Toward Understanding the Relationship of Temporal Changes in Demographic Structure to Changes in U.S. Poverty

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This paper attempts to quantify how changes in demographic trends have affected the poverty rate in the United States since the start of the "War on Poverty" in the 1960's. The analysis uses both the official Census poverty definition and a supplemental poverty measure that better captures both the resources available to families and their expenditure needs. Using regression estimates to construct a counterfactual, our results reveal that, while some demographic change increase poverty and others decrease poverty, the net effect of the changes in the demographic structure of the U.S. population was to reduce both of these two measures of poverty.

Keywords: poverty, demographic change, labor market change

JEL classification: I 32, J 11

1. Introduction

In 1964, President Johnson declared a "War on Poverty". Many things have changed since the 1960's, including the demographics of the population, the structure of the labor market, and changes in public policy, all of which affect the poverty rate. In this paper, we attempt to quantify the effect of changes in the demographic structure of the population on changes in two measures of poverty over the 1968–2012 period—the Official Poverty Rate (OPM) and the Supplemental Poverty Rate (SPM).

In this paper, we use micro-data from the Panel Study of Income Dynamics to explore the effects of the changing pattern of the nation's demographic structure on both the OPM and the SPM. Our results reveal that, while some demographic changes increase poverty and others decrease poverty, the net effect of the changes in the demographic structure of the U.S. population reduces both of these measures of poverty.

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Understanding the evolution of poverty in the nation is a crucial issue both from intellectual and policy perspectives. Many studies have speculated as to the causes of the rises and falls of the nation's poverty rate, and our findings provide quantitative evidence of the role of one of the most important of these causes. Policymakers will find these results helpful in that they suggest anti-poverty policy interventions to offset these demographic changes. For example, measures to reverse the growth of single parent families could offset the negative effect of this change on the poverty rate.

In section 2, we present the prior literature that precedes this study. In section 3, we define the OPM and SPM poverty measures. In section 4, we examine descriptive statistics about the changes over the 1968–2012 period in both demographic variables and the poverty rate for each demographic characteristic. Section 5 presents regression results for these poverty rates. Section 6 presents a counterfactual used to calculate the changes in the poverty rates associated with changes in the demographic structure. Section 7 concludes.

2. Prior Literature

At the fiftieth anniversary of President Johnson's declaration, several reviews and assessments have been made of the War on Poverty (for example, Bailey and Danzinger, 2013; President's Council of Economic Advisors, 2014; Haveman, et al., 2014). Many of these studies have sought to understand the difference in poverty trends using both the OPM and a version of the SPM.

Fox et al. (2015) compares poverty using a supplemental poverty measure, which includes taxes and in-kind government transfers, to poverty measured by the official poverty measure. Examining trends in poverty over from 1967 to 2012 using both measures, they find the trends in poverty with the supplemental measure have been more favorable than the trends using the official poverty measure; they interpret this as suggesting that public policy has been more effective in reducing poverty than official poverty measures capture. In particular, they find government programs play a particularly large and growing role in reducing childhood poverty. They do not explore the effect of demographic changes on either of these poverty measures.

Wimer et al. (2016) is an extension of this work, using an anchored supplemental poverty measure to look at historical trends in poverty since 1967. Although the official poverty measure has remained relatively flat over the decades, Wimer et al. show that the poverty rate with the post-tax/post-transfer anchored supplemental poverty measure has fallen by more than 40 percent during the past fifty years. They conclude that "government policies, not market incomes, are driving the declines observed over time" (p. 1207).

This paper takes a different approach in answering the same question as Fox et al. (2015) and Wimer et al. (2016). By incorporating regression analysis and presenting counterfactuals for two measures of poverty in 1968 and 2012, we are able to estimate the effect demographic changes on two U.S. poverty rates. The analysis uncovers both the changes in demographic characteristics and the changes in how these characteristics are associated with poverty since the start of the war on poverty.

3. Poverty Measures

As we have indicated above, our analysis uses two measures of the poverty rate, the Official Poverty Rate and the Supplemental Poverty Rate. The Official Poverty Rate (OPM) is the most well-known of the poverty rates that we use. The U.S. Census Bureau determines family poverty status by comparing pre-tax cash income with a threshold that is set at three times the cost of a minimum food diet in 1963, updated annually for inflation using the Consumer Price Index, and adjusted for family size, composition, and age of householder.[1] Hence, the OPM is insensitive to the fact that non-food expenditures may increase more than proportionally. While the official poverty rate is relatively easy to measure, it faces criticism for not accurately reflecting the income and needs of families. For example, since the measure is pre-tax cash income it does not include many in-kind and tax-based transfer programs such as food stamps and the Earned Income Tax Credit. Similarly, the needs of a family do not reflect the changing composition of what families buy, such as the increase in child care and work costs as more mothers are in the labor market.

The Supplemental Poverty Rate (SPM) differs in several ways from the OPM. The SPM begins with family pre-tax cash income but also takes into account the dollar value of in-kind benefit programs (e.g. the Food Stamp program) and benefits conveyed through the tax system (e.g. the Earned Income Tax Credit) in the resource measure. The SPM also deducts estimates of FICA taxes (to support Social Security and Medicare), work-related expenses, net federal income tax and net state income tax (including the federal and state Earned Income Tax Credit) and out-of-pocket health-care costs. The SPM poverty thresholds are based on expenditures on food, housing, and clothing (rather than just food) and are adjusted over time as the composition of expenditures changes; hence the SPM is a quasi-relative poverty measure.

1 "Family" is defined by the official poverty measure as persons living together who are related by birth, marriage, or adoption. The thresholds do not vary geographically. This description is drawn from the web site of the Institute for Research on Poverty: http://www.irp.wisc.edu/faqs/faq2.htm

Differences in housing costs by type of housing (own home with no mortgage, own home with mortgage, and rent) and an improved equivalence scale are also used to determine the thresholds for different types of families.[2] For many, the SPM provides a more reliable national poverty measure than does the OPM.

The following table shows the primary differences between the OPM and the SPM.

Table 1
Poverty Measure Concepts: OPM and SPM

Concept	Official poverty measure (OPM)	Supplemental Poverty Measure (SPM)
Household Unit definition	Conventional definition: Families and unrelated individuals	Broadened definition: All related individuals who live at the same address, including any cohabiters and their relatives and foster children
Resource measure	Before-tax cash income	Cash income *plus* noncash transfers (such as food stamps and housing subsidies) and refundable tax credits *minus* income and payroll taxes, medical out-of-pocket expenses, and work expenses (includes childcare expenses)
Threshold level for base two-adult/two-child unit	Three times the cost of a minimum food diet (from the Department of Agriculture), updated by the U.S. Consumer Price Index	33rd percentile of expenditures on food, clothing, shelter, and utilities (from recent Bureau of Labor Statistics surveys) multiplied by 1.2
Threshold adjustments	Implicit equivalence scale that varies by family size, composition, and age of the family head	Explicit equivalence scale that varies by unit size and composition, but not by age of unit head; also, adjustments for differences in housing costs by (1) housing status (e.g. owner with a mortgage) and (2) geographic area

Sources: Short (2012). DeNavas-Walt, Proctor, and Smith (2012). See also http://www.census.gov/newsroom/releases/archives/income_wealth/cb12-172.html.

2 The SPM is also often adjusted for differences in housing costs between areas, but our measure does not contain these cost adjustments.

4. Descriptive Statistics on Demographic Variables and Poverty Rates

There are a variety of ways that changes in the demographic composition of the population (age, race, gender, education, marital status etc.) could have affected the OPM and SPM poverty rates over the 1968–2012 period. Some demographic changes would be associated with lower expected poverty, such as the increase in female labor force participation and the increases in educational attainment. Other demographic changes would be associated with higher expected poverty, such as the increase in single-parent households and the aging of the population.

The demographic composition of the population in 1968 and 2012 is shown in Table 2. The data are tabulated from individual observations included in the Panel Study of Income Dynamics supplemented with tax data calculated using the National Bureau of Economic Research TAXSIM tax simulation program.[3] The table highlights the statistically significant changes in the demographic composition of the population. Most variables have changed in statistically significant ways. Some of these changes are things that would be expected to increase poverty (e.g. the increase in female headed families, and divorced and single individuals) while other factors would be expected to reduce poverty (e.g. the decrease in large families and the increase in educational attainment). The largest changes are 1) the shift in the age composition of the population with relatively fewer children and relatively more older people, 2) a substantial increase in the prevalence of female headed families, divorced individuals and singles, 3) a large increase in racial minorities (especially Hispanics), 4) a large increase in the prevalence of households with no workers (a part of this is accounted for by the increase in older households many of which are retirees)[4], 5) a large decrease in the prevalence of large families, 6) a very large increase in the prevalence of those with a college or advanced degree and the associated decrease in the prevalence of those with little education, and 7) the large decrease in the prevalence of households with children less than 18 years living at home.

In Table 3,we show the changes in the OPM and the SPM poverty rates for the nation and for each of the demographic categories. The changes from 1968 to 2012 are quite different between the two measures; while the OPM remains about the same over the period, the SPM decreases by nearly 4 percentage points. The inclusion of the value of in-kind transfers in the SPM largely ac-

3 The Panel Study of Income Dynamics (PSID) is a U.S. longitudinal data set that began in 1968. The sample includes 15,937 observations in 1968 and 17,403 observations in 2012. PSID sample weights are used in all analysis to make the sample nationally representative.

4 When the sample is limited to those 18-65, the percent of households with no workers is 6.26 percent in 1968 and 11.7 percent in 2013.

Table 2
Changes in Demographic Characteristics 1968 to 2012

	% of Population In 1968	% of Population In 2012	Percentage Point Difference	t-statistic
Age				
5 and under	12.0 %	6.9 %	**−5.1 %**	**−15.84**
6 to 17	27.3 %	15.2 %	**−12.2 %**	**−27.34**
18 to 39	29.6 %	29.5 %	−0.1 %	−0.17
40 to 64	23.6 %	33.2 %	**9.6 %**	**19.53**
65 to 79	6.3 %	10.8 %	**4.5 %**	**14.69**
80 plus	1.1 %	4.5 %	**3.3 %**	**18.66**
Race				
Non-Hispanic White	82.3 %	69.5 %	**−12.8 %**	**−27.72**
Black	12.5 %	14.3 %	**1.8 %**	**4.90**
Hispanic	3.7 %	12.8 %	**9.1 %**	**30.87**
Other	1.1 %	3.3 %	**2.1 %**	**13.34**
Gender				
Female	51.2 %	51.1 %	−0.1 %	−0.16
Family Structure				
Female-Headed Household	13.7 %	24.0 %	**10.3 %**	**24.29**
Head's Marital Status				
Married	83.6 %	59.6 %	**−23.9 %**	**−50.54**
Widow	6.7 %	5.7 %	**−0.9 %**	**−3.52**
Single	3.3 %	17.6 %	**14.3 %**	**44.49**
Divorced	6.4 %	17.0 %	**10.6 %**	**30.65**
Home Ownership				
Owns home	65.5 %	63.8 %	**−1.7 %**	**−3.30**
Number of Workers in Household				
Zero workers	10.3 %	18.9 %	**8.5 %**	**22.35**
One worker	52.0 %	42.2 %	**−9.8 %**	**−17.92**
Two workers	37.7 %	38.9 %	**1.2 %**	**2.30**
Number of Children Under 18 in Household				
Zero	25.9 %	52.3 %	**26.4 %**	**51.44**
One	15.3 %	15.9 %	0.5 %	1.35
Two	19.1 %	17.9 %	**−1.2 %**	**−2.88**
Three	15.7 %	8.3 %	**−7.4 %**	**−20.69**
Four or more	24.0 %	5.6 %	**−18.4 %**	**−48.24**
Education Level of Head or Wife, whichever Higher				
High School Dropout	33.6 %	8.3 %	**−25.3 %**	**−59.01**
High School Graduate	36.3 %	25.3 %	**−11.0 %**	**−21.74**
Some College	15.3 %	26.1 %	**10.7 %**	**24.51**
College Graduate	9.4 %	19.8 %	**10.4 %**	**27.38**
Advanced Degree	5.3 %	20.4 %	**15.1 %**	**42.69**
Region				
Northcentral	30.2 %	26.1 %	**−4.1 %**	**−8.27**
Northeast	24.3 %	17.3 %	**−7.0 %**	**−15.78**
South	29.5 %	33.5 %	**4.0 %**	**7.92**
West	16.0 %	22.5 %	**6.5 %**	**15.02**

Table 3
Changes in Poverty Rates by Demographic Variables

	Census Poverty rate				SPM Poverty Rate			
	1968	2012	Change	t-Stat	1968	2012	Change	t-Stat
Overall	11.1 %	11.1 %	−0.1 %	−0.24	**13.6 %**	**10.1 %**	**−3.6 %**	**−10.04**
Age								
5 and under	**13.1 %**	**16.4 %**	**3.3 %**	**3.17**	**15.7 %**	**11.8 %**	**−3.8 %**	**−3.80**
6 to 17	*13.3 %*	*14.7 %*	*1.4 %*	*1.91*	**15.6 %**	**10.7 %**	**−4.9 %**	**−7.04**
18 to 39	**7.5 %**	**12.8 %**	**5.3 %**	**8.96**	**10.7 %**	**12.2 %**	**1.5 %**	**2.40**
40 to 64	8.4 %	8.6 %	0.1 %	0.20	**10.4 %**	**8.5 %**	**−2.0 %**	**−2.79**
65 to 79	**21.1 %**	**5.6 %**	**−15.5 %**	**−8.65**	**23.3 %**	**6.6 %**	**−16.7 %**	**−8.95**
80 plus	**34.6 %**	**10.7 %**	**−23.9 %**	**−5.08**	**33.6 %**	**11.5 %**	**−22.1 %**	**−4.71**
Race								
Non-Hispanic White	7.2 %	6.8 %	−0.4 %	−0.97	**9.0 %**	**6.5 %**	**−2.5 %**	**−6.16**
Black	**35.7 %**	**24.7 %**	**−11.0 %**	**−13.80**	**41.3 %**	**21.0 %**	**−20.3 %**	**−25.78**
Hispanic	18.3 %	18.9 %	0.6 %	0.34	**24.7 %**	**17.1 %**	**−7.6 %**	**−3.97**
Other	*7.5 %*	*11.6 %*	*4.1 %*	*1.89*	10.2 %	11.3 %	1.1 %	0.49
Gender								
Male	10.3 %	10.0 %	−0.3 %	−0.54	**12.9 %**	**9.3 %**	**−3.6 %**	**−7.21**
Female	12.0 %	12.1 %	0.1 %	0.18	**14.4 %**	**10.8 %**	**−3.5 %**	**−7.00**
Family Structure								
Fem.-Head Household	**29.1 %**	**24.2 %**	**−4.9 %**	**−5.17**	**31.4 %**	**22.1 %**	**−9.3 %**	**−9.72**
Not Fem.-Head Hhld.	**8.3 %**	**6.9 %**	**−1.4 %**	**−4.03**	**10.8 %**	**6.3 %**	**−4.5 %**	**−12.72**
Head's Marital Status								
Married	**8.0 %**	**4.4 %**	**−3.6 %**	**−10.78**	**10.6 %**	**3.9 %**	**−6.7 %**	**−19.23**
Widow	**18.0 %**	**25.4 %**	**7.4 %**	**4.67**	20.3 %	23.0 %	2.7 %	1.63
Single	**28.3 %**	**13.2 %**	**−15.1 %**	**−8.24**	**28.7 %**	**13.9 %**	**−14.8 %**	**−7.98**
Divorced	**30.8 %**	**18.7 %**	**−12.0 %**	**−9.94**	**33.7 %**	**17.0 %**	**−16.7 %**	**−13.74**
Home Ownership								
Owns home	**6.9 %**	**4.1 %**	**−2.8 %**	**−7.90**	**7.7 %**	**3.7 %**	**−4.0 %**	**−11.28**
Does not own home	**19.2 %**	**23.3 %**	**4.1 %**	**6.35**	**24.9 %**	**21.3 %**	**−3.6 %**	**−5.38**
Number of Workers in Household								
Zero workers	**41.5 %**	**26.2 %**	**−15.2 %**	**−11.11**	**43.0 %**	**26.1 %**	**−16.8 %**	**−12.26**
One worker	**10.8 %**	**12.8 %**	**1.9 %**	**3.89**	**14.0 %**	**11.2 %**	**−2.8 %**	**−5.43**
Two workers	**3.3 %**	**1.9 %**	**−1.4 %**	**−4.79**	**5.1 %**	**1.1 %**	**−4.1 %**	**−12.38**
Number of Children Under 18 in Household								
Zero	**10.4 %**	**8.8 %**	**−1.6 %**	**−2.46**	**12.0 %**	**9.6 %**	**−2.4 %**	**−3.44**
One	**7.1 %**	**10.2 %**	**3.1 %**	**4.04**	10.6 %	10.7 %	0.1 %	0.11
Two	**7.0 %**	**9.3 %**	**2.2 %**	**3.24**	**9.1 %**	**7.2 %**	**−1.9 %**	**−2.64**
Three	**9.9 %**	**16.8 %**	**6.9 %**	**6.83**	**11.7 %**	**9.6 %**	**−2.1 %**	**−2.29**
Four or more	**18.6 %**	**31.7 %**	**13.1 %**	**9.72**	22.2 %	22.1 %	−0.1 %	−0.04
Education Level of Head or Wife, whichever Higher								
High School Dropout	**25.2 %**	**40.6 %**	**15.4 %**	**12.01**	**29.6 %**	**37.0 %**	**7.4 %**	**5.83**
High School Graduate	**5.4 %**	**16.3 %**	**10.9 %**	**17.55**	**7.9 %**	**14.4 %**	**6.5 %**	**10.38**
Some College	**3.9 %**	**9.6 %**	**5.7 %**	**9.23**	**4.7 %**	**9.0 %**	**4.3 %**	**6.72**
College Graduate	**0.9 %**	**3.1 %**	**2.2 %**	**5.15**	**0.8 %**	**2.9 %**	**2.1 %**	**5.03**
Advanced Degree	**0.2 %**	**2.1 %**	**2.0 %**	**6.06**	**0.5 %**	**2.0 %**	**1.5 %**	**3.73**
Region								
Northcentral	**6.8 %**	**11.1 %**	**4.3 %**	**6.85**	*8.4 %*	*9.5 %*	*1.1 %*	*1.77*
Northeast	**4.9 %**	**7.7 %**	**2.8 %**	**3.95**	7.8 %	6.9 %	−1.0 %	−1.26
South	**21.4 %**	**13.2 %**	**−8.2 %**	**−13.08**	**24.1 %**	**12.1 %**	**−12.0 %**	**−18.94**
West	10.1 %	10.0 %	−0.1 %	−0.07	**13.0 %**	**9.7 %**	**−3.2 %**	**−3.74**

counts for this difference. The patterns shown in Table 3 give insight into how changes from 1968 to 2012 in the poverty rate by demographic characteristic contribute to the overall change in the two poverty rates. For example, if the returns to education have increased over this period, we would expect the poverty rate to go up for those who are high school dropouts relative to those with higher education levels.

These changes mean that even if the demographic characteristics of the population were unchanged from 1968 to 2012, we would expect to see a different poverty rate in 2012 than 1968 because the poverty rate associated with each demographic characteristic has changed over this period. The most striking patterns are, for both poverty rates: 1) a large decrease in poverty for older people, 2) a large decrease for Blacks, 3) a sizable decrease for female headed families, the divorced and the widowed, 4) a decrease for households with one or more workers, 5) a sizable increase (decrease) for those with low education (higher education), and 6) decrease for those living in the South. These changes suggest that it is not just the changing demographics, but also the changes in the relationship between poverty and these demographics that must be considered. The regression analysis and counterfactuals in the next two sections provide a framework for examining this.

5. Poverty Regressions

Table 3 fails to isolate the effect of any given demographic characteristic on poverty. For example, there is a lower poverty rate in 2012 for households with zero workers than there was in 1968. We would expect the opposite given the transition from AFDC to EITC. The reason, though, is in part due to the large change in the age distribution over this time period with a rapid growth of retirees who are just above the poverty line.

We have undertaken a series of probit regressions revealing the correlates of the OPM and the SPM poverty rates. For both 1968 and 2012 sample we estimate the following probit regression:

$$Poverty_i = a + \beta X_i + \epsilon_i \tag{1}$$

where $Poverty_i$ is a dummy variable that equals 1 if the individual is in poverty and 0 otherwise, X_i is a vector of demographic variables, and ϵ_i is an individual-specific error term. We note that the regression estimates are reduced form rather than structural. However, the coefficient estimates indicate the extent to which different demographic factors are related to poverty and changes in these patterns over time. By comparing the coefficients from the probit (β) from estimating Equation (1) separately on the 1968 and the 2012 samples, we can report the extent to which a particular demographic variable has increased or decreased its relationship to poverty rate over time.

Table 4a presents the results of the probit regression for the OPM and Table 4b presents the results for the SPM. The first four columns show the marginal effect[5] (and standard error) of changes in the demographic variables, while the last two columns show the change in the coefficient estimate and a t-statistic indicating whether the coefficient estimate is statistically significantly different in 2012 than 1968. While many of the demographic variables are statistically significant in both years for the two measures, we highlight where the coefficient estimates have changed over time in a statistically significant way. For both older and younger people, Blacks, and living in the South, the differences in the marginal effect over time are consistently statistically significant across both measures of poverty; the marginal effects decrease over time for these three characteristics across both measures of poverty. The changes in these coefficient estimates suggests that while changes in demographic variables are important, they are also occurring in the context of changing economic and policy considerations.

6. Counterfactuals

The changes in the demographic characteristics (Table 2), combined with the changes in the reduced form regressions (Table 4), indicate how the changing distribution of demographic characteristics are correlated with poverty. This information provides the framework for the decomposition methodology and counterfactuals we use. The counterfactuals are calculated using the demographic characteristics (X from Equation (1)) in 1968 and 2012 with the coefficients (β from Equation (1)) from the 1968 and 2012 probit regressions. These counterfactuals indicate the extent to which changes in demographic characteristics are associated with changes in poverty.

Consider first the Census poverty measure (OPM) in Panel A of Table 5. Using 1968 demographics (X_{1968}) and 1968 probit coefficient estimates (β_{1968}), the 1968 census poverty rate is predicted to have been 11.2 % (cell a). However, with the 2012 demographics (X_{2012}), the predicted poverty rate using 1968 probit coefficient estimates falls to 10.1 % (cell b). The demographic changes are associated with a 1.1 percentage point (9.8 percent) reduction in poverty. If, instead, the 2012 probit coefficients are used (β_{2012}), the difference in results are even greater. Comparing cell c and cell d, the changing demographics are associated with a 5.1 percentage point (31 percent) reduction in poverty.

5 The marginal effects reported show the change in the poverty rate for a change in a category from the base value.

Table 4a

Marginal Effects from Probit on Census Poverty in 1968 and 2012

	1968		2012		Difference (2012–1968)	t-Statistic
	Marginal Effect	Stand. Error	Marginal Effect	Stand. Error		
Age (40 to 64 is omitted category)						
5 and under	0.0023	0.0056	**0.0187**	**0.0078**	0.0164	1.709
6 to 17	**−0.0062**	**0.0029**	−0.0004	0.0041	0.0058	1.153
18 to 39	−0.0083	0.0044	0.0052	0.0045	**0.0135**	**2.144**
65 to 79	0.0035	0.0082	**−0.0287**	**0.0045**	**−0.0322**	**−3.440**
80 plus	**0.0710**	**0.0314**	**−0.0244**	**0.0053**	**−0.0954**	**−2.999**
Race (White is omitted category)						
Black	**0.0655**	**0.0136**	**0.0142**	**0.0067**	**−0.0513**	**−3.384**
Hispanic	0.0446	0.0273	**0.0217**	**0.0104**	−0.0229	−0.784
Other	0.0090	0.0172	0.0259	0.0191	0.0170	0.661
Gender and Household Composition						
Individual is Female	0.0012	0.0024	**0.0067**	**0.0034**	0.0055	1.323
Household head is fem.	0.0102	0.0127	0.0034	0.0065	−0.0068	−0.474
Head's Marital Status (Married is omitted category)						
Widow	0.0046	0.0136	−0.0065	0.0101	−0.0111	−0.658
Single	0.0292	0.0221	**0.0548**	**0.0125**	0.0255	1.007
Divorced	0.0105	0.0145	**0.0237**	**0.0100**	0.0131	0.746
Home Ownership						
Owns home	**−0.0390**	**0.0090**	**−0.0596**	**0.0076**	−0.0206	−1.755
Number of Workers in Household (Two or more is the omitted category)						
Zero workers	**0.3387**	**0.0457**	**0.3064**	**0.0318**	−0.0324	−0.581
One worker	**0.0525**	**0.0090**	**0.0672**	**0.0103**	0.0147	1.070
Number of Children Under 18 in Household (Two is omitted category)						
Zero	**−0.0184**	**0.0073**	**−0.0260**	**0.0077**	−0.0076	−0.714
One	−0.0051	0.0097	−0.0096	0.0071	−0.0045	−0.375
Three	0.0132	0.0138	**0.0595**	**0.0194**	0.0464	1.945
Four or more	**0.0480**	**0.0158**	**0.1007**	**0.0334**	0.0527	1.429
Educ. Level of Head or Wife, whichever Higher (HS Dropout is omitted)						
High School Graduate	**−0.0456**	**0.0106**	**−0.0690**	**0.0163**	−0.0234	−1.204
Some College	**−0.0128**	**0.0096**	**−0.0271**	**0.0071**	−0.0143	−1.194
College Graduate	**−0.0319**	**0.0091**	**−0.0222**	**0.0071**	0.0097	0.844
Advanced Degree	**−0.0255**	**0.0124**	−0.0014	0.0098	0.0241	1.525
Region (North Central is omitted category)						
Northeast	**−0.0287**	**0.0072**	**−0.0162**	**0.0059**	0.0125	1.353
South	**0.0659**	**0.0126**	0.0026	0.0059	**−0.0633**	**−4.571**
West	0.0255	0.0150	**−0.0159**	**0.0060**	**−0.0414**	**−2.558**

Table 4b

Marginal Effects from Probit on SPM Poverty in 1968 and 2012

	1968		2012		Difference (2012–1968)	t-Statistic
	Marginal Effect	Stand. Error	Marginal Effect	Stand. Error		
Age (40 to 64 is omitted category)						
5 and under	−0.0038	0.0074	0.0140	0.0073	0.0177	1.712
6 to 17	**−0.0113**	**0.0048**	−0.0007	0.0039	0.0106	1.721
18 to 39	−0.0045	0.0064	0.0077	0.0044	0.0122	1.578
65 to 79	0.0120	0.0126	**−0.0250**	**0.0041**	**−0.0370**	**−2.798**
80 plus	**0.0817**	**0.0363**	**−0.0236**	**0.0043**	**−0.1053**	**−2.877**
Race (White is omitted category)						
Black	**0.0994**	**0.0197**	0.0070	0.0056	**−0.0924**	**−4.510**
Hispanic	**0.0666**	**0.0326**	**0.0219**	**0.0102**	−0.0447	−1.309
Other	0.0072	0.0224	0.0255	0.0186	0.0183	0.629
Gender and Household Composition						
Individual is Female	−0.0001	0.0034	0.0032	0.0033	0.0034	0.723
Household head is fem.	0.0288	0.0223	0.0057	0.0062	−0.0231	−0.997
Head's Marital Status (Married is omitted category)						
Widow	−0.0190	0.0149	−0.0096	0.0080	0.0093	0.553
Single	0.0085	0.0227	**0.0315**	**0.0100**	0.0230	0.928
Divorced	−0.0127	0.0157	0.0086	0.0077	0.0212	1.211
Home Ownership						
Owns home	**−0.0818**	**0.0128**	**−0.0595**	**0.0075**	0.0223	1.503
Number of Workers in Household (Two workers is omitted category)						
Zero workers	**0.3306**	**0.0439**	**0.3235**	**0.0325**	−0.0071	−0.130
One worker	**0.0708**	**0.0115**	**0.0728**	**0.0105**	0.0020	0.128
Number of Children Under 18 in Household (Two is omitted category)						
Zero	**−0.0255**	**0.0101**	−0.0017	0.0069	0.0238	1.940
One	0.0074	0.0153	0.0101	0.0091	0.0027	0.153
Three	0.0098	0.0163	0.0160	0.0135	0.0062	0.291
Four or more	**0.0616**	**0.0199**	**0.0474**	**0.0237**	−0.0142	−0.459
Educ. Level of Head or Wife, whichever Higher (HS Dropout is omitted)						
High School Graduate	**−0.0677**	**0.0137**	**−0.0608**	**0.0151**	0.0069	0.339
Some College	**−0.0281**	**0.0122**	**−0.0177**	**0.0061**	0.0104	0.763
College Graduate	**−0.0541**	**0.0106**	**−0.0219**	**0.0062**	**0.0322**	**2.630**
Advanced Degree	−0.0111	0.0281	−0.0005	0.0091	0.0105	0.357
Region (North Central is omitted category)						
Northeast	**−0.0306**	**0.0111**	**−0.0129**	**0.0056**	0.0178	1.424
South	**0.0783**	**0.0147**	0.0050	0.0055	**−0.0733**	**−4.665**
West	**0.0424**	**0.0202**	−0.0084	0.0059	**−0.0508**	**−2.412**

Table 5
Predicted Poverty Rate Based on Probit Coefficient Estimates and Demographics: Census Poverty Measure and SPM

Panel A: Official Census Poverty Definition	1968 Probit Coefficients β_{1968}	2012 Probit Coefficients β_{2012}
1968 Demographics X_{1968}	11.2 % [a]	16.2 % [c]
2012 Demographics X_{2012}	10.1 % [b]	11.1 % [d]

Panel B: Supplemental Poverty Definition	1968 Probit Coefficients β_{1968}	2012 Probit Coefficients β_{2012}
1968 Demographics X_{1968}	13.7 % [A]	12.1 % [C]
2012 Demographics X_{2012}	11.1 % [B]	10.1 % [D]

Panel B shows a similar exercise for the SPM measure. Using the 2012 probit coefficients, the change in demographic characteristics (cell C to cell D) reduced the poverty rate from 12.1 % to 10.1 %, a reduction of 2.0 percentage points (16.5 percent). Using the 1968 probit coefficients (cell A to cell B) the change is similar, at 2.6 percentage points (19.0 percent).[6]

The counterfactuals show what would happen if all of the demographics were changed to reflect 1968 or 2012 demographics, but it is also of interest to disaggregate this for the different sets of demographic characteristics. For example, which demographic changes are associated with increases in poverty and which are associated with decreases in poverty? Since the predicted probability from the probit regression is a non-linear function of the demographic characteristics, it is not possible to isolate the effect of individual characteristics within the counterfactuals since the effects vary depending on the values of the other demographic variables. However, as an approximation, we use the marginal effects from the regression and the changes in the demographic variables between 1968 and 2012 to get a sense of the direction and relative importance of categories of demographic variables. Most of the demographic changes between 1968 and 2012 had the effect of increasing both OPM and SPM poverty, with large increases associated with the changes in marital status and number of households with no workers. The changes in racial compo-

6 It is interesting to note that while the demographic changes lead to a reduction in poverty for both the OPM and SPM, using the coefficient estimates from 2012 increase poverty relative to the 1968 coefficients for the OPM but decrease poverty for the SPM. This suggests that changes in the other factors, such as the labor market and public policy, have changed in a way that differentially affects the narrower pre-tax/transfer cash income measure of the OPM compared to the broader after-tax/transfer income measure of the SPM. An understanding of these differences are beyond the scope of this paper, but warrant further investigation.

sition, female-headed families, and home ownership are also associated with smaller increases in poverty. However, these increases are outweighed by a large decrease in poverty associated with the educational changes and households having fewer children, with the net result being the counterfactual result of reduced poverty from demographic changes.

In summary, for both poverty measures, the changes in demographic characteristics results in a lower poverty rate. For the OPM, the magnitude of the reduction is larger using the 2012 probit coefficients than the 1968 coefficients, while for the SPM poverty measure the result is similar regardless of which year's coefficient estimates are used. However, for all of the counterfactual measures the net results of the demographic changes is a reduction in poverty. This net reduction is driven by the educational changes and having fewer children in the household, poverty-reducing demographic changes that outweigh the other demographic changes, particularly in marital status and households with no workers, that work to increase poverty.

7. Conclusion

The analysis in this paper has examined two different measures of poverty in 1968 and 2012 in an attempt to quantify the effect of changing demographics on the poverty rate in the United States. There have been substantial changes in demographic patterns over this time period, particularly related to the age of the population, family structure, racial diversity, labor market attachment, and education levels. In addition, the poverty rate associated with different demographic changes has changed over time, both in the descriptive statistics and the regression analysis. Some of these changes, such as the increased educational attainment, would be expected to be associated with a lower poverty rate while others, like the increase in single-parent families, would be expected to be associated with a higher poverty rate. The analysis uses a counterfactual calculated using the probit regressions and the demographic changes to show that the net effect of the changes in demographics reduces poverty across both poverty measures.

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