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Abstract

*In this paper we ask, *how do individual and community factors influence the average length of poverty spells?* We measure local economic conditions by the county unemployment rate and neighborhood spillover effects by the racial makeup and poverty rate of the county. We find that moving an individual from one standard deviation below the mean poverty rate to one standard deviation above the mean poverty rate (from the inner city to the suburbs) lowers the average poverty spell by 20 to 25 percent. This effect is equal in magnitude to the effect of changing the household head from female to male. Also, we find that when we control for the demographic, human capital, and county level effects the conditional effect for high school graduates is only 2 months (85 percent smaller than the unconditional effect), black poverty spells are 7.8 months (half of the unconditional effect), and female headed households increase length of spells by 7.7 months (only 20 percent shorter than the unconditional effect).

*We would like to thank Ann Huffs Stevens for providing us part of the data, Jan Ondrich for helpful discussion, and participants of the seminars at East Carolina University and Joint SOLE/EALE meeting (2005).

1. Introduction

It is widely recognized that the annual poverty rate provides an incomplete picture of poverty; poverty persistence, or the length of time spent in poverty is also an important determinant of the economic status of the poor (Chakravarty et al., 1985; Dardanoni, 1993). The focus of our research is on the individual and community factors that influence poverty dynamics; in particular, the factors that influence the length of a poverty spell.

Beginning with Bane and Ellwood (1986) a common method for studying poverty transitions is estimating the poverty hazard rate. This approach focuses on individual spells and estimates the probability of ending a poverty spell. While the hazard rate approach is enlightening it does not take into account the entire history of poverty transitions. We address poverty persistence by asking somewhat different questions. We study what factors determine the length of a poverty spell.

In our research we ask, *how do individual and community factors influence the average length of poverty spells?* We use the term community factors to describe two distinct phenomena: local economic conditions and social interaction effects. The concern over local economic conditions is easily motivated: is the persistence of poverty greater in counties with high rates of unemployment? To introduce the notion of social interactions we follow Durlaf (2003). He argues that individuals are influenced by neighborhood spillover effects. For example, individuals in counties with chronically high annual poverty rates may suffer greater poverty persistence even when controlling for local economic conditions because of peer pressure, norms, etc. Similarly, counties with high proportions of minority residents may enjoy lower levels of social capital and hence longer spells of poverty.

We address four potential explanations for the behavior of the individuals in poverty. Demographic characteristics are expressed by race, gender, and marital status. Human capital explanations are captured by the education and age of the household head. The local market conditions are represented by the level of unemployment in a county. And finally, the social interaction effects are captured by the percent black and percent poor in a county. To study the demographic, human capital and county level effects on the average poverty spell length we use a matched PSID / Census sample.

Our data covers the period 1968 to 1989 and includes all poverty spells greater than 12 months. The average poverty spell is nearly 39 months. The average black poverty spell length is 16 months longer than the average white poverty spell. The average female headed household poverty spell is 9.3 months longer that of male headed households. High School graduate households suffer 12 fewer months of poverty than dropout households. However, when we control for the demographic, human capital, and county level effects we find that relative high school graduate poverty spell falls by 85 percent (2 months), black poverty spells falls in half (7.8 months), female headed households poverty spells falls by only 20 percent (7.7 months).

Consistent with a life cycle explanation, we find that for both races poverty spell length falls in childhood, rises in adulthood and falls again after retirement. Using separate equations for whites and blacks we find important differences in the factors (other than age) that influence poverty spells across races.

We consider the effect of a county's unemployment rate, poverty rate and racial makeup on the length of a poverty spell. Of these three factors, the percentage of poor in a county has the largest effect. Moving an individual from one standard deviation below the

mean poverty rate to one standard above the mean poverty rate (from the inner city to the suburbs) lowers average poverty lowers the average poverty spell by 20 to 25 percent. This effect is equal in magnitude to changing the household head from female to male.

The results of the paper are mainly descriptive in nature and we do not claim to have identified causality between all the independent variables and the poverty measures. However, the effects of the demographic, human capital, county level characteristics are sensible, and both statistically and economically significant.

2. Previous Literature

Stephen Jenkins (2000) in his Presidential Address to the European Society for Population Economics observes that much more is known about secular trends in poverty than about the dynamics of poverty (p.530). For example, there exists a large body of research that identifies the demographic and human capital characteristics of the poor (c.f. Danziger and Haveman, 2001). The literature on poverty persistence is not nearly as large.

The seminal paper investigating the dynamics of poverty using spell duration and exit probabilities is Bane and Ellwood (1986). Using twelve years of data (1970-1982) from the Panel Study of Income Dynamics (PSID) Bane and Ellwood find that most of the individuals who become poor have only a short stay in poverty. However, at any given time the majority of the people who are poor are in the midst of a long spell of poverty.

More recently, Stevens (1999) advances the study of poverty dynamics by providing estimates of the time spent in poverty over multiple spells. Like Bane and Ellwood she finds substantial persistence among the *stock* of poor individuals. In contrast to Bane and Ellwood she finds substantial persistence among individuals who *flow* into

poverty. Stevens notes that single spell analyses find that most people will be poor for less than two years (see Gottschalk et al., 1994); her multiple spell analysis highlights the fact that the average time in poverty over a decade is four years.

Jenkins notes that much of the poverty dynamics literature (following Bane and Ellwood) focuses on consecutive observations within a given state or poverty spell. However, he notes a further need to study the "longitudinal *patterns* of poverty experience" (p.535). The original contribution to the study of poverty patterns is the well-know *Years of Poverty, Years of Plenty* (Duncan et al., 1984).

The effects of the neighborhood characteristics on the situation of the poor also gained considerable attention. To cite the most recent studies, Quillian (2003) uses PSID to provide evidence that blacks stay longer in poor neighborhoods. Another recent study by Keels et al. (2005) reports success of poor black households who were relocated to more affluent suburban neighborhoods from downtown Chicago as a result of the Gautreaux residential mobility program.

3. Methods and Data

The contribution of this paper is in the introduction of the local market and social interaction effects. To study the characteristics that describe the length of a poverty spell we choose a linear regression approach. The strategy has an advantage of a simple interpretation and easy introduction of non-linearity. Our model is specified as follows:

$$Poverty\ spell\ length(months) = f(D, H, C) \qquad (1)$$

where D represents demographic characteristics including race and gender, H stands for human capital factors such as household head's education and age as well as individual's

age (cubic function), and *C* include county level variables such as percent unemployed, percent black, and county poverty rate, all modeled as quadratic functions.

The approach of using Ordinary Least Squares (OLS) clearly is a major simplification which ignores spell dependence, non-normal distribution of the error term, spell censoring, and non-linearity of the spell length. It is well documented that the conditional probability of exiting poverty during a particular year, given the number of years a person was poor, a hazard rate, is non negligible (Bane and Ellwood 1986, Stevens 1999). The violation of the normal distribution on the error term prevents valid inference. The censoring can create a significant bias to the estimates for the same reasons that the bias is present in all limited dependent variable models. Because of spell dependence the relationship between independent variables and the duration is always non-linear, with the simplest possibility being the log duration model.

Thus, our equation (1) should potentially be estimated by the duration model. However, the disadvantages of the duration model are the often strong parametric assumptions on the hazard rate and a non trivial computation of the marginal effects on the length of the spell. In some models it may be difficult to obtain standard errors for the marginal effects. Moreover, the solutions to the left-censoring may have a large effect on the predicted spell length because of the usually assumed extreme value distribution on the error term (it may predict overly long spell lengths which in turn distorts the predicted mean duration). In general, the marginal effects of independent variables on the spell length in duration models may vary greatly between various specifications and it is mainly due to the fact that the duration model is not designed to compute marginal effects in the first place and we need to do multiple transformations to calculate them.

We believe that the benefits of using simple linear regression outweigh the disadvantages. Multivariate regression overcomes the difficulty of computing the marginal effects because these come directly from the parameter values in OLS. We can easily capture non-linearity in the relationship between spell length and independent variables by including both polynomial and interactions terms. Depending on the level of censoring it is possible that if the bias to OLS is small, the estimates may actually be more robust and close to the true values than marginal effects computed from different specifications of the duration models. In contrast to the durations models consistency of the OLS does not require assumption of any particular distribution on the errors as long as the expected value of the innovations is zero. Still, the standard errors may be incorrect in OLS, but we may induce more bias by computing non-linear functions of the standard errors for marginal effects from potentially mis-specified parametric duration models.

Another issue is the potential self-selection of poor individuals into the counties with high percentage poor. It may be particularly important if persons who on average have short spells of poverty locate themselves in counties which consist of small number of poor individuals. We may then observe a positive relationship between poverty rate and the length of the poverty spell but not due of the casual effect, but because of self-selection. Because PSID follows individuals we have records of their movement between counties and we can partially mitigate the effect of self-selection by controlling with dummy variables for movers. We did not attempt a Heckman's self-selection model because we could not locate variables that affect selection of individuals into the high poverty counties but affect poverty spell length (an exclusion restriction), and because the movers are relatively a small part of the sample, just over 15%. (Self-selection should

affect in equal way an OLS as well as the duration model estimates; however, the problem is easier to solve in OLS because of the well established set of econometric techniques given information in the data.)

Thus, a linear regression with multiple non-linear terms may be better suited for our purpose of estimating the marginal effects. Obviously, estimating of the "true" duration model is the appropriate method for poverty spell length modeling and computation of marginal effects. However, it is possible that a mis-specified duration model is more severely biased than the OLS. We present competing duration method results in Table 5 and argue that they are inferior to our OLS estimates.

Data Sources

Our primary data source is the Panel Study of Income Dynamics (PSID) for 1968-89 (Stevens 1999). We study only individuals who were poor at least once during the sample period. Following Stevens we define poverty as 1.25 times the official poverty line income. We ignore all individuals who have never been poor assuming that they are very different from people who have ever been poor.

In addition to the rich selection of individual and family characteristics, we use information about county location for each person. We matched county level data (poverty rates, racial makeup) from the 1970, 1980, and 1990 Censuses. The data points for years in between censuses were obtained by imputing information by the closest census data and then adjusting the weighted average to the national mean as reported by the Statistical Abstract of the United States.

Annual county level unemployment rates are available from 1975 onward. The years for which unemployment data were not available include information from the

closest year available. All weighted averages were corrected to match the annual mean as reported in the Statistical Abstract of the United States.

Summary Statistics

Table 1a provides summary statistics used in our analysis of the length of poverty spells.[1] Our sample contains 27, 020 poverty spells with an average spell length of 38.75 months. We consider three types of variables, individual characteristics, head of household characteristics, and county characteristics. The individuals in our sample of poverty spells have an average age of 23.1 years, are nearly two-thirds black (63.8 percent), and slightly more likely to be female (53.7 percent). The household heads are 41.6 percent unmarried females, 51.8 percent married, and 6.6 percent unmarried males. Only slightly more than one-third of the household heads are high school graduates. More than 70 percent of the household heads are between 25 and 60 years of age. The typical county of residence by a poor individual has an unemployment rate of 6.13 percent, is nearly one-quarter black, and has a poverty rate of 16.47 percent.

Table 1b provides summary statistics for average poverty spell length. Blacks on average are poor for 44.46 months, whites for 28.71 months. Persons in female headed households have poverty spells that are 9 months longer on average than individuals living in male headed households. Persons living in households where the head is a high school dropout suffer an additional 12.8 months of poverty.

Table 1b also provides average poverty spell lengths for county levels variables. Individuals in county's with percentage black less than the mean have an average spell of 33.09 months, while those above the mean suffer poverty spells of 45.50 months.

[1] See the Appendix for a discussion of poverty spells and years in poverty. Out of 14882 individuals in the sample over 54% have a single spell in the data.

Individuals in county's with the percentage poor below the mean suffer 34.82 months in poverty while those above the mean have poverty spells of 44.55 months. The county's unemployment rate appears to be negatively correlated with poverty spell; those individuals living in counties with below average unemployment rates have longer poverty spells than those in high unemployment county's. We caution that these are unconditional estimates. In the next section we provide the conditional estimates of the influence of the demographic, human capital, and county level effects on poverty spell length.

4. Empirical Results

We divide our analysis into three sections. First, we discuss summary statistics and the demographic influences on poverty spell length. Then we consider the effect of an individuals' age on poverty spell length. Finally, we examine the effect of county characteristics on average poverty spell length. We also provide estimates using alternative data sample selection criteria in order to gauge the sensitivity of our county level results

Demographic indicators

Table 2 provides the regression coefficients for the demographic indicator variables. The dependent variable is the number of months an individual spends in poverty. In addition to race we consider the effect of the head's gender (female-head), the education of the head (High School), the age of the head (agehead_0-25 and agehead_60), and the gender of the individual (female). All regressions include state and year dummies as well as indicators for individuals that changed counties (moved) and for censored poverty spells. We include variables for the individual's age and the county-level effects but report these results in separate sections.

The first column of Table 2 reports the demographic coefficients without the county level effects in the regression. Comparing these coefficients to the coefficients with the county level effects (column 2) shows little change in the coefficient values across model specifications. This allows us to concentrate on the regression results that include the county level effects.

Table 2, column 2, contains the regression results for all poverty spells (i.e., both races) including the county level effects. We find that being black, female, and living in a female headed household increases poverty spell length while living with a head with a high school education or a head less than less than 25 years old reduces the average spell length. In addition, all of the above coefficients are significant at the one percent level. Furthermore, we find that living in a married household (relative to the omitted group, single male head) and living with a head greater than 60 years old (relative to a head between 25 and 59) does not significantly affect the length of the poverty spell.

Examining the magnitude of the effects of the demographic indicator variable on poverty spell length, we find that blacks' suffer an additional 7.81 months of poverty relative to the typical individual in a white-headed household. Individuals living in female-headed households suffer spells of an additional 7.70 months relative to the omitted group, unmarried male heads. Living in a family with a high school educated head reduces poverty spells by approximately 2 months. Individuals living with heads less than 26 years old have poverty spells 4.8 months shorter than those living with older heads. Individual female poverty spells are 1.59 months longer than male poverty spells.

It is useful to compare the predicted poverty spells from Table 2 with the observed poverty spells in Table 1b. The black / white observed gap in Table 1a is 15.76 months

(44.46 - 28.70); however, the predicted gap is only 7.81 months. Thus, controlling for other factors reduces the black / white gap by 50 percent. For female heads the observed gap is 9.34 months and the conditional gap is 7.70 months. This implies that only about 20 percent of the female head gap is explained by differences in the covariates. In contrast, high school dropouts have an observed gap of 12.8 months while the conditional gap is only 1.9 months. In this case almost all (85 percent) of the gap between high school graduates and dropouts can be explained differences in the controlling factors.

Columns 3 and 4 of Table 2 present the regression results by race. It is quickly apparent that "race matters." The difference in races is most obvious for female head and head less than 26 years old. Individuals in black, female-headed households suffer an additional 9.40 months of poverty while individuals in white, female-headed households suffer only 3.98 additional months of poverty. Living with a young head shortens the average black poverty spell by more than 6 months while living with a young head shortens poverty spells for whites by only 2.7 months.

Individual's age

We model an individual's age and the length of the poverty spell as a cubic function. Interpreting the meaning of a cubic function from a table is burdensome; we use simple plots together with 95 percent confidence bands to explore the relationship between age and poverty spell length.

Figures 1a and 1b present the conditional predicted poverty spell length by age for white and black individuals. Figure 1a is the white 'age effect.' The cubic function appears to fit the data quite well; poverty spell length declines as white children age and then begins to rise during adulthood. White individuals near retirement age have poverty spells

of approximately the same length as small children. After retirement age white poverty spell length declines continuously.

We present the black 'age effect' in Figure 1b. Unlike other demographic indicators such as female-head we find little difference in the age effect between races. We conclude that for both races poverty spell length falls in childhood, rises in adulthood and falls again after retirement. This result seems to clearly reflect the expected life cycle.

County level effects

Our primary interest is in investigating the relationship between poverty spell length and county level 'neighborhood' effects. By modeling the poverty spell length as a function of a county's unemployment rate we can examine the impact of local market conditions on spell length. To capture the impact of social interactions we model poverty spell length as a function of the county's racial makeup (percent black). Further, we consider the effect of the percent poor in a county on the average poverty spell length which we suspect contains elements of both local market conditions and social interactions. We present our results by race in Figures 2-4.

Figure 2 models the relationship between county level unemployment and poverty spell length as a quadratic function (we obtain similar, but less precise estimates using the cubic function). For whites (Figure 2a) low unemployment in a county is associated with shorter poverty periods up to unemployment rates of approximately 10 percent, after which the effect diminishes. We find very similar results for blacks (Figure 2b) -- low unemployment is also associated with shorter poverty spells up to unemployment rates of about 10 percent and rates above 10 percent to not add to the length of the poverty spell.

This is in contrast from the unconditional estimates Table 1b that suggested that the unemployment rate was negatively correlated with poverty spell length.

Figure 3 investigates the effect of a county's racial makeup on poverty spell length. For whites (Figure 3a) we find no association between the percentage of blacks in a county and the length of a poverty spell. For blacks the length of a poverty spell is positively associated the county racial makeup up to an approximately 25 percent black / 75 percent white county racial mix.

Figure 4 examines the relationship between a county's poverty rate and an individual's predicted poverty spell. Like the county unemployment rate and the percent black in the county, we model the percent poor in the county as a quadratic function. However, for both whites and blacks we find a linear, positive relationship between the poverty rate in the county and the length of the individual's poverty spell.

Figures 2-4 provide a useful starting point for our analysis of the impact of county characteristics on the length of an individual's poverty spell. Table 3 provides the point estimates of the county level effects. Consistent with the previous graphs, percent unemployed positively affects the poverty spell length, although at a decreasing rate, for both whites and blacks. While percent black and percent black squared are significant for both races combined and blacks separately, there appears to be no county level race effect for whites. Finally, the county's percent poor has a positive and linear relationship with poverty spell length for both whites and blacks.

While Figures 2-4 and Table 3 suggest that county level effect "matter" in the determination of the length of a poverty spell, it is useful to ask "what is the (relative) magnitude of the county level effects? One benchmark is comparing the effect of a head

with a high school degree. In Table 2 we find that not having a high school degree adds approximately 2 months to a poverty spell in the both races sample. In Table 3 we observe that the percent unemployed for whites and the percent poor for blacks are the county level effects with the greatest magnitudes. Using the point estimates in Table 3 we find that an increase in the county unemployment rate from 4.0 to 6.5 percent results in a 2 month increase in poverty spells for whites. Furthermore, an increase in the percentage poor in a county from 10 to 13 percent results in a 2 month increase in poverty spells for blacks.

In the previous example we show that relative modest changes in county level indicators have an effect on the average length of a poverty spell. Suppose we consider the change in the percent poor in a county from one standard deviation below the mean to one standard deviation above the mean (mean, 16.5; standard deviation 7.9). If we move a white individual from a county that is 24 percent poor to one that is 8 poor the average poverty spell falls by 5.6 months (20 percent). The same change for black individuals results in an 11 month decrease (25 percent decrease). In both cases the effect is greater than that of a female head on the average poverty spell. A similar experiment for whites and unemployment results in a 4 month decease in poverty, again similar in magnitude to the white female head effect.

How realistic is this assumption of moving individuals from a county with a poverty rate of 24 percent to one of 8 percent? Consider the following examples of neighboring localities (census estimates): District of Columbia (17.2 percent) and Fairfax County, VA (5 percent); City of Richmond (20.1 percent) and Chesterfield County (5.9 percent); Orleans Parish (New Orleans—26.9 percent) and St. Tammany Parish (Slidell—10.9 percent); and rural Northampton County, NC (21.5) and Wake County (Raleigh—7.8

percent). This implies that moving from one standard deviation above the mean poverty rate to one standard deviation below the poverty rate is equivalent to moving people from either the inner city to the suburbs or from the countryside to the city.

Sensitivity Analysis

Figures 2-4 and Table 3 demonstrate the importance of county level effects on the length of a poverty spell. In Table 4 we consider three alternative sampling techniques. First, we consider a sample of non-movers only. In the second sample we study the "long term" poor, individuals in poverty for two or more years. In the third sample we use the 1968 weights to weight the data along with providing clustered standard errors.

The first three columns of Table 4 provide the non-movers results for all races, whites, and blacks. For the non-mover sample we note that 80 percent of whites and 90 percent of blacks did not change counties during a poverty spell. All in all we observe very little differences in result between Table 3 and the non-movers subset in Table 4. This reassures us that moving from county to county is probably not a big problem in our data and that this potential self selection is minimal.

The second three columns of Table 4 provide county level results for the "long term" poor, individuals in poverty for two or more years. Comparing sample sizes we find that 26 percent of the white spells and 43 percent of the black spells last two or more years. As in the full sample results the county's unemployment rate is significant for both whites (one percent level) and blacks (10 percent level) Similarly, the county's percentage black increases black poverty spell length and has no effect on white poverty spell length. Similarly, the higher the county's percentage in poverty, the longer the white poverty spells length. In contrast to the full sample, the percentage poor does not increase the

poverty spell length for blacks. Again, this is a very different sample from Table 3; however, the results confirm our contention that county level effects matter.

The last three columns of Table 4 provide the results using weighted data using the 1968 weights. We note that deciding which years' weights to use is problematic. However, our weighted results are similar to our unweighted findings. For example, the unemployment rate increases the length of the poverty spell at a decreasing rate, the percentage black in a county has little effect on the poverty spell, and that the percentage poor increases the poverty spell at a constant (linear) rate. This allows us to avoid the problem of which year' weights to use in our analysis.

Finally, we confront the possible issues of misspecification of the OLS by running censored regression (censored from the right for un-ended spells) to control for censoring, censored regression on log of poverty months to control for non normal error term, and a more general Weibull model with and without right censoring to investigate the effect of the flexible functional form. A duration model assuming a Gamma distribution on the hazard rate did not converge, and we did not estimate proportional hazard models due to difficulty with obtaining marginal effects. We also ignored left censoring, unobserved heterogeneity, and multiple spells which are relatively complicated issues. Table 5 presents the results.

The first column presents the OLS results from the full dataset with all the individuals (same as in table 3). Controlling for right censoring (second column) does not change the signs or magnitudes of the effects and most coefficients are within two standard deviations of the OLS results. Using dependent variable in the log of poverty periods has little impact on estimations as well. However, the use of a parametric Weibull model

affects the coefficients in a measurable way. For example, at the mean duration level, the length of the poverty spell length for blacks is 17 months which is more than twice the size of the effect from the OLS. Again, censoring marginally affects the coefficients.

We note that in most cases the results of the OLS (first column) lie between the results from both the log duration model and Weibull model. Also, OLS fares relatively well as measured by the median of MSE. Thus, even though we acknowledge that a properly selected and estimated duration model is more appropriate for modeling a poverty spell length than a simple OLS, we believe than an arbitrarily selected duration model may cause more harm than good for our purpose of modeling the conditional effects.

5. Conclusion

In this paper we ask, *how do individual and community factors influence the average length of poverty spells?* We use the term community factors to describe two distinct phenomena: local economic conditions, and neighborhood spillover effects. We measure local economic conditions using county the unemployment rate. We measure neighborhood spillover effects using the racial makeup and poverty rate of the county.

Our matched PSID / Census sample covers the period 1968 to 1989 and includes all poverty spells greater than 12 months. The average poverty spell is nearly 39 months. The average black poverty spell length is 16 months longer than the average white poverty spell. The average female headed household poverty spell is 9.3 months longer that of male headed households. High School graduate households suffer 12 fewer months of poverty than dropout households. However, when we control for the demographic, human capital, and county level effects we find that the relative high school graduate poverty spell

falls by 85 percent (2 months), black poverty spells fall in half (7.8 months), female headed households poverty spells fall by only 20 percent (7.7 months).

Consistent with a life cycle explanation, we find that for both races the poverty spell length falls in childhood, rises in adulthood and falls again after retirement. Using separate equations for whites and blacks we find important differences in the factors (other than age) that influence poverty spells across races. Individuals in black, female-headed households suffer an additional 9.4 months of poverty while individuals in white, female-headed households suffer only 4 additional months of poverty. Living with a young head shortens the average black poverty spell by more that 6 months while living with a young head shortens poverty spells for whites by only 2.7 months.

We consider the effect of a county's unemployment rate, poverty rate and racial makeup on the length of a poverty spell. Of these three factors, the percentage of poor in a county has the largest effect. Moving an individual from one standard deviation below the mean poverty rate to one standard above the mean poverty rate (from the inner city to the suburbs) lowers average poverty lowers the average poverty spell by 20 to 25 percent. This effect is equal in magnitude to changing the household head from female to male.

Appendix---Identifying the Patterns of Poverty

We focus on the distinction between individuals in poverty, spells of poverty, and years in poverty (per individual or per spell). The idea can be most easily demonstrated by the following graphic:

Year	68	69	70	71	72	73	74	75	76	77	78	79	80	TOT 13
Poor=1	0	0	1	1	1	1	0	0	0	1	1	1	0	7
Person	<----------					years in sample							----------- >	1
Spell			<---- spell ---->							<- spell ->				2
Spell-year			<>	<>	<>	<>				<>	<>	<>		7

During the 13 years shown in the above example, there are two spells of poverty, one of 3 poverty years, and one of 4 poverty years, for a total of 7 poverty years. The average number of years per spell for a particular person is 3.5 years. Previous studies of poverty dynamics studies do not make a distinction between single and multiple poverty spells by the same person. Duration studies usually focus on individual spells only and do not analyze the particular pattern of poverty transitions (exception is Stevens 1999).

The importance of identifying the patterns of poverty can be illustrated by the following example. Suppose two individuals are in the sample during all 13 years and each is poor during 7 of these years. The first person is poor during the first 7 years, ends his poverty period, and stays non-poor for the rest of the time frame. In contrast, suppose the second individual alternates between states of poverty and non-poverty during the same time frame. Clearly, policies designed to aid the first person who suffers prolonged periods of poverty may not be effective at helping the second person who suffers multiple, but short periods of poverty.

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Table 1a. Summary statistics for spells

Variable	Mean	Std.Dev.	Std.Err.	Obs	Min	Max
Poverty mths	38.750	43.25	0.263	27020	12	264
			Individual			
Age	23.090	20.350	0.123	27020	1	99
Black	0.637	0.480	0.002	27020	0	1
Female	0.536	0.498	0.003	27020	0	1
			Head			
Female head	0.415	0.492	0.0029	27020	0	1
High School	0.340	0.473	0.0028	27020	0	1
Age < 25	0.176	0.381	0.0023	27020	0	1
Age > 60	0.117	0.322	0.0019	27020	0	1
Married	0.517	0.499	0.0030	27020	0	1
			Country			
unemployed	6.120	2.990	0.018	27020	0	30.51
black	23.860	18.350	0.111	27020	0	80.61
poor	16.460	7.850	0.047	27020	2.34	57.86

Table 1b. Summary statistics for poverty months per spell

Variable	Obs	Mean	Std.Err.	Std.Dev.	[95% Conf.	Interval]
non black	9793	28.70	.315	31.24	28.09	29.32
black	17227	44.46	.365	47.85	43.75	45.17
Male	12517	37.09	.367	41.07	36.37	37.81
female	14503	40.18	.373	45.00	39.45	40.92
male head	15793	34.87	.316	39.75	34.25	35.49
female head	11227	44.21	.445	47.21	43.33	45.08
Less than hs	17831	43.09	.353	47.14	42.40	43.78
High school	9189	30.32	.343	32.89	29.65	31.00
age head <25	4766	33.65	.525	36.26	32.62	34.68
age head >60	3184	37.11	.707	39.9	35.72	38.50
Unempl< Mean	15179	41.89	.389	47.89	41.13	42.65
Unempl> Mean	11841	34.74	.331	36.07	34.09	35.39
Black< Mean	14695	33.09	.309	37.43	32.89	33.70
Black> Mean	12325	45.50	.437	48.46	44.65	46.36
Poor< Mean	16093	34.82	.314	38.87	34.21	35.44
Poor> Mean	10927	44.55	.452	47.21	43.66	45.43
Total	27020	38.75	.263	43.25	38.23	39.27

Table 2. Months in poverty by demographic characteristics

	All	All	White	Black
Black	8.3241	7.8052		
	(0.5753)***	(0.6576)***		
Female	1.6211	1.5908	1.1428	1.9586
	(0.4719)***	(0.4710)***	(0.6309)*	(0.6461)***
Femalehead	7.4910	7.6976	3.9786	9.4335
	(0.9141)***	(0.9118)***	(1.1966)***	(1.2695)***
heduc_high	-2.2339	-1.9627	-1.1465	-2.4839
	(0.5511)***	(0.5506)***	(0.7116)	(0.7735)***
agehead_0_25_	-4.9571	-4.8393	-2.6901	-6.2327
	(0.6443)***	(0.6433)***	(0.8178)***	(0.9137)***
agehead_60_	0.4824	0.4601	2.0198	1.4148
	(0.9360)	(0.9359)	(1.3107)	(1.2736)
Married	1.3237	1.1952	1.2649	0.9186
	(0.8969)	(0.8956)	(1.1290)	(1.2706)
County variables	no	yes	yes	yes
Cubic age	yes	yes	yes	yes
Moving indicators	yes	yes	yes	yes
Censoring variables	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
State dummies	yes	yes	yes	yes
Observations	27083	27020	8657	17227
R-squared	0.2762	0.2820	0.2685	0.2861
Average poverty length #	38.73692	38.7544	28.36364	44.46485
	(43.22962)	(43.25611)	(31.3008)	(47.85173)
	[.2626836]	[.2631508]	[.3364122]	[.36458]

reports mean, standard deviation, and standard error

* - significant on 10% level, ** - significant on 5% level, *** - significant on 1% level

Figure 1a. White

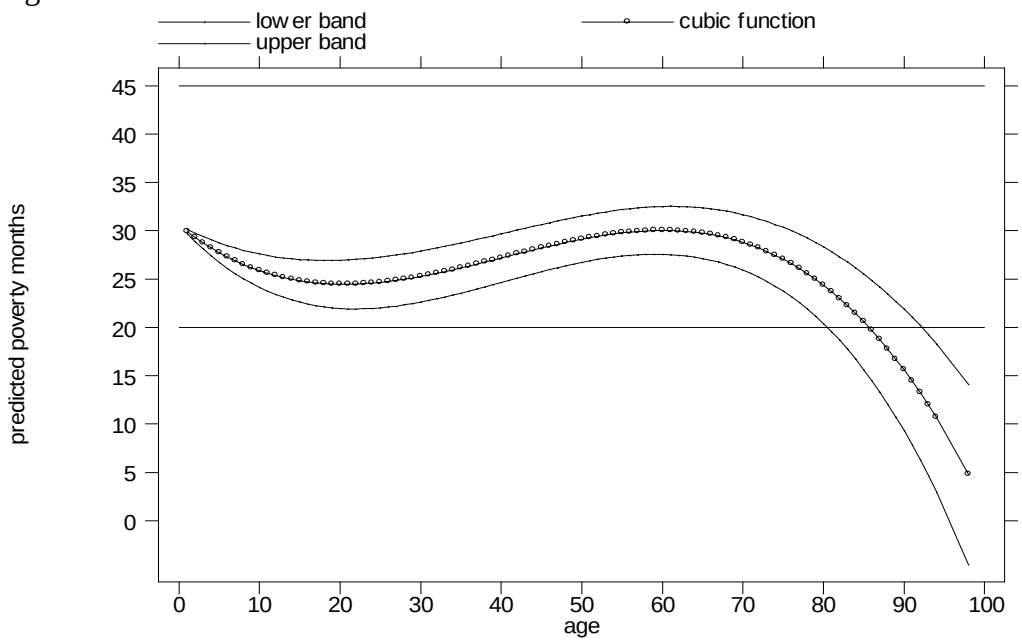

Figure 1b. Black

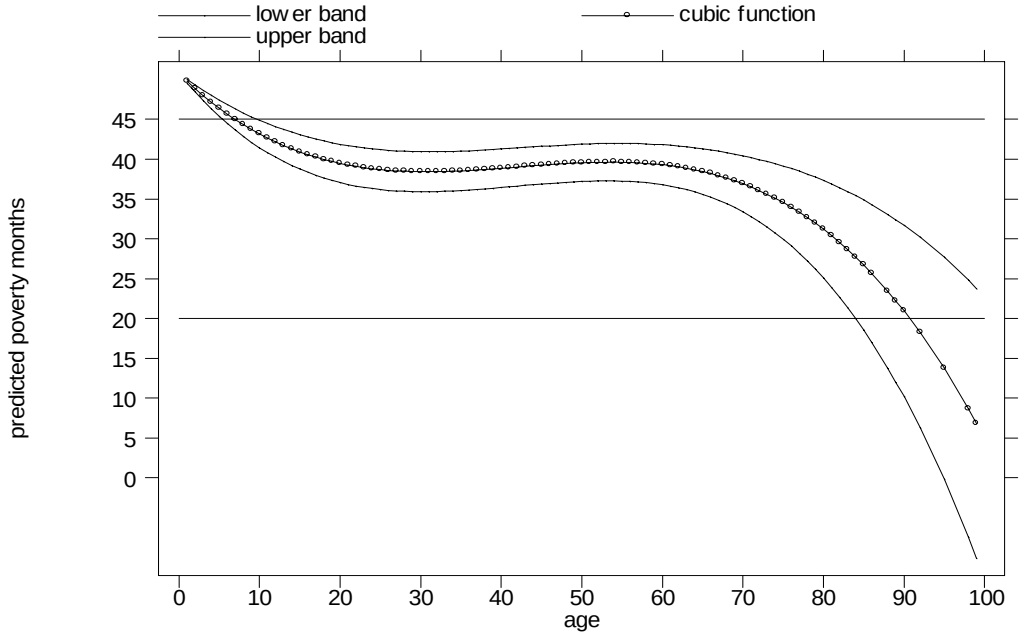

Figure 2a. White

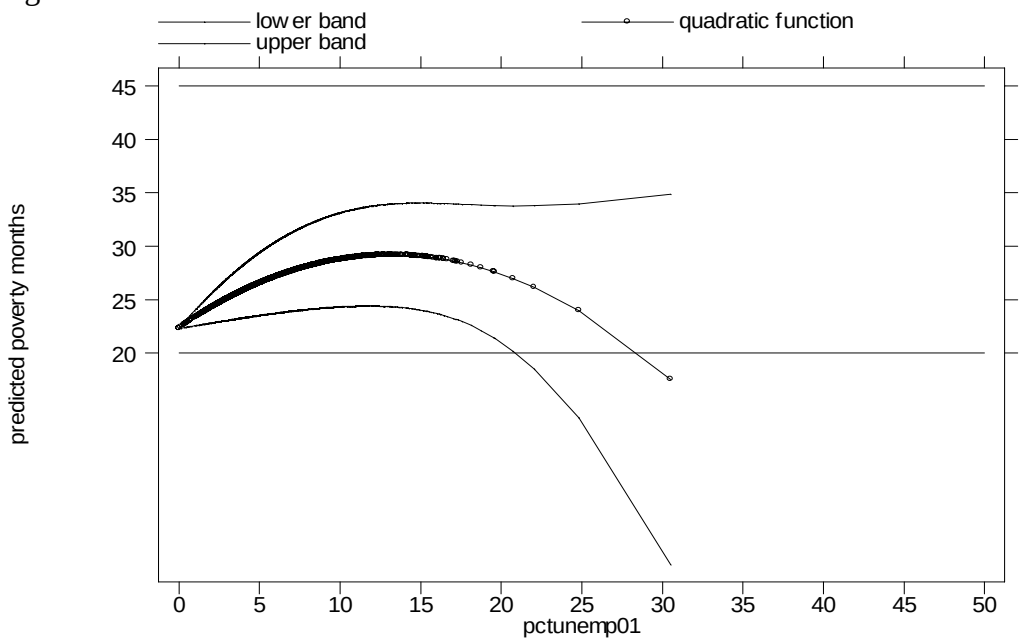

Figure 2b. Black

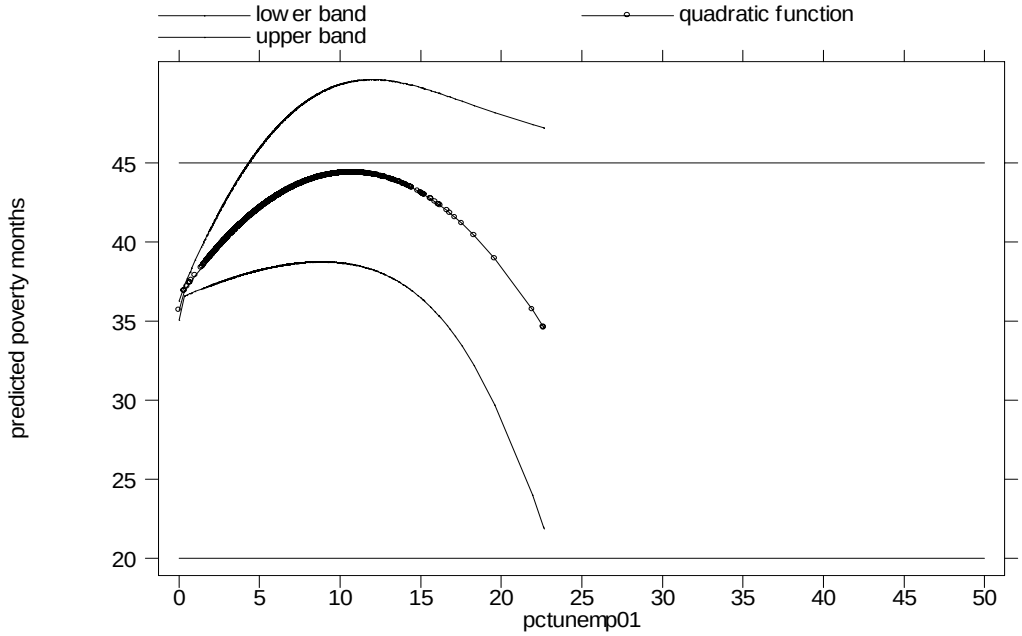

Figure 3a. White

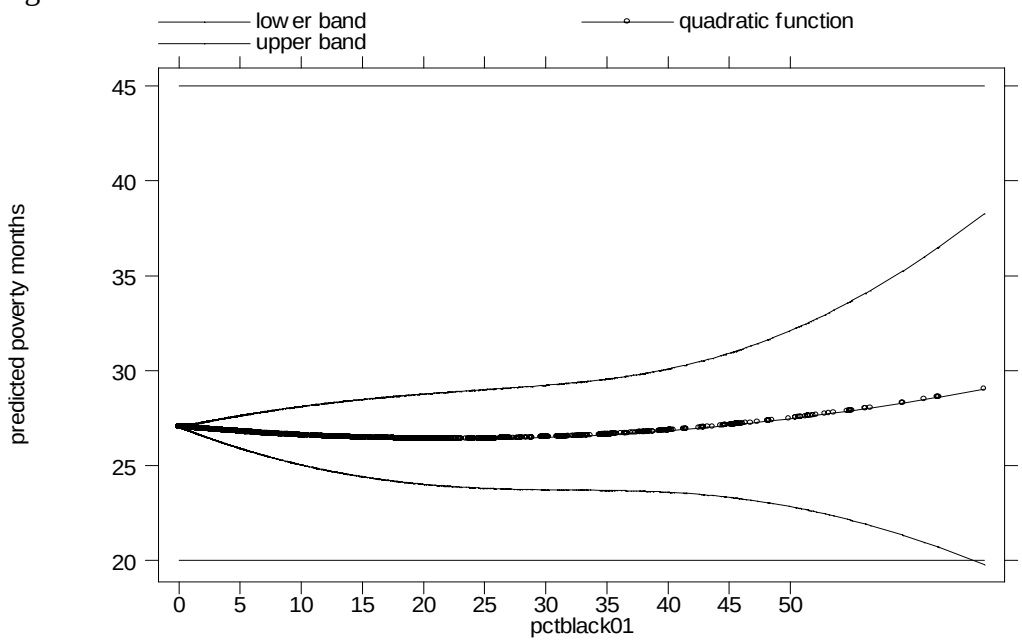

Figure 3b. Black

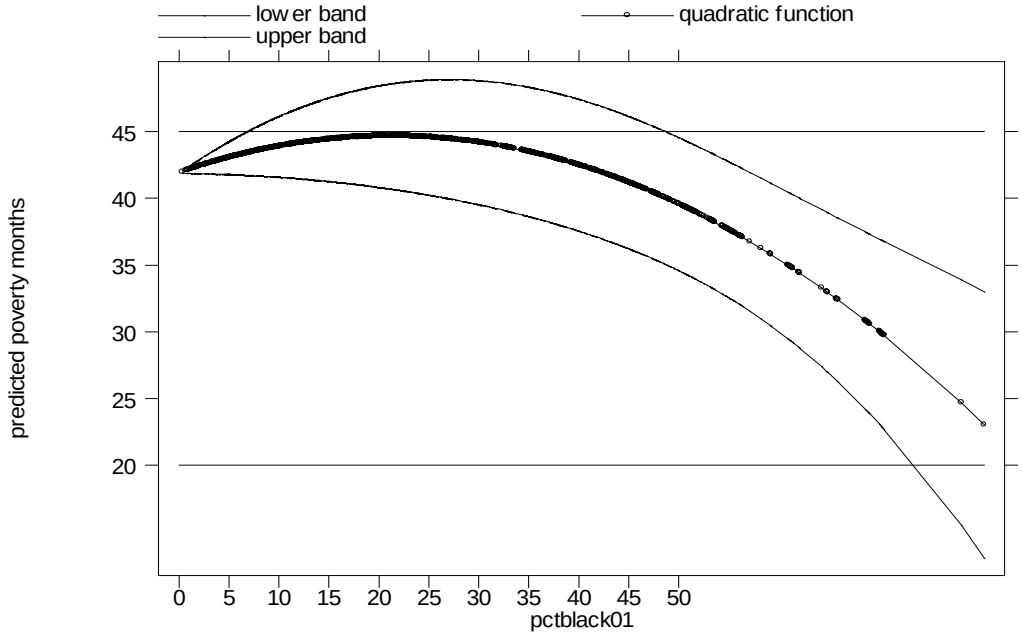

Figure 4a. White

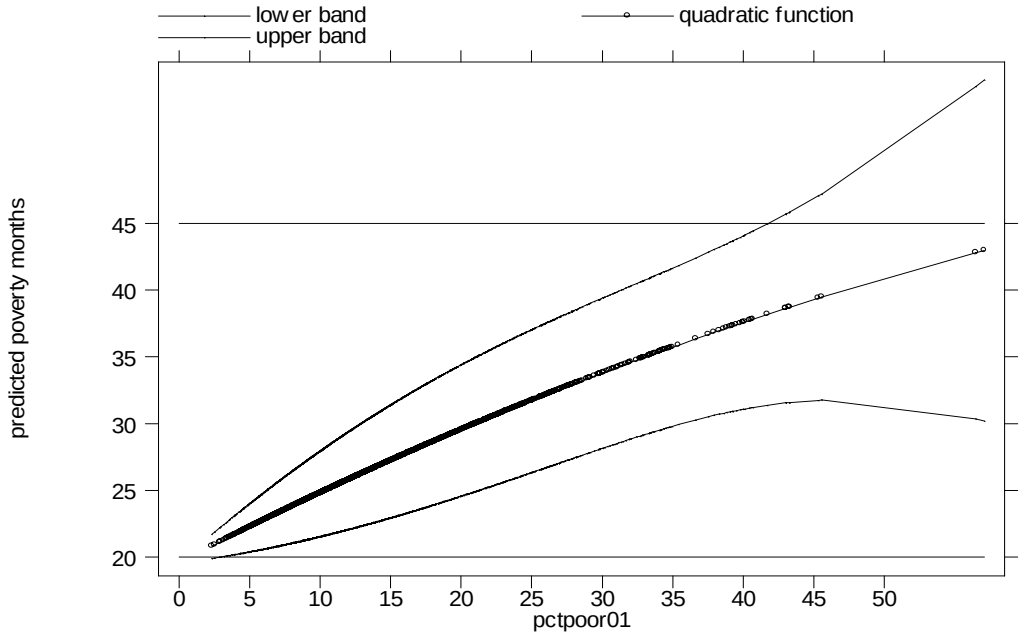

Figure 4b. Black

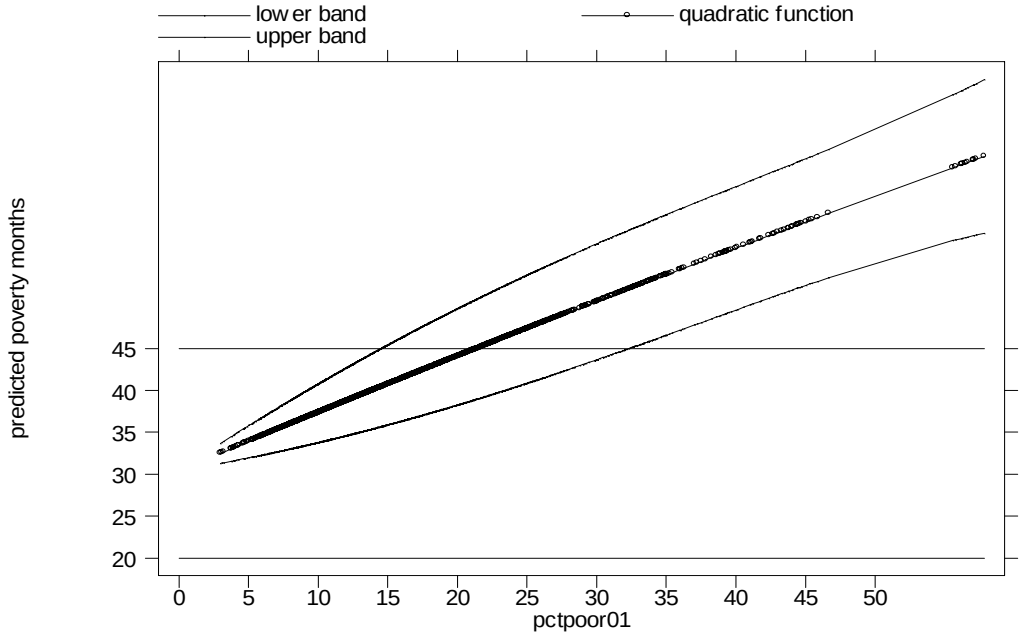

Table 3. Poverty months and quadratic county level effects

	All	White	Black
% unemp	0.9334	1.3074	1.0915
	(0.3127)***	(0.3439)***	(0.4981)**
% unemp^2	-0.0367	-0.0481	-0.0490
	(0.0166)**	(0.0175)***	(0.0272)*
% black	0.2032	0.0068	0.3147
	(0.0674)***	(0.0872)	(0.1278)**
% black^2	-0.0053	0.0006	-0.0062
	(0.0012)***	(0.0020)	(0.0020)***
% poor	0.6383	0.4205	0.7835
	(0.1264)***	(0.1791)**	(0.1976)***
% poor^2	-0.0004	-0.0023	-0.0034
	(0.0024)	(0.0041)	(0.0034)
Observations	27020	8657	17227
R-squared	0.2820	0.2685	0.2861
Average poverty length #	38.75 (43.26) [.263]	28.36 (31.30) [.336]	44.46 (47.85) [.364]

reports mean, standard deviation, and standard error

* - significant on 10% level, ** - significant on 5% level, *** - significant on 1% level

Table 4. Poverty months and quadratic county level effects

	Never moved			Spells > 2			Weighted estimation with clustered standard errors		
	All	White	Black	All	White	Black	All	White	Black
% unemp	1.020	1.035	1.482	1.387	3.311	1.725	1.427	1.182	2.01
	(0.339)***	(0.388)***	(0.518)***	(0.661)**	(0.999)***	(0.90*	(0.301)***	(0.324)***	(0.685)***
% unemp^2	-0.041	-0.039	-0.069	-0.049	-0.147	-0.08	-0.062	-0.046	-0.08
	(0.018)**	(0.020)**	(0.029)**	(0.036)	(0.049)***	(0.05)	(0.015)***	(0.0146)***	(0.032)**
% black	0.155	-0.059	0.261	0.431	0.098	0.52	0.022	-0.115	-0.26
	(0.0748)**	(0.098)	(0.136)*	(0.137)***	(0.225)	(0.22)**	(0.076)	(0.108)	(0.187
% black^2	-0.005	0.0014	-0.006	-0.009	0.0007	-0.01	-0.004	0.0022	0.001
	(0.0013)***	(0.0022)	(0.002)***	(0.002)***	(0.005)	(0.004)**	(0.002**	(0.003)	(0.003)
% poor	0.651	0.546	0.698	-0.100	0.773	-0.390	0.666	0.546	0.832
	(0.140)***	(0.205)***	(0.212)***	(0.244	(0.409)*	(0.341)	(0.178)***	(0.272)**	(0.351)**
% poor^2	0.0001	-0.003	-0.001	0.007	-0.018	0.010	0.0002	-0.002	-0.004
	(0.0026)	(0.005)	(0.004)	(0.004)*	(0.008)**	(0.006)*	(0.0041)	(0.007)	(0.007)
Observations	23235	6850	15430	9995	2259	7385	26375	8494	16758
R-squared	0.23	0.20	0.23	0.29	0.33	0.30	0.25	0.24	0.26
Average poverty length #	37.17 (41.56) [.272]	26.78 (29.87) [.361]	42.26 (45.54) [.366]	78.88 (49.54) [.495]	67.10 (40.65) [.855]	83.10 (51.85) [.603]	33.57 (37.57) [.231]	28.72 (31.21) [.338]	46.18 (48.88) [.377]

reports mean, standard deviation, and standard error

* - significant on 10% level, ** - significant on 5% level, *** - significant on 1% level

Table 5. Marginal effects using parametric duration models (all observations).

	OLS	right-censored OLS	right-censored log OLS	Uncensored Weibull duration	Censored Weibull duration
Black	7.8052*	6.8824	6.2969	17.5725	17.9110
Female	1.5908*	0.4244	0.3618	2.8017	1.8383
Femalehead	7.6976*	4.8837	5.1284	16.0670	13.2217
heduc_high	-1.9628*	-2.3328	-3.0057	-3.9571	-4.1564
agehead_0_25_	-4.8393*	-5.8914	-5.2903	-9.4923	-11.8167
agehead_60_	0.4601	-1.4906	-0.5676	1.5212	0.1311
Married	1.1952	-0.8606	-0.9543	2.5254	-0.9909
% unemp	0.9334*	0.6754	0.6704	1.8992	1.8938
% unemp^2	-0.0367*	-0.0100	-0.0115	-0.0486	-0.0169
% black	0.2032*	0.1808	0.0954	0.5039	0.4967
% black^2	-0.0053*	-0.0043	-0.0024	-0.0112	-0.0096
% poor	0.6383*	0.5027	0.4831	1.3564	1.4126
% poor^2	-0.0004*	-0.0010	-0.0010	-0.01014	-0.0130
Observations	27020	27020	27020	27020	27020
median MSE	293.49	461.76	521.03	230.06	412.61

Note1: we report only coefficients because the standard errors may not be comparable between models and we could not obtain them for the Weibull specification.

Note2: 9238 spells are right censored.

* - significant on 5% level