Consumption and Income Poverty over the Business Cycle*

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Abstract

We examine the relationship between the business cycle and poverty for the period from 1960 to 2008 using income data from the Current Population Survey and consumption data from the Consumer Expenditure Survey. This new evidence on the relationship between macroeconomic conditions and poverty is of particular interest given recent changes in anti-poverty policies that have placed greater emphasis on participation in the labor market and in-kind transfers. We look beyond official poverty, examining alternative income poverty and consumption poverty, which have conceptual and empirical advantages as measures of the well-being of the poor. We find that both income and consumption poverty are sensitive to macroeconomic conditions. A one percentage point increase in unemployment is associated with an increase in the after-tax income poverty rate of 0.9 to 1.1 percentage points in the long-run, and an increase in the consumption poverty rate of 0.3 to 1.2 percentage points in the long-run. The evidence on whether income is more responsive to the business cycle than consumption is mixed. Income poverty does appear to be more responsive using national level variation, but consumption poverty is often more responsive to unemployment when using regional variation. Low percentiles of both income and consumption are sensitive to macroeconomic conditions, and in most cases low percentiles of income appear to be more responsive than low percentiles of consumption.

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1. Introduction

There are two standard sets of tools that have been used to reduce poverty: programs that directly target poor populations, and policies that alleviate poverty indirectly through economic growth that benefits the worst off. There is a consensus that the latter set of policies has greater potential impact.[1] In her essay on fighting poverty Blank (2000) concludes that "a strong macroeconomy matters more than anything else." However, in some periods the relationship between growth and poverty appears weak. There is also disagreement on the link between specific policies and the macroeconomy. We reexamine the relationship between the macroeconomy and poverty. We do this in part because past work has found a changing relationship between poverty and measures of the macroeconomy. Past work has emphasized that the relationship between official poverty and unemployment is very strong in some decades, but weak in others. There is even greater concern that the relationship may be different in recent years than in the past because our safety net has undergone a dramatic transformation. Policies such as welfare reform, EITC expansions, expanded childcare, and restrictions on use of food stamps by the able bodied have pushed many low income families to be more reliant on employment. We expect that the effects of macroeconomic conditions on poverty will be greater when the poor are more closely attached to the labor market. On the other hand, the argument that economic growth helps those at the bottom may also be less evident during times, such as recent decades, when growth is accompanied by a rise in income inequality. In addition there are a number of groups that are less likely to be affected by macroeconomic fluctuations including those on disability or retirement benefits, both of which have grown recently.

Our analyses will consider several indicators of the well-being of those at the bottom of the distribution. Looking beyond official income poverty measures to improved, broader measures of well-being is important for several reasons. Official pre-tax income poverty has been widely criticized as poorly measuring the well-being of the worst off. The official measure fails to capture all the resources available to the family including in-kind transfers and tax credits that have been key tools in the anti-poverty efforts of the last decades. Other

[1] For example, see Blank and Blinder (1986), Blank (2000), Haveman and Schwabish, (2000).

flaws include an unattractive adjustment for family size and changes in the real value of the poverty thresholds over time due to biases in the CPI (Citro and Michael, 1995; Meyer and Sullivan, 2009).

More importantly, changes in consumption may provide a better measure of the effect of the economy on the well-being of the worst off than changes in income. Even when income changes, consumption may vary little if transfers from extended family members, in-kind government transfers, or access to savings or credit shield a families' living standards from transitory changes in income (Cutler and Katz, 1991; Slesnick, 1993, 2001; Meyer and Sullivan, 2008, 2009). If the importance of factors such as extended families and access to credit changes over time, the effect of the economy on well-being will likely change. Because consumption reflects home and car ownership, which provide a flow of consumption services to their owners even though not captured by income, consumption may provide a better picture of well-being if ownership rates differ across groups or over time.

The consumption and income data available in the U.S. are both subject to error, but there is evidence that consumption is reported better than income for those near the bottom of the distribution. For example, income is often far below consumption for those with few resources, even for those with little or no assets or debts (Meyer and Sullivan 2003, 2007). Income measurement issues may be particularly important for this study because many of the types of income that may be more important in recessions seem to be poorly measured in household surveys. For example, in bad economic times, off-the-books income, inter-family transfers, and government transfers are likely to be more prevalent. Each of these sources is not well reported in household surveys (Edin and Lein, 1997; Meyer, Mok, and Sullivan, 2009). Our analyses will shed light on whether consumption poverty is less sensitive to macroeconomic conditions because of the wide variety of ways in which households can smooth their consumption and because mis-reporting of income is likely to be more cyclically sensitive than mis-reporting of consumption.

In addition to alternative poverty rates, we consider how the macroeconomy affects low percentiles of the income and consumption distributions. These analyses provide a better picture of the sensitivity of the bottom of the distribution to economic conditions than focusing exclusively on a poverty rate, which is the cumulative distribution function of resources evaluated at a single point.

We find that both income and consumption poverty are sensitive to macroeconomic conditions. The evidence on whether income is more responsive to the business cycle than consumption is mixed. Income poverty does appear to be more responsive using national level variation, but consumption poverty is often more responsive to unemployment when using regional variation. Our results suggest that, for the period from 1981 to 2008, a 1 percentage point increase in unemployment is associated with an increase in the after-tax income poverty rate of 0.9 to 1.1 percentage points, and an increase in the consumption poverty rate of 0.3 to 1.2 percentage points. Results for the 2000s indicate that after-tax income poverty is responsive to changes in the national unemployment rate, although the point estimates are smaller than for the 1990s.

The evidence for low percentiles is consistent with that for poverty. Low percentiles of both income and consumption are sensitive to macroeconomic conditions, and in most cases low percentiles of income appear to be more responsive than low percentiles of consumption. Across several low income percentiles, we find that a 1 percentage point increase in unemployment is associated with a decline in these percentiles ranging from 4 to 10 percent. For low percentiles of consumption this range is from 0 to 7 percent.

This paper advances knowledge in a number of respects. First, we look beyond official poverty, examining alternative income poverty and consumption poverty. Second, we update the relationship between macroeconomic conditions and poverty through 2008. Given the sensitivity to time period found in past work, and recent policy changes, recent years are of special interest. Third, we examine low percentiles of income and consumption to provide a more complete picture of how macroeconomic conditions affect the worst off. Finally, we exploit both regional and national variation in economic conditions.

There are a number of limitations to any analysis of this kind. The relationship between economic conditions and poverty will depend on how government policy responds to a recession. We necessarily estimate the combined effect of macroeconomic conditions and any policy adjustments engendered by those conditions. Also, business cycles vary considerably in the extent to which they affect different industries, demographic groups, or regions. Thus, the relationship between macroeconomic conditions and poverty will differ across cycles. The unique nature of each business cycle makes it difficult to draw general conclusions about the impact of changes in macroeconomic conditions. Moreover, it is

difficult to estimate precisely how the response of poverty to the business cycle changes over time given the short time series for these subperiods. Our own robustness analyses, as well as comparisons of our results to others in the literature, demonstrate variation in estimates across equally plausible specifications for narrow time periods, such as a single decade.

In the following section we briefly summarize the key findings from previous studies of the effect of macroeconomic conditions on poverty. In Section 3 we describe the data used to construct alternative income and consumption measures of poverty and the methods used to examine how the macroeconomy is related to these outcomes. We present our results in Section 4. In Section 5 we briefly simulate poverty rates for the current recession and we offer conclusions in Section 6.

2. Previous Research on Poverty and Macroeconomic Conditions

A long series of papers have examined the relationship between macroeconomic conditions and poverty.[2] The consensus from this literature is that the relationship between national unemployment and official poverty is strong, but the magnitude of the effect is sensitive to the years examined.[3] For example, using data from 1959-1983, Blank and Blinder (1986) find that a one percentage point rise in unemployment results in a 1.1 percentage point increase in poverty. Comparable estimates from Cutler and Katz (1991), whose sample period covers 1959-1989, indicate that a one point rise in the unemployment rate raises poverty by 0.43 to 0.69 points. These and other papers conclude that the effect of inflation on poverty is much more modest than that of unemployment.[4]

The literature has also emphasized that the relationship between macroeconomic conditions and poverty has changed over time. Early studies documented a strong relationship for the 1960s. However, there is evidence that this relationship weakened in the 1970s and particularly the 1980s (Blank, 1993). During the economic expansion from 1983 to

[2] See Haveman and Schwabish (2000) for a brief review of this literature.
[3] Studies using regional or state variation in poverty and macroeconomic conditions have found similar evidence (Blank and Card, 1993; Tobin, 1994; Freeman, 2001; Gundersen and Ziliak, 2004; Hoynes, Page, and Stevens, 2006).
[4] Several papers have considered the effect that government transfer spending has on poverty (Gottschalk and Danziger, 1984; Blank and Blinder, 1986; Haveman and Schwabish, 2000; Blank 2009). These studies typically find that greater transfer spending is associated with reduced poverty, but the estimates are imprecise.

1989, real GDP grew by 27 percent, unemployment fell by 45 percent, but poverty fell a modest 16 percent. More recent studies have shown the relationship between unemployment and poverty to be stronger in the 1990s than in the 1980s but still weaker than earlier years (Blank, 2000; Haveman and Schwabish, 2000).

A number of studies have documented how the relationship between macroeconomic conditions and poverty differs across demographic groups. Recent examples include Blank (2000, 2009) and Gundersen and Ziliak (2004). Blank (2000, 2009) finds that poverty is particularly responsive to unemployment for groups that have high exposure to public assistance: single mother families and black families. In the earlier paper, she finds for both of these groups that the relationship is stronger in the 1990s than in any earlier decade.

Our paper contributes to the existing literature in several important ways. First, this literature has focused, almost exclusively, on officially measured poverty.[5] We consider alternative poverty measures that address known criticisms in the official measure. In addition to broader measures of income poverty, we examine consumption poverty, which is arguably a better measure of the well-being of the poor. As far as we know, we are the first to look at the relationship between macroeconomic conditions and consumption poverty. Second, we update past work by examining the relationship between macroeconomic conditions and poverty through 2008. This recent evidence is particularly interesting given the flurry of anti-poverty policies over the past two decades that have placed greater emphasis on participation in the labor market and in-kind transfers. Third, in addition to poverty measures, we will look at low percentiles of the distributions of income and consumption to provide a more complete picture of how the bottom of the distribution responds to the business cycle. Finally, we exploit both regional and national variation in economic conditions. This additional source of variation allows us to estimate more precisely how economic conditions are related to the well-being of the worst-off. In addition, we can estimate models with year fixed effects, which control for aggregate changes that have similar effects on poverty or low percentiles in all regions, such as changes in federal tax and transfer policies.

[5] One exception is Gundersen and Ziliak (2004), who look at an after-tax income poverty measure.

3. Data and Methods

Our analyses of the relationship between macroeconomic conditions and the well-being of the worst off relies on official statistics on unemployment and poverty, as well as alternative poverty measures and percentiles of the income and consumption distribution that we calculate using nationally representative survey data. The income data come from the ASEC/ADF Supplement to the Current Population Survey (CPS) and the consumption data come from the Interview component of the Consumer Expenditure (CE) Survey.

The CPS is the source for many official income statistics including poverty rates. Respondents to the CPS report information on a number of different sources of money income. In addition, the survey collects information on some noncash benefits such as food stamps, housing subsidies, and public health insurance. To calculate alternative income poverty measures and percentiles of the income distribution, we use the 1964-2009 CPS surveys, which provide data on income for the previous calendar year. In the analyses that follow, we consider three different measures of income: pre-tax money income, after-tax money income, and after-tax money income plus noncash benefits. Pre-tax money income is the measure used in official poverty statistics. To calculate after-tax money income we add the value of tax credits such as the EITC, and subtract state and federal income taxes and payroll taxes, as explained in the Data Appendix. Our measure of after-tax money income plus noncash benefits adds to after-tax money income the cash value of food stamps, and imputed values for housing and school lunch subsidies, and the imputed value of Medicaid and Medicare coverage. For more details, see the Data Appendix.

The CE Survey is the most comprehensive source of spending data for the U.S. To calculate the consumption poverty rate and percentiles of the consumption distribution, we use data from the CE Survey for the years 1960-1961, 1972-1973, 1980-1981 and 1984-2008. The 1960-1961 surveys provide data on annual expenditures collected in a single interview, while the 1972-1973 surveys provide data on annualized expenditures collected from quarterly interviews. Since 1980, quarterly expenditures have been provided. To obtain annual measures we multiply these quarterly measures by four. We do not use the data from the fourth quarter of 1981 through the fourth quarter of 1983 because the surveys for these quarters only include respondents from urban areas. We group the data for the 1960-1961

period because the data are only representative of the full population when the samples from these two years are combined.

Our measure of consumption includes both durable and nondurable goods. To convert reported expenditures into a measure of consumption, we make a number of adjustments. First, we convert vehicle spending to a service flow equivalent. Instead of including the full purchase price of a vehicle, we calculate a flow that reflects the value that a consumer receives from owning a car during the period that is a function of a depreciation rate and the current market value of the vehicle (see the Data Appendix). Second, to convert housing expenditures to housing consumption for homeowners, we exclude mortgage interest payments, property tax payments, and spending on insurance, maintenance and repairs, and add the reported rental equivalent of the home. Third, for respondents living in government or subsidized housing, we impute a rental value using detailed housing characteristics available in the survey. Finally, we exclude spending that is better interpreted as an investment such as spending on education and health care, and outlays for retirement including pensions and social security.[6] For more details, see the Data Appendix.

Our measure reflects family consumption of goods and services, but does not capture other important components of consumption such as home production of food, food preparation, and home repair and maintenance. It is important to note, however, that these components are also missed in an income measure.

Our poverty rates measure the fraction of all individuals who live in families with resources that are below a poverty threshold. Resources are measured at the family level. To adjust for differences in family size and composition we scale all measures using an NAS recommended equivalence scale (Citro and Michael, 1995): $(A + 0.7K)^{0.7}$, where A is the number of adults in the family and K is the number of children. See Meyer and Sullivan (2009) for a discussion of the importance of equivalence scales for poverty measurement. For each scale-adjusted measure, the poverty threshold in 1980 is specified as the point in the distribution in 1980 such that the poverty rate for that measure is equal to that of the official poverty rate in 1980 (13.0 percent). To obtain thresholds for other years, these thresholds are

[6] We also exclude spending on individuals or entities outside the family, such as charitable contributions and spending on gifts to non-family members. This category is very small relative to total consumption.

adjusted for inflation using the CPI-U-RS.[7] Anchoring our alternative poverty measures to the official poverty rate in 1980 facilitates comparisons across measures, allowing us to examine the same point of the distribution initially so that different measures do not diverge simply because of differential changes at different points in the distribution. In addition to calculating a national level poverty rate for each year, we also calculate separate poverty rates for four geographic regions: the Northeast, Midwest, South and West. These are the narrowest geographic regions identifiable in CE Survey data for all years.

In addition to poverty rates, we also examine the relationship between macroeconomic conditions and low percentiles of the distribution of consumption or after-tax income. The percentiles of the distribution are determined in each year after adjusting for differences in family size using the NAS-recommended equivalence scale.

We focus on two annual measures of macroeconomic conditions. The first is the national unemployment rate for the U.S. civilian population age 16 and older. We also examine regional unemployment data, for each of the four regions that are identifiable in both the CPS and the CE Survey.[8] Data on the national unemployment rate are available for our entire sample period, but data on the regional unemployment rate are only available for the years from 1976 through 2008.[9]

The national unemployment rate and our main outcome variables are shown for various years in Table 1. Over most periods, the unemployment rate and the poverty rate move in the same direction regardless of how poverty is measured. However, in some cases, the reverse is true. For example, the unemployment rate rises by 1.5 percentage points between 1972 and 1980, while the after-tax income and consumption poverty rates both fall by 1.2 percentage points. Changes in the 10th percentiles of income and consumption are similar, although the 10th percentile of income is a bit more volatile, and the two measures diverge between 2000 and 2008.

[7] The official poverty thresholds are adjusted for inflation using the CPI-U. The CPI-U-RS corrects for many, but not all, of the biases in the CPI-U. See Meyer and Sullivan (2009) for more details.
[8] We also estimate specifications using GDP and median family income as a measure of macroeconomic conditions. We discuss these results briefly in Section 5.
[9] The unemployment data are available at the Bureau of Labor Statistics (www.bls.gov/data/#unemployment).

To determine how the poverty rate and percentiles are related to either national or regional variation in macroeconomic conditions we estimate several different models. At the national level, we estimate

$$y_t = \alpha_1 + \beta_1 U_t + \lambda_1 y_{t-1} + \pi_1 Inflation_t + \tau_1 t + \sum_{d=1}^{D-1} [\delta_{1,d} decade_{d,t} + \kappa_{1,d} decade_{d,t} * t] + \varepsilon_{1,t} \quad (1)$$

where y_t represents a national poverty rate or a percentile of income or consumption in year t and U_t is the national unemployment rate for year t. We include a lagged value of the dependent variable since poverty rates and percentiles are slow to change. $Inflation_t$, which is the change in the CPI-U-RS between years t and $t-1$, is included because past work has hypothesized that it might reduce the real incomes of the poor, such as those with unindexed pensions. Finally, we include a linear time trend, indicator variables for the D decades in the sample period, and the interaction of the time trend and the decade indicators. Because much of the previous literature has focused on how the relationship between macroeconomic conditions and poverty has changed over time we also estimate models that allow the relationship to differ by decade:

$$\begin{aligned} y_t = \alpha_2 &+ \sum_{d=1}^{D} [\beta_{2,d} decade_{d,t} * U_t] + \lambda_2 y_{t-1} + \pi_2 Inflation_t + \tau_2 t \\ &+ \sum_{d=1}^{D-1} [\delta_{2,d} decade_{d,t} + \kappa_{2,d} decade_{d,t} * t] + \varepsilon_{2,t} \end{aligned} \quad (2)$$

For any given year, both the unemployment rate and the poverty rate will differ considerably across regions in the U.S. This additional source of variation allows us to estimate more precisely how economic conditions are related to the well-being of the worst-off. Another important advantage of examining this relationship regionally is that it allows us to include year fixed effects, which control for any aggregate changes that have similar effects on poverty or low percentiles in all regions, such as changes in federal tax and transfer policies. Specifically, we estimate a model that includes region (R_j) and year (γ_t) fixed effects:

$$y_{jt} = \alpha_3 + \beta_3 U_{jt} + \lambda_3 y_{jt-1} + R_j + \gamma_t + \varepsilon_{3,jt}. \quad (3)$$

Alternatively, to consider whether the relationship between regional economic conditions and poverty has changed over time we estimate models that allow the relationship to differ by decade:

$$y_{jt} = \alpha_4 + \sum_{d=1}^{D}[\beta_{4,d} decade_{d,t} * U_{jt}] + \lambda_4 y_{jt-1} + R_j + \gamma_t + \sum_{d=1}^{D-1}[\delta_{4,d} decade_{d,t}] + \varepsilon_{4,jt} \ . \quad (4)$$

4. Results

To examine the bivariate relationship between the macroeconomy and the well-being of the worst off, we construct scatter plots of annual unemployment and the official poverty rate for the years 1960 through 2008. These plots are shown for four separate time periods in Figure 1. The results for the 1960s show the strong relationship between unemployment and official poverty for this decade that has been emphasized in many previous studies. Both unemployment and poverty fell sharply during this decade. This positive relationship is much less evident in the 1970s and 1980s, but is more noticeable again in the 1990s and 2000s.

Figure 2 provides similar plots for after-tax income and consumption poverty. The patterns for after-tax income poverty are fairly similar to those for official income poverty. For the 1960s, we again see a strong positive relationship between poverty and unemployment. The pattern is somewhat different for the 1970s, however, when unemployment and after-tax income poverty are inversely related for part of the decade. For the period from 1980 to 2008, we also show the relationship between consumption poverty and unemployment.[10] These scatter plots indicate a positive relationship between consumption poverty and unemployment that is fairly similar to that for after-tax income poverty.

Table 2 presents estimates of equations 1 and 2 for three different measures of income poverty: official poverty, after-tax income poverty, and after-tax income plus noncash benefits poverty. We provide estimates for different sample periods so that we can compare estimates across outcomes for the same periods. Because all specifications include a lag of the dependent variable on the right hand side, we also report in brackets the long run derivatives, which are calculated as $\beta/(1-\lambda)$, where β is the point estimate for unemployment and λ is the point estimate for lagged poverty. We emphasize these long run derivatives when summarizing the results. The results in columns 1 and 2 indicate a strong relationship

[10] We do not show consumption poverty for the 1960s and 1970s because data for consumption are only available for a few years (1960-1961, 1972 and 1973). During the 1980s, data for consumption poverty is reported for 1980, 1981, and 1984-1989.

between official income poverty and national unemployment. For the period from 1964 to 2008, a one percentage point increase in the unemployment rate is associated with a 0.6 percentage point rise in official poverty in the long run (column 1). These results are comparable to estimates from the literature for earlier time periods, such at those from Cutler and Katz (1991) or Blinder and Blank (1986) discussed in Section 2. Consistent with previous research, we find a very strong relationship between poverty and unemployment in the 1960s, and a weaker relationship during the 1970s and 1980s (column 2). The point estimate for the 1990s is slightly larger than that for the 1970s and 1980s.[11] For the 2000s, we find a statistically significant relationship between unemployment and poverty, but one that is slightly smaller than that for the 1990s.

Although our estimates are sensitive to which years are included in the sample period, the results are quite similar for different measures of income poverty.[12] For example, the results for after-tax income poverty (columns 3 and 4) are similar to those for official income poverty (columns 1 and 2), and the results for after-tax income poverty (columns 7 and 8) are similar to those for after-tax income plus noncash benefits poverty (columns 9 and 10). We should emphasize that the decade specific estimates of the effect of unemployment on poverty in the even columns of Table 2 are sensitive to which covariates are included in the specification and to which years are included in the sample period.[13] Each of the specifications in Table 2 includes inflation as a control. As has been emphasized in past research (for example, Blank and Blinder, 1986), we find the relationship between inflation and poverty to be weak. The point estimates for inflation (not reported) are considerably smaller than those for unemployment, and in all but one of the specifications reported in Table 2, this coefficient is not significantly different from zero.

[11] Looking at the period from 1959 to 1998, Haveman finds the largest effect for the 1959-1972 period, and then for the 1993-1998 period.

[12] As explained in Section 3, our measures of alternative poverty differ from official poverty not just in how resources are measured, but also in how differences in family size are accounted for and in how thresholds are adjusted for inflation.

[13] For example, the results in column 4 suggest a weak relationship between unemployment and after-tax income poverty for the 1964-1969 period. However, when the interaction terms between the linear time trend and the decade dummies are excluded, this point estimate is much closer to the one for official poverty in column 2.

Estimates for equations 3 and 4, which consider the effect of regional unemployment on regional poverty, are presented in Table 3.[14] Focusing on the long run derivatives, we again see that income poverty is sensitive to changing macroeconomic conditions, and the magnitudes of these estimates are similar to those using national variation in Table 2. For example, a 1 percentage point increase in regional unemployment is associated with a 1.1 percentage point increase in after-tax income poverty (column 3), which is comparable to the analogous estimate using national variation (column 5 of Table 2). The results in Table 3 also indicate that the sensitivity of poverty to unemployment is similar for different measures of income poverty. As in Table 2, the estimates vary somewhat across decades (even columns). The point estimates for the 1990s are larger than those for the late 1970s and 1980s. The estimates for the 2000s are slightly lower than those for the 1990s, and these estimates are not significantly different from zero. The estimates for the region dummies (not reported) indicate the sharp differences in poverty across regions, with the south experiencing sharply higher rates than other regions regardless of how poverty is measured.

We also estimate equations 1 to 4 for consumption poverty to determine how the response of consumption poverty to macroeconomic conditions compares to that of income poverty. We report estimates for both after-tax income poverty and consumption poverty for comparable years in Table 4. Estimates using national variation in unemployment and poverty are presented in columns 1 to 6, while those using regional variation are presented in columns 7 to 10. For each specification in Table 4, we allow the error term in the income poverty equation to be correlated the error term in the corresponding consumption poverty equation, estimating these equations simultaneously using the Seemingly Unrelated Regressions approach proposed by Zellner (1962).[15]

The results in Table 4 indicate that both income and consumption poverty are sensitive to macroeconomic conditions. For the full time period (columns 1 and 4) there is evidence that after-tax income poverty is more sensitive to the national unemployment rate than

[14] These results do not include data from the 1960s and early 1970s because the regional unemployment rate series provided by the BLS only goes back to 1976.

[15] For example, the specifications in columns 1 and 4 are estimated simultaneously, as are those in columns 2 and 5, etc.

consumption poverty.[16] The former rises by 0.8 percentage points and the latter by 0.5 percentage points in response to a one point rise in unemployment. These responses are significantly different from each other. For the period from 1981 to 2008 (columns 2 and 5), a 1 percentage point increase in unemployment is associated with an increase in the after-tax income poverty rate of 0.9 percentage points, and an increase in the consumption poverty rate of 0.3 points in the long run, but these responses are not significantly different from each other. For after-tax income poverty, the effect of the national unemployment rate (column 3) is significant in each decade, and the effect is smaller in the 2000s than in previous decades. For consumption poverty, the effect of the national unemployment rate (column 6) is not significant in any of the decades. The response to national unemployment for income poverty is greater than that for consumption in each decade, but these responses are only significantly different from each other for the 1990s.

Using regional variation we also find that both income and consumption poverty are sensitive to macroeconomic conditions. For these specifications, however, there is little evidence that income poverty is more responsive than consumption poverty. None of the long-run estimates for consumption poverty are significantly different from those for income, and in most cases the point estimates are larger when looking at consumption poverty. The point estimates indicate that a 1 percentage point increase in regional unemployment is associated with an increase in the after-tax income poverty rate of 1.1 percentage points, and an increase in the consumption poverty rate of 1.2 points in the long run. The decade specific estimates indicate that the regional unemployment rate (column 8) has a significant effect on after-tax income poverty in both the 1980s and 1990s, and the effect is smaller in the 2000s than in previous decades. For consumption poverty, the effect of the regional unemployment rate (column 10) is greater than that of the national unemployment rate. Regional unemployment has a large and significant effect on consumption poverty in the 1990s and 2000s.

To examine in more detail how the bottom of the distribution responds to the macroeconomy, we consider how low percentiles of income and consumption respond to the business cycle. In Table 5A, we report these results for the 10^{th} percentile using both national

[16] For the full time period, we do not include a lagged dependent variable because we only observe one observation for consumption poverty in the 1960s and only two observations in the 1970s.

variation (columns 1 to 6) and regional variation (columns 7 to 10). We again find that both income and consumption are sensitive to macroeconomic conditions. In general, the effect of unemployment on the 10th percentile of income is larger than that on the 10th percentile of consumption. For example a 1 percentage point rise in the national unemployment rate is associated with a 4.5 percent decline in the 10th percentile of income, and a 1 percent decline in the 10th percentile of consumption, and these responses are significantly different from each other. The decade specific estimates (columns 2 and 4) indicate that in each decade the 10th percentile of income is more sensitive to the national unemployment rate than the 10th percentile of consumption, but these responses are only significantly different from each other in the 1990s and 2000s. For the 10th percentile of after-tax income, the effect of the national unemployment rate is significant in each decade, and the effect is larger in the 1980s and 1990s than in the 2000s. The decade specific effects of the national unemployment rate are smaller and insignificant for the 10th percentile of consumption. There is also evidence that the effect of unemployment on the 10th percentile of income is greater than that on the 10th percentile of consumption using regional variation (columns 7 to 10). However, these responses are only significantly different from each other for the 1980s. The effect of the regional unemployment rate on the 10th percentile of consumption is large and significant for both the 1990s and 2000s.

Tables 5B and 5C report analogous results for the 5th and 15th percentiles respectively. These results are quite similar to those reported in Table 5A. Again, we see that low percentiles of both income and consumption are responsive to macroeconomic conditions. And, using national variation, there is evidence that low percentiles of income are more responsive than low percentiles of consumption. The response of the 5th percentile of the income distribution to unemployment is somewhat greater than that for the 10th percentile. For example, 1 percentage point rise in the national unemployment rate is associated with an 8.6 percent decline in the 5th percentile of income, as compared to a 4.5 percent decline in the 10th percentile. The point estimates for the effect of unemployment on the 15th percentile of both income and consumption (Table 5C) are very similar to those on the 10th percentile.

We also examine higher percentiles of the distributions of income and consumption. As with the 10th percentile, estimates for the 50th percentile indicate that both median after-tax income and median consumption are responsive to unemployment (results available from the

authors). The point estimates for the effect of unemployment on median income are slightly smaller than those on the 10th percentile, and in all cases, the long-run effect of unemployment is greater on median after-tax income than on median consumption. However, we cannot reject the hypotheses that these responses are the same.

All of the poverty results presented thus far are for absolute measures of poverty using a poverty line that does not change over time in real terms. We focus on absolute measures because the official poverty measure in the U.S. is designed to capture absolute poverty and the previous work looking at changes in income poverty over the business cycle in the U.S. has focused on absolute poverty. The European Union and other areas rely on relative poverty measures that are based on a poverty line that can rise (or fall) over time. The expected effects of macroeconomic conditions on relative poverty are unclear. On the one hand, if improved economic conditions benefit the middle of the distribution more than the bottom, then low unemployment could lead to a rise in relative poverty. On the other hand, if the bottom of the distribution benefits the most from low unemployment, then we would expect relative poverty to fall as macroeconomic conditions improve.

In Table 6, we examine the relationship between the unemployment rate and both income and consumption relative poverty, where relative poverty is defined as the fraction of individuals with resources below 50 percent of median resources. In general, the results show that there is a weaker relationship between unemployment and relative poverty than between unemployment and absolute poverty. In most cases, the estimates in Table 6 are smaller than those in Table 4. At the national level, the relationship between unemployment and relative poverty is weak regardless of whether poverty is measured using income or consumption. The relationship between unemployment and relative poverty is significant at the regional level, and there is some evidence that consumption relative poverty is more responsive than income relative poverty, but the difference is only significant for the 1990s.

The unemployment rate is only one indicator of macroeconomic conditions. To assess whether our main findings are sensitive to how we specify the business cycle, we consider other measures of macroeconomic conditions. In Appendix Table 1 we present the results for GDP per capita. At the national level, a rise in GDP per capita is associated with a decline in both income and consumption poverty. Income poverty appears more responsive than consumption poverty and the differences are significant in some cases. As was the case for

the results using unemployment, consumption poverty appears more responsive to GDP per capita when using regional variation. For the relationship between regional GDP per capita and regional income poverty (column 8), the test for a unit root is marginally significant. So, we have added an additional specification with the first difference of income poverty as the dependent variable (column 9). In both of these specifications the relationship between regional income poverty and regional GDP per capita is weak.

We also consider other measures of macroeconomic conditions including lagged unemployment, GDP, lagged GDP, and median income (these results are available from the authors). The results from the other alternative specifications are also qualitatively similar to those focusing on unemployment.

5. Predicted Effects of the Current Recession

If we were to extrapolate the estimated effects over the 1981-2008 period to the next few years, the predicted changes in poverty are very large. Unemployment rose 4.7 percentage points between 2007 and 2009 and averaged an additional 0.3 percentage points higher over the first ten months of 2010. The predicted change over three years can be obtained by inserting coefficient estimates in the expression

$$\beta[\Delta U_{t-2}(1+\lambda^2) + \Delta U_{t-1}(1+\lambda\ ) + \Delta U_t]. \qquad (5)$$

Based on the estimates in Table 4, the increase in unemployment would be predicted to raise after-tax income poverty by 2.4 to 3.4 percentage points and consumption poverty by 1.3 to 3.9 percentage points in 2010 over the 2007 level. This is a very large and troubling possible increase in poverty. These forecasts should be interpreted cautiously, though, given that such forecasts do not reflect changes in government policy in response to the recent recession and given the instability of the effect of economic conditions on poverty over the past 50 years. Monea and Sawhill (2009) provide another set of estimates. They suggest that the recession will have much smaller effects on income poverty than we estimate, raising poverty about 1.7 percentage points between 2007 and 2010. The smaller estimated effect is due to their reliance on a smaller coefficient on unemployment than ours, based on Blank (2009).

6. Conclusions

This paper examines the relationship between poverty and macroeconomic conditions in the United States from 1960 through 2008. Overall, we find that consumption and income poverty rates respond strongly to economic conditions, whether they are measured by unemployment rates, per capita GDP, or median incomes. The response of poverty to macroeconomic conditions is similar across several different measures of income poverty, although the magnitude of the response is somewhat sensitive to the years included in the sample period. The results indicate that, for the period since 1981, a 1 percentage point increase in unemployment is associated with an increase in the after-tax income poverty rate of 0.9 to 1.1 percentage points in the long run.

While we expect consumption poverty to be less sensitive to unemployment than income poverty given the ability of some households to smooth their consumption, the poor measurement of some cyclically large components of income may reverse this relationship. The empirical evidence on whether income poverty is more responsive to macroeconomic conditions than consumption poverty is mixed. Income poverty does appear to be more responsive using national level variation, but consumption poverty is often more responsive to unemployment when using regional variation. We find that a 1 percentage point increase in unemployment is associated with an increase in the consumption poverty rate of 0.3 to 1.2 percentage points in the long run.

The effects of unemployment on low percentiles of income and consumption have a similar pattern to that for the poverty rate. Low percentiles of both income and consumption are sensitive to macroeconomic conditions, and in most cases low percentiles of income appear to be more responsive than low percentiles of consumption. Our results for the 5^{th}, 10^{th}, and 15^{th} percentiles indicate that a 1 percentage point increase in unemployment is associated with a decline in these percentiles ranging from 4 to 10 percent. For low percentiles of consumption this range is from 0 to 7 percent. Consistent with the permanent income hypothesis, median consumption is in all cases less sensitive to unemployment than median income.

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Data Appendix

Measuring Consumption in the CE Survey

Consumption includes all spending in the CE Survey measure of total expenditures less spending on out of pocket health care expenses, education, and payments to retirement accounts, pension plans, and social security. In addition, housing and vehicle expenditures are converted to service flows. For homeowners we subtract spending on mortgage interest, property taxes, maintenance, repairs, insurance, and other expenses, and add the reported rental equivalent of the home.

Because a rental equivalent is not reported in the 1960-1961 and 1980-1981 surveys, we impute a rental equivalent for these years. Using data from the 1984 survey, we regress log reported rental equivalent on the log market value of the home, log total non-housing expenditures, family size, and the sex and marital status of the family head. Estimates from these regressions are used to impute a value of the rental equivalent for respondents in the 1980-1981 surveys. A similar approach is used to impute a rental equivalent value for the 1960-1961 surveys using data from the 1972-1973 surveys.

For those in public or subsidized housing, we impute a rental value using reported information on their living unit including the number of rooms, bedrooms and bathrooms, and the presence of appliances such as a microwave, disposal, refrigerator, washer, and dryer. Specifically, for renters who are not in public or subsidized housing we estimate quantile regressions for log rent using the CE Survey housing characteristics mentioned above as well as a number of geographic identifiers including state, region, urbanicity, and SMSA status, as well as interactions of a nonlinear time trend with appliances (to account for changes over time in their price and quality). We then use the estimated coefficients to predict the 40th percentile of rent for the sample of families that do not report full rent because they reside in public or subsidized housing. We use the 40th percentile because public housing tends to be of lower quality than private housing in dimensions we do not directly observe. Evidence from the PSID indicates that the average reported rental equivalent of public or subsidized housing is just under the predicted 40th percentile for these units using parameters estimated from those outside public or subsidized housing.

For vehicle owners we subtract spending on recent purchases of new and used vehicles as well vehicle finance charges. We then add the service flow value of all vehicles owned by the family. The service flow for each vehicle is a function of the market price of the vehicle and a depreciation rate. We determine a current market price for each vehicle in the CE survey in one of three ways. First, for vehicles that were purchased within twelve months of the interview and that have a reported purchase price (the estimation sample), we take the current market price to be the reported purchase price. Second, for vehicles that were purchased more than twelve months prior to the interview and that have a reported purchase price, we specify the current market price as a function of the reported purchase price and an estimated depreciation rate as explained below.

Finally, for the remaining vehicles, we impute a current market price because the purchase price is not reported. Using the estimation sample, we regress the log real purchase price on a cubic in vehicle age, vehicle characteristics, family characteristics, and make-model-year fixed effects. The vehicle characteristics include indicators for whether the vehicle has automatic transmission, power brakes, power steering, air conditioning, a diesel engine, a sunroof, four-wheel drive, or is turbo charged. Family characteristics include log real expenditures (excluding vehicles and health), family size, region, and the age and education of the family head. Coefficient estimates from this regression are then used to calculate a predicted log real purchase price for the ith vehicle ($x_i\hat{\beta}$). The predicted current market value for each vehicle without a reported purchase price is then equal to $\hat{\alpha} * \exp(x_i\hat{\beta})$, where $\hat{\alpha}$ is the coefficient on $\exp(x_i\hat{\beta})$ in a regression of y_i on $\exp(x_i\hat{\beta})$ without a constant term.[17]

To estimate a depreciation rate for vehicles, we compare prices across vehicles of different age, but with the same make, model, and year. In particular, from the estimation sample we construct a subsample of vehicles that are in a make-model-year cell with at least two vehicles that are not the same age. Using this sample, we regress the log real purchase price of the vehicle on vehicle age and make-model-year fixed effects. From the coefficient on vehicle age (β), we calculate the depreciation rate (δ): $\delta = 1 - EXP(\beta)$. The service flow is then the product of this depreciation rate and the current market price. If the vehicle has a reported purchase price but was not purchased within 12 months of the interview we calculate the service flow as: (real reported purchase price)*$\delta(1-\delta)^t$, where t is the number of years since the car was purchased.

Measures of Income in the CPS ASEC/ADF

Money Income: This measure follows the Census definition of money income that is used to measure poverty and inequality. Money income sources, as reported in the ASEC codebook, include: earnings; net income from self employment; Social Security, pension, and retirement income; public transfer income including Supplemental Security Income, welfare payments, veterans' payment or unemployment and workmen's compensation; interest and investment income; rental income; and alimony or child support, regular contributions from persons outside the household, and other periodic income.

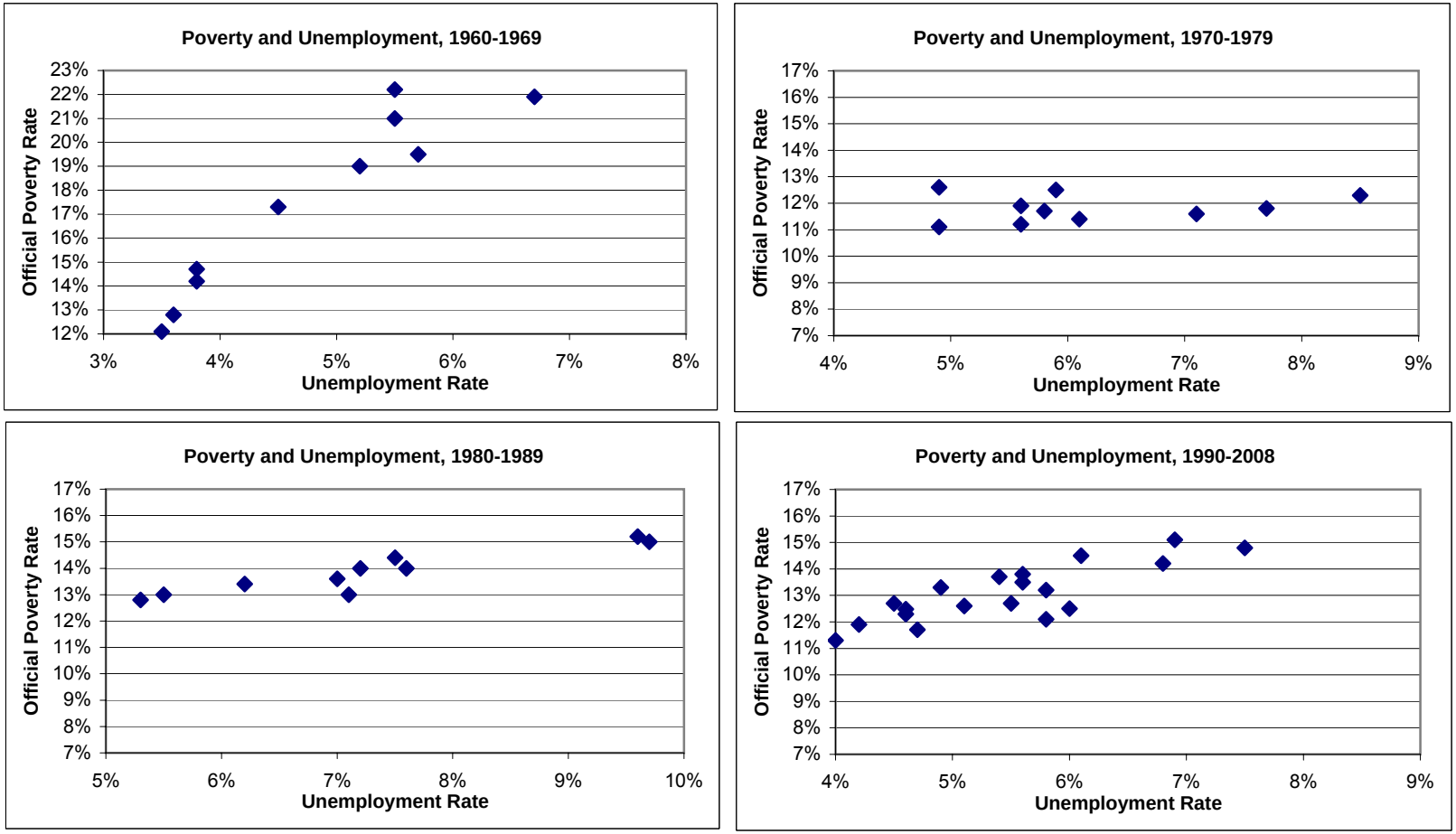
After-Tax Money Income: adds to money income the value of tax credits such as the EITC, and subtracts state and federal income taxes and payroll taxes, and includes capital gains and losses. Federal income tax liabilities and credits and FICA taxes are calculated for all years using TAXSIM (Feenberg and Coutts 1993).[18] State taxes and credits are also calculated using TAXSIM for the years 1977-2008. Prior to 1977 we calculate state taxes using IncTaxCalc (Bakija, 2008). We confirm that in 1977 net state tax liabilities generated using IncTaxCalc match very closely those generated using TAXSIM.

[17] This adjustment is made because $\exp(x_i\hat{\beta})$ will tend to underestimate y_i.

[18] The ASEC/ADF also includes an imputed value for taxes and credits, but this information is only available starting with the 1980 survey.

After-tax Money Income Plus Noncash Benefits: this adds to After-Tax Money Income the cash value of food stamps, and imputed values for housing subsidies, school lunch programs, Medicaid and Medicare.

Figure 1: Unemployment and Official Income Poverty, 1960-2008



Notes: Each data point represents a poverty rate and unemployment rate pair for a given year. The poverty rate is the official measure reported by the Census Bureau. The unemployment rate is measured at the national level and is reported by the Bureau of Labor Statistics.

Figure 2: Unemployment and After-Tax Income or Consumption Poverty, 1963-2008

Notes: Each data point represents a poverty rate and unemployment rate pair for a given year. After-tax income poverty is calculated using data from the CPS, while consumption poverty is calculated using data from the CE Survey. Data for consumption poverty is reported for 1980, 1981, and 1984-2008.

Table 1: Unemployment, Poverty, and the 10th Percentile, 1960-2008

	National Unemployment Rate (1)	Official Income Poverty (2)	After-Tax Income Poverty (3)	Consumption Poverty (4)	10th Percentile of After-Tax Income (5)	10th Percentile of Consumption (6)
Year						
1960	5.5	22.2				
1961	6.7	21.9		20.6		10,799
1963	5.7	19.5	25.0		8,016	
1972	5.6	11.9	14.2	14.2	11,832	12,860
1975	8.5	12.3	13.9		12,201	
1980	7.1	13.0	13.0	13.0	12,466	13,247
1985	7.2	14.0	14.5	14.0	11,548	12,668
1990	5.6	13.5	12.6	13.1	12,402	13,204
1995	5.6	13.8	11.3	12.5	13,349	13,522
2000	4.0	11.3	8.8	10.3	15,462	14,391
2005	5.1	12.6	9.7	9.1	14,731	15,034
2008	5.8	13.2	10.2	7.7	14,306	15,592
Percent Change or Difference						
1961-1972	-1.1	-10.0		-6.4		19.1%
1963-1972	-0.1	-7.6	-10.7		47.6%	
1972-1980	1.5	1.1	-1.2	-1.2	5.4%	3.0%
1980-1990	-1.5	0.5	-0.4	0.1	-0.5%	-0.3%
1990-2000	-1.6	-2.2	-3.9	-2.8	24.7%	9.0%
2000-2008	1.8	1.9	1.4	-2.5	-7.5%	8.3%

Notes: The statistics in columns 3-6 are based on the authors' calculations using CPS data for income or CE Survey data for consumption. The poverty rates in columns 3 and 4 are anchored at the official rate in 1980, as explained in the text. The 10^{th} percentiles in columns 5 and 6 are expressed in constant 2005 dollars using the CPI-U-RS, adjusted for family size, and normalized to a three person family with one adult and two children.

Table 2: The Relationship between National Unemployment and Income Poverty, 1964-2008

Dependent Variable	Official Income Poverty		After-Tax Income Poverty						After-Tax Income Plus Noncash Benefit Poverty	
Period	1964-2008		1964-2008		1976-2008		1980-2008		1980-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate	0.377*		0.333*		0.507*		0.488*		0.482*	
	(0.074)		(0.076)		(0.068)		(0.078)		(0.097)	
	[0.624]*		[0.729]*		[1.018]*		[0.937]*		[1.004]*	
Unemployment Rate X 1960s		2.202*		0.415						
		(0.465)		(0.517)						
		[3.518]*		[0.800]						
Unemployment Rate X 1970s		0.210		0.092		1.095				
		(0.087)		(0.096)		(1.100)				
		[0.335]*		[0.177]		[1.991]				
Unemployment Rate X 1980s		0.423*		0.599*		0.531*		0.526*		0.578*
		(0.111)		(0.120)		(0.105)		(0.109)		(0.134)
		[0.676]*		[1.154]*		[0.965]*		[0.948]*		[1.120]*
Unemployment Rate X 1990s		0.609*		0.590*		0.563*		0.562*		0.501*
		(0.159)		(0.170)		(0.130)		(0.133)		(0.159)
		[0.973]*		[1.137]*		[1.024]*		[1.013]*		[0.971]*
Unemployment Rate X 2000s		0.435*		0.420*		0.385*		0.382*		0.352*
		(0.148)		(0.159)		(0.126)		(0.129)		(0.159)
		[0.695]*		[0.809]*		[0.700]*		[0.688]*		[0.682]
Lagged Poverty	0.396*	0.374*	0.543*	0.481*	0.502*	0.450*	0.479*	0.445*	0.520*	0.484*
	(0.110)	(0.100)	(0.101)	(0.102)	(0.072)	(0.090)	(0.084)	(0.093)	(0.107)	(0.116)
N	45	45	45	45	33	33	29	29	29	29

Notes: Standard errors are in parentheses. The numbers in brackets are long run derivatives calculated as β/(1-λ), where β is the point estimate for unemployment and λ is the point estimate for lagged poverty. * denotes significance at the 5% level. Poverty and unemployment are measured at the national level. In addition to the covariates listed, all regressions include controls for inflation and a linear time trend, decade dummies, and interactions of the time trend with the decade dummies.

Table 3: The Relationship between Regional Unemployment and Income Poverty, 1976-2008

Dependent Variable	Official Income Poverty		After-Tax Income Poverty				After-Tax Income Plus Noncash Benefit Poverty	
Period	1976-2008		1976-2008		1980-2008		1980-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unemployment Rate	0.231*		0.178*		0.264*		0.272*	
	(0.070)		(0.062)		(0.077)		(0.090)	
	[1.095]*		[1.113]*		[1.222]*		[1.277]*	
Unemployment Rate X 1976-79		-0.028		-0.048				
		(0.135)		(0.127)				
		[-0.104]		[-0.241]				
Unemployment Rate X 1980s		0.272*		0.243*		0.227*		0.248*
		(0.113)		(0.104)		(0.107)		(0.126)
		[1.015]*		[1.221]*		[1.032]*		[1.148]
Unemployment Rate X 1990s		0.465*		0.318*		0.329*		0.321*
		(0.145)		(0.131)		(0.138)		(0.163)
		[1.735]*		[1.598]*		[1.495]*		[1.486]*
Unemployment Rate X 2000s		0.434		0.259		0.205		0.183
		(0.250)		(0.230)		(0.237)		(0.279)
		[1.619]		[1.302]		[0.932]		[0.847]
Lagged Poverty	0.789*	0.732*	0.840*	0.801*	0.784*	0.780*	0.787*	0.784*
	(0.052)	(0.055)	(0.042)	(0.046)	(0.052)	(0.054)	(0.056)	(0.058)
N	132	132	132	132	116	116	116	116

Notes: Standard errors are in parentheses. The numbers in brackets are long run derivatives calculated as $\beta/(1-\lambda)$, where β is the point estimate for unemployment and λ is the point estimate for lagged poverty. * denotes significance at the 5% level. Poverty and unemployment are measured at the regional level. In addition to the covariates listed, all regressions include region and year fixed effects, and the specifications in even columns include decade dummies.

Table 4: The Relationship between Unemployment and Income and Consumption Poverty

Dependent Variable	National Level Poverty						Regional Level Poverty			
	After-Tax Income Poverty			Consumption Poverty			After-Tax Income Poverty		Consumption Poverty	
	1963-2008	1981-2008	1981-2008	1961-2008	1981-2008	1981-2008	1981-2008		1981-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate	0.821*	0.512*		0.476*[1]	0.242		0.288*		0.540*	
	(0.256)	(0.078)		(0.142)	(0.144)		(0.078)		(0.185)	
		[0.874]*			[0.281]		[1.103]*		[1.208]*	
Unemployment Rate X 1980s			1.062*			1.002		0.290*		-0.033
			(0.358)			(0.672)		(0.115)		(0.273)
			[1.569]*			[1.133]		[1.090]*		[-0.069]
Unemployment Rate X 1990s			0.734*			0.334		0.310*		1.079*[1]
			(0.109)			(0.234)		(0.111)		(0.278)
			[1.084]*			[0.378][1]		[1.165]*		[2.257]*
Unemployment Rate X 2000s			0.413*			0.284		0.195		0.974
			(0.090)			(0.167)		(0.189)		(0.492)
			[0.610]*			[0.321]		[0.733]		[2.038]*
Lagged Poverty		0.414*	0.323*		0.138	0.116	0.739*	0.734*	0.553*	0.522*
		(0.073)	(0.074)		(0.154)	(0.176)	(0.052)	(0.052)	(0.082)	(0.080)
N	30	25	25	30	25	25	100	100	100	100

Notes: Corresponding income and consumption equations were estimated simultaneously using SUR. Standard errors are in parentheses. The numbers in brackets are long run derivatives calculated as $\beta/(1-\lambda)$, where β is the point estimate for unemployment and λ is the point estimate for lagged poverty. * denotes significance at the 5% level. [1] denotes that the effect for consumption is significantly different from that for income. In columns 1-6, poverty and unemployment are determined at the national level, and specifications include inflation, a linear time trend, decade dummies, and interactions of the time trend with the decade dummies. In columns 7-10, poverty and unemployment are determined at the regional level, and specifications include region and year fixed effects. Columns 8 and 10 also include decade dummies. For comparability across measures, we use data from years when both income and consumption data are available. For the full time period these years are 1961 or 1963, 1972, 1973, 1980, 1981, and 1984-2008.

Table 5A: The Relationship between Unemployment and the 10th Percentile of Log Income and Consumption

Dependent Variable	National Level						Regional Level			
	10th Percentile of Log After-Tax Income			10th Percentile of Log Consumption			10th Percentile of Log After-Tax Income		10th Percentile of Log Consumption	
	1963-2008	1981-2008	1981-2008	1961-2008	1981-2008	1981-2008	1981-2008		1981-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate	-0.040*	-0.026*		-0.015*[1]	-0.008[1]		-0.029*		-0.020*	
	(0.009)	(0.005)		(0.004)	(0.005)		(0.005)		(0.006)	
		[-0.045]*			[-0.009]*[1]		[-0.063]*		[-0.043]*	
Unemployment Rate X 1980s			-0.051*			-0.036		-0.032*		-0.002[1]
			(0.024)			(0.022)		(0.007)		(0.008)
			[-0.079]*			[-0.037]		[-0.068]*		[-0.004][1]
Unemployment Rate X 1990s			-0.036*			-0.011[1]		-0.028*		-0.038*
			(0.008)			(0.007)		(0.007)		(0.008)
			[-0.056]*			[-0.011][1]		[-0.059]*		[-0.075]*
Unemployment Rate X 2000s			-0.023*			-0.011*		-0.023*		-0.038*
			(0.006)			(0.005)		(0.011)		(0.015)
			[-0.036]*			[-0.011][1]		[-0.049]*		[-0.075]*
Lagged 10th Percentile		0.418*	0.353*		0.070	0.037	0.543*	0.527*	0.539*	0.492*
		(0.079)	(0.087)		(0.167)	(0.184)	(0.057)	(0.057)	(0.078)	(0.075)
N	30	25	25	30	25	25	100	100	100	100

Notes: Corresponding income and consumption equations were estimated simultaneously using SUR. Standard errors are in parentheses. The numbers in brackets are long run derivatives calculated as $\beta/(1-\lambda)$, where β is the point estimate for unemployment and λ is the point estimate for the lagged 10th percentile. * denotes significance at the 5% level. [1] denotes that the effect for consumption is significantly different from that for income. In columns 1-6, the 10th percentile and unemployment are determined at the national level, and specifications include inflation, a linear time trend, decade dummies, and interactions of the time trend with the decade dummies. In columns 7-10, the 10th percentile and unemployment are determined at the regional level, and specifications include region and year fixed effects. Columns 8 and 10 also include decade dummies. For comparability across measures, we use data from years when both income and consumption data are available. For the full time period these years are 1961 or 1963, 1972, 1973, 1980, 1981, and 1984-2008.

Table 5B: The Relationship between Unemployment and the 5th Percentile of Log Income and Consumption

Dependent Variable	National Level						Regional Level			
	5th Percentile of Log After-Tax Income			5th Percentile of Log Consumption			5th Percentile of Log After-Tax Income		5th Percentile of Log Consumption	
	1963-2008	1981-2008	1981-2008	1961-2008	1981-2008	1981-2008	1981-2008		1981-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate	-0.058*	-0.061*		-0.013*[1]	0.000[1]		-0.042*		-0.023*	
	(0.015)	(0.010)		(0.005)	(0.005)		(0.009)		(0.007)	
		[-0.086]*			[0.000][1]		[-0.102]*		[-0.065]*	
Unemployment Rate X 1980s			-0.021			-0.066		-0.041*		0.004[1]
			(0.048)			(0.022)		(0.014)		(0.010)
			[-0.027]			[-0.044]*		[-0.097]*		[0.009][1]
Unemployment Rate X 1990s			-0.059*			-0.007[1]		-0.044*		-0.048*
			(0.014)			(0.006)		(0.013)		(0.010)
			[-0.077]*			[-0.005][1]		[-0.105]*		[-0.110]*
Unemployment Rate X 2000s			-0.059*			-0.003[1]		-0.043		-0.062*
			(0.012)			(0.006)		(0.023)		(0.018)
			[-0.077]*			[-0.002][1]		[-0.102]		[-0.143]*
Lagged 5th Percentile		0.292*	0.234*		-0.431*	-0.514*	0.590*	0.579*	0.644*	0.565*
		(0.088)	(0.088)		(0.207)	(0.173)	(0.065)	(0.066)	(0.078)	(0.075)
N	30	25	25	30	25	25	100	100	100	100

Notes: See notes to Table 5A.

Table 5C: The Relationship between Unemployment and the 15th Percentile of Log Income and Consumption

Dependent Variable	National Level						Regional Level			
	15th Percentile of Log After-Tax Income			15th Percentile of Log Consumption			15th Percentile of Log After-Tax Income		15th Percentile of Log Consumption	
	1963-2008	1981-2008	1981-2008	1961-2008	1981-2008	1981-2008	1981-2008		1981-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate	-0.036*	-0.023*		-0.014*[1]	-0.006[1]		-0.019*		-0.015*	
	(0.008)	(0.004)		(0.004)	(0.004)		(0.003)		(0.005)	
		[-0.043]*			[-0.007][1]		[-0.058]*		[-0.033]*	
Unemployment Rate X 1980s			-0.052*			-0.016		-0.021*		0.002[1]
			(0.018)			(0.020)		(0.005)		(0.008)
			[-0.081]*			[-0.019]		[-0.062]*		[0.004][1]
Unemployment Rate X 1990s			-0.034*			-0.006[1]		-0.017*		-0.030*
			(0.006)			(0.007)		(0.005)		(0.008)
			[-0.053]*			[-0.007][1]		[-0.050]*		[-0.061]*
Unemployment Rate X 2000s			-0.018*			-0.008		-0.016*		-0.027
			(0.004)			(0.005)		(0.008)		(0.014)
			[-0.028]*			[-0.010]		[-0.047]*		[-0.055]
Lagged 15th Percentile		0.460*	0.356*		0.154	0.177	0.671*	0.659*	0.550*	0.505*
		(0.079)	(0.081)		(0.147)	(0.171)	(0.050)	(0.050)	(0.079)	(0.078)
N	30	25	25	30	25	25	100	100	100	100

Notes: See notes to Table 5A.

Table 6: The Relationship between Unemployment and Income and Consumption Relative Poverty

Dependent Variable	National Level Poverty						Regional Level Poverty			
	After-Tax Income Relative Poverty			Consumption Relative Poverty			After-Tax Income Relative Poverty		Consumption Relative Poverty	
	1963-2008	1981-2008	1981-2008	1961-2008	1981-2008	1981-2008	1981-2008		1981-2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment Rate	0.156	0.173		0.107	-0.214		0.240*		0.371*	
	(0.082)	(0.095)		(0.096)	(0.161)		(0.088)		(0.174)	
		[0.210]			[-0.186][1]		[0.654]*		[0.890]*	
Unemployment Rate X 1980s			0.369			1.203		0.279*		-0.168
			(0.472)			(0.665)		(0.137)		(0.248)
			[0.418]			[0.872]		[0.723]*		[-0.381]
Unemployment Rate X 1990s			0.293*			-0.237[1]		0.258*		0.899*[1]
			(0.136)			(0.209)		(0.124)		(0.251)
			[0.332]*			[-0.172][1]		[0.668]*		[2.039]*
Unemployment Rate X 2000s			0.095			-0.060		0.048		0.682
			(0.121)			(0.173)		(0.216)		(0.445)
			[0.108]			[-0.043]		[0.124]		[1.546]
Lagged Poverty		0.178	0.118		-0.151	-0.380	0.633*	0.614*	0.583*	0.559*
		(0.155)	(0.155)		(0.382)	(0.355)	(0.070)	(0.071)	(0.086)	(0.083)
N	30	25	25	30	25	25	100	100	100	100

Notes: The consumption (income) relative poverty rate is defined as the fraction of individuals with consumption (income) below 50 percent of median consumption (income). See Table 4 for additional notes.

Appendix Table 1: The Relationship between GDP per Capita and Income and Consumption Poverty

Dependent Variable	National Level Poverty						Regional Level Poverty (1981-2008)						
	After-Tax Income Poverty			Consumption Poverty			After-Tax Income Poverty				Consumption Poverty		
									First				
	Level	Level	Level	Level	Level	Level	Level	Level	Difference	Level	Level	Level	Level
	1963-2008	1981-2008	1981-2008	1961-2008	1981-2008	1981-2008	1981-2008				1981-2008		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Log GDP per Capita	-54.436*	-14.996*		-27.903*[1]	-5.002		-10.117*	0.899	3.022		-30.582*	-18.127*	
	(5.453)	(4.378)		(3.361)	(6.049)		(3.209)	(1.716)	(1.640)		(4.301)	(4.929)	
		[-25.417]*			[-5.927][1]			[5.549]				[-30.466]*	
Log GDP per Capita X 1980s			7.124			39.199				-1.640			-21.712*
			(45.755)			(59.557)				(1.883)			(5.039)
			[12.368]			[43.554]				[-6.721]			[-33.925]*[1]
Log GDP per Capita X 1990s			-15.051*			-10.587				3.439			-16.345*
			(6.948)			(11.769)				(1.771)			(5.321)
			[-26.130]*			[-11.763]				[14.094]			[-25.539]*[1]
Log GDP per Capita X 2000s			-15.245*			-2.158				1.399			-15.014*
			(6.264)			(8.158)				(1.732)			(5.088)
			[-26.467]*			[-2.398]				[5.734]			[-23.459]*[1]
Lagged Poverty		0.410*	0.424*		0.156	0.100		0.838*		0.756*		0.405*	0.360*
		(0.101)	(0.122)		(0.159)	(0.231)		(0.049)		(0.060)		(0.095)	(0.095)
N	30	25	25	30	25	25	100	100	100	100	100	100	100

Notes: The dependent variable is either the poverty rate (level) or the change in the poverty rate from the previous year (first difference). See Table 4 for additional notes.