 non-white poverty was still three times as great as poverty overall although it had fallen by more than 25 percent in absolute terms.

Table 3 also reveals that an important determinant of non-white poverty was the percentage of female headed households. This variable had a positive and statistically significant coefficient in model 7. The percentage of female headed households increased dramatically over the sample period. In 1962 this percentage was a little less than 12 percent. By 1999 it had more than tripled to nearly 30.4 percent. The implications are clear, in that single parent families are more likely to be in poverty than families with both parents present. During this same period, the percentage of female headed households for the entire population never rose above 10 percent. Had non-white female headed households remained at 1962 levels, we estimate that non-white poverty would have been 17 percent in 1999. Therefore, non-white poverty would have been approximately 6 percentage points lower in 1999.

We were able to examine the robustness of these results using the Sen index. These results are presented in model 8 of Table 3. Table 1 revealed that there was little distributional difference in the specifications presented in models 7 and 8 besides for the size of the estimated coefficients. This is not the case for the non-white subset.

Model 8 of Table 2 has only two estimated coefficients that were statistically significant. These were overall economic growth and the robust growth period of the 1960s. The statistically significant impact of female headed households and unemployment are not apparent in this model.

Once again, the economic expansions of the 1980s and 1990s did not have a significant impact on poverty for this subsection. As was the case with overall poverty, the compositional make up of non-white poverty was changing over this period as well. Figure 2 shows that from 1962 through about 1977 the income gap of non-whites in poverty was falling. This meant that the average income level of non-whites in poverty was rising. The income gap of non-whites began to rise

around 1977 and reached levels near its 1963 high in 1994. It is not surprising, then, that robust growth became less effective over this period as those in poverty were becoming more entrenched.

At the same time that the income gap for non-whites was rising there was also a steady increase in the Gini coefficient of those non-whites in poverty. After reaching its absolute lowest level in 1977, this measure came to within two percentage points of its 1962 levels. This meant that at the same time that non-whites in poverty were becoming more entrenched, there was also a distributional shift of income taking place.

<div align="center">CONCLUSIONS</div>

Our investigation set out to see what impact economic growth has had on poverty over the last four decades. Some of our findings confirm what has been reported by previous researchers, namely that economic growth does have a statistically significant impact on poverty. In addition, we find that the period of robust growth that occurred during the 1960s had an extra boost in reducing poverty.

This work does find that the results of our initial model specification are not altered dramatically when a Sen index of poverty is used instead of the U.S. official headcount measure of poverty.

We do find some results that are quite new and interesting, however. The economic expansion of the 1980s did not have the same extra poverty reducing boost as the one in the 1960s. Researchers had speculated that this was due to the stagnation that occurred in real wages of those in low paying jobs. After the expansion of the 1990s saw real wages begin to grow, it was believed that robust economic growth would once again regain its anti-poverty punch. This was shown not to be the case using both measures of poverty.

Our research shows that the expected negative relationship between robust growth and poverty never occurred. We believe that this is due to the fact that the composition of those in poverty has been changing since the mid- to late-1970s. In essence, the poor have been getting poorer which is evidenced by the widening of both the income gap and the Gini coefficient of those in poverty. The reader should note, however, that this work does not explain why the widening of the Income Gap and the Gini coefficient has occurred but use it as one explanation of why robust growth has lost some of its effectiveness. These findings are confirmed by previous research that show robust economic growth was statistically insignificant in the 1990s.

In addition, we analyzed the effects of economic growth and other macroeconomic controls on a subset of the poverty population. We investigated how the non-white poor responded to the same economic determinants. We find that the non-white poor do not respond to the same determinants as the population as a whole. In addition, the degree to which this subgroup differs from the entire population is only heightened when using a distribution sensitive measure of poverty.

The poverty implications are clear in that policies aimed at reducing poverty have to be cognizant of the fact that robust economic growth alone will not be sufficient to alleviate poverty and that some component of the poor are less able

to enjoy the benefits of a robust economy. In addition, policy makers will need to be aware of the fact that not all groups that are in poverty respond the same to economic growth and that the non-white poverty population has been significantly affected by the dramatic increase in the number of households which are headed by females.

APPENDIX

To test the robustness of the results presented in the main body of the paper we subjected the data to further testing. Table A1 begins this analysis. The control variables are the same ones used in the specification presented earlier. The difference in Table A1 is the ordering of the dummy variables. In this specification we create dummy variables for all periods excluding the expansion of the 1960s.

There were two periods of robust growth after the 1960s. We have included a dummy variable for the periods 1983–89 and 1992–99. The other periods, 1973–82 and 1990–91 were periods of flat or declining growth. In addition, we run the regressions using both the official headcount measure of poverty (columns 1 and 3) and our Sen index measure (columns 2 and 4).

As expected, the periods of flat or declining growth were significantly associated with increases in poverty. What is more interesting is what was happening to poverty during the periods of robust growth. Although the sign on the estimated

TABLE A1

THE EFFECTS OF ECONOMIC GROWTH AND OTHER DETERMINANTS OF AGGREGATE POVERTY IN THE UNITED STATES, 1962–99[1]

	Model 1	Model 2	Model 3	Model 4
	Δ Official Headcount (1)	Δ Sen Index (2)	Δ Official Headcount (3)	Δ Sen Index (4)
Intercept	−0.665*	−0.316	−0.510	−0.111
	(−1.82)	(−1.13)	(−1.28)	(−0.38)
% ΔGDP	−0.236***	−0.176***	−0.282***	−0.228***
	(−6.85)	(−6.70)	(−6.67)	(−7.32)
% Δfemale heads	0.059	0.061**	0.045	0.042
	(1.53)	(2.05)	(1.13)	(1.43)
% Δtransfers	−0.002	−0.003	−0.001	−0.001
	(−0.77)	(−1.19)	(−0.36)	(−0.54)
Unemployment	0.190***	0.112***	0.165***	0.082*
	(3.74)	(0.038)	(2.99)	(2.02)
% ΔGDP: 1973–82			0.102**	0.103***
			(2.12)	(2.89)
% ΔGDP: 1983–89			0.050	0.060
			(0.99)	(1.61)
% ΔGDP: 1990–91			0.451*	0.251
			(1.98)	(1.50)
% ΔGDP: 1992–99			0.065	0.075**
			(1.35)	(2.12)
Adjusted R^2	0.714	0.686	0.752	0.748
D-W	1.96	1.68	2.06	1.90

Notes:
[1]t-statistics (in parentheses).
*, **, ***denote significance at 10, 5, and 1 percent levels.

TABLE A2

NON-WHITE; THE EFFECTS OF ECONOMIC GROWTH AND OTHER DETERMINANTS OF AGGREGATE POVERTY IN THE UNITED STATES, 1962–99[1]

	Model 1	Model 2	Model 3	Model 4
	Δ Official Headcount (1)	Δ Sen Index (2)	Δ Official Headcount (3)	Δ Sen Index (4)
Intercept	−2.130**	−1.424	−2.191*	−0.902
	(−1.89)	(−1.63)	(−1.71)	(−1.02)
% ΔGDP	−0.364***	−0.310***		
	(−3.43)	(−3.78)		
% Δfemale heads NW	0.1984	0.096	0.189*	0.212**
	(1.19)	(1.03)	(1.93)	(2.37)
% Δtransfers NW	−0.009	−0.001	0.015	0.002
	(−0.39)	(−0.18)	(0.60)	(0.31)
Unemployment NW	0.230**	0.350***	0.210*	0.273**
	(2.60)	(2.89)	(1.99)	(2.12)
% ΔGDP: 1962–72			−0.443***	−0.422***
			(−3.46)	(−4.58)
% ΔGDP: 1983–89			−0.310**	−0.257**
			(−2.16)	(−2.51)
% ΔGDP: 1992–99			−0.245	−0.308**
			(−1.36)	(−2.53)
Adjusted R^2	0.401	0.453	0.412	0.524
D-W	1.85	1.38	2.15	1.78

Notes:
[1]t-statistics (in parentheses).
*, **, ***denote significance at 10, 5, and 1 percent levels.

TABLE A3

THE EFFECTS OF ECONOMIC GROWTH AND OTHER DETERMINANTS OF AGGREGATE POVERTY IN THE UNITED STATES, 1962–99[1]

	Model 1	Model 2	Model 3	Model 4
	Δ Official Headcount (1)	Δ Sen Index (2)	Δ Official Headcount (3)	Δ Sen Index (4)
Intercept	−0.665*	−0.316	−0.930*	−0.437
	(−1.82)	(−1.13)	(−2.03)	(−1.34)
% ΔGDP	−0.236***	−0.176***		
	(−6.85)	(−6.70)		
% Δfemale heads	0.059	0.061**	0.011	0.006
	(1.53)	(2.05)	(0.25)	(0.19)
% Δtransfers	−0.002	−0.002	−0.006	−0.001
	(−0.77)	(−1.19)	(−0.14)	(−0.32)
Unemployment	0.190***	0.112***	0.205***	0.112**
	(3.74)	(2.90)	(3.08)	(2.37)
% ΔGDP: 1962–72			−0.228***	−0.187***
			(−4.79)	(−5.50)
% ΔGDP: 1983–89			−0.185**	−0.133***
			(−3.50)	(−3.51)
% ΔGDP: 1992–99			−0.142**	−0.097**
			(−2.26)	(−2.15)
Adjusted R^2	0.714	0.686	0.621	0.639
D-W	1.96	1.68	1.72	1.67

Notes:
[1]t-statistics (in parentheses).
*, **, ***denote significance at 10, 5, and 1 percent levels.

coefficients were positive in both robust growth periods, seeming to imply that poverty increased during periods of increasing GDP, neither estimated coefficient was statistically significant at conventional levels. These results mirror those presented in the main body of the paper. The estimated coefficient for the period of the 1990s was insignificant. Although Haveman and Schwabish (2000) use a different methodology, a different set of demographic controls, lagged terms instead of percentage changes, and seek to answer a different set of questions, it is encouraging that our results are similar in some regards. The estimated coefficient is positively significant for the 1990s using the Sen index of poverty shown in column 3.

To further test whether the 1990s had diminished impacts on poverty we use a specification in which we remove %ΔGDP for the entire period. The three robust growth period dummies are still included. In Tables A2 and A3 (see column 3), although each dummy variable is negative and statistically significant the estimated coefficient on the period of the 1990s is smaller than that of the 1960s and only significant at the 5 percent level. Although a specification like this is incomplete since it does not include growth over the entire period it does demonstrate that the period of the 1990s was not as robust as the 1960s and is closer to that of the 1980s.

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