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Do Changes in Educational Attainment Impact Rates of Poverty for Communities?: A Longitudinal Evaluation of the Viability of Policy Aimed at Reducing Poverty through Increasing Educational Attainment in Louisiana, 1970-2000

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Abstract: In this paper we assess the viability of a policy approach in the State of Louisiana to address the high rate of poverty. Louisiana lawmakers have implemented policy to increase rates of high school completion. At the same time, Louisiana has established legislation to reduce the rate of poverty in the state by 50%. Given the lack of research on this topic, we perform an exploratory analysis of historical Census data to identify a relationship between poverty rates and the percent of the population completing high school. Our descriptive analysis suggests that Louisiana diverges from the national trend in important ways. To further assess the validity of this relationship, we perform a fixed effect longitudinal analysis. Our findings provide robust support for the link between educational attainment and poverty rates in Louisiana over time and suggest that mandates to increase educational attainment may be a promising avenue for addressing the social problem of poverty in Louisiana.

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INTRODUCTION

Dating back to the initial formulations of human capital and status attainment theory, researchers have argued for the relationship between economic well-being and investments in education, job specific training, and work experience (Becker, 1964; Blau & Duncan, 1967). Recently, two intersecting policy efforts in Louisiana have the potential to put this line of reasoning into practice. On one hand, the Governor of Louisiana and a prominent State Senator developed legislation to reduce poverty by half in ten years (Office of the Governor, 2008). On the other hand, the legislative branch has sought to increase graduation rates and improve educational attainment in the state (Louisiana Legislature, 2009). Following human capital theory, the simultaneous implementation of these two policy efforts may provide for an effective policy approach to reducing poverty for communities.

A central difficulty in applying this perspective is the nature of the relationship between educational attainment and rates of poverty. At the national level, research explaining changes in the overall U.S. poverty rate over time focus largely neglect the role of educational attainment. This line of study focuses on three factors: economic growth, economic inequality, and changes in family structure (Iceland, 2003; Danzinger & Gottschalk, 1995). These researchers argue that the economic expansion following WWII generated large increases in per capita income through the transition from an agriculture based economy to one rooted in manufacturing and services. Following 1970, income stagnated and inequality in income grew (Bluestone & Harrison, 1990). Coupled with an increasing rate of female headed families, the U.S. poverty rate stopped declining after 1970 and stabilized for remainder of the century. However, improved high school

graduation rate provide a key policy tool for states. For example, a high school diploma is often a necessary credential to obtain post-secondary education, access to job training programs, and strongly associated with finding quality employment (Caspi, Wright, Moffit, & Silva, 1999; Chen & Kaplan, 2003; Goldschmidt & Wang, 1999). In contrast, lacking a high school diploma increases the likelihood of unemployment and engagement in criminal behaviors (Lochner & Moretti, 2004). In turn, communities with a highly educated labor force are likely to attract high paying industries, while those lacking a pool of highly educated workers have difficulties recruiting new employers and outside investment (Goetz, 1993; Kraybill & Weber, 1995). Thus, educational attainment indirectly affects poverty by creating new opportunities in the community that result in lower rates of poverty.

At the subnational level, a limited number of studies have developed models to explain variation in poverty rates over time for communities. These analyses provide some insight into the role of educational attainment, but present mixed findings. For example, Fontenot et al., (2010) examine changes in the rate of poverty from 1990-2000 among counties in two high poverty regions: the Texas Borderland and the Mississippi Delta. Fontenot et al., (2010) finds no significant relationship between the change in the percent of persons age 25 and over who did not complete high school and changes in the rate of poverty between 1990 and 2000 for counties in the Mississippi Delta. The Mississippi Delta region includes a number of rural parishes in the northeastern portion of Louisiana that borders the Mississippi River.

In contrast, Slack et al., (2009) find a significant effect of educational attainment on poverty. In a pooled analysis of counties in the Mississippi Delta and the Texas

Borderland region they find a significant effect of the percent of persons age 25 and over not completing high school. Counties with a high rate of non high school completers in 1990 have higher rate of poverty among married couple families in 2000. With respect to Louisiana, only one study to our knowledge has performed a longitudinal poverty analysis for Louisiana communities. After adjusting for initial levels of demographic, labor force, and family characteristics of Louisiana Parishes, Blanchard, Stokes, DeCuir, Bonhomme, and Forsyth (2011) find that the percent change in the population not completing high school is a key predictor of the percent change in poverty between 1990 and 2000.

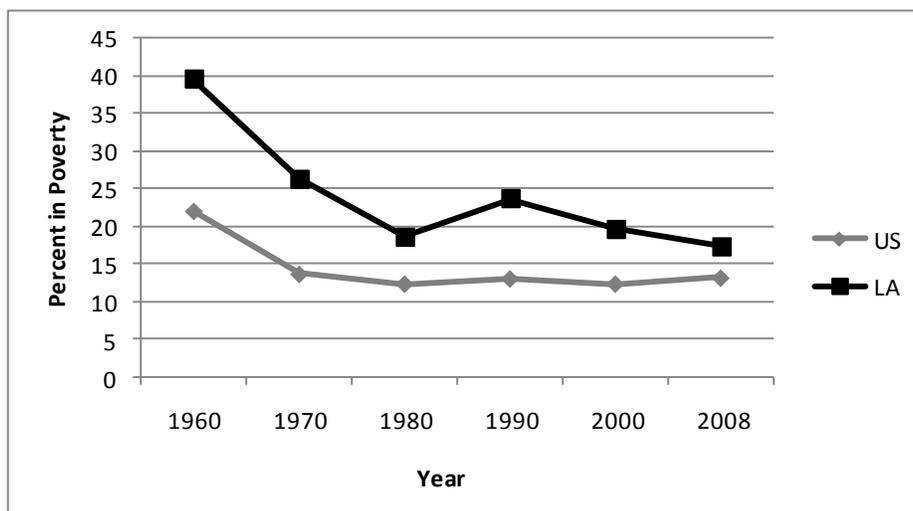
In addition to the inconsistent findings, a key shortcoming of all three subnational studies is that the analyses focus on a single decade, the 1990s. In this paper, we seek to add clarity to this line of study by examining 1970-2000 data on poverty for Louisiana Parishes. We test the hypothesis that increases in educational attainment are associated with declines in poverty rates over time. This research question is important because it may provide support for a policy model that may reduce poverty

in a state that is experiencing one of the highest rates of poverty in the U.S.

Is Louisiana Different? Poverty and Educational Attainment in Historical Context

Given the lack of longitudinal studies of the relationship between poverty and educational attainment, we examine historical data on Louisiana and the U.S. using historical census data from the second half of the twentieth century. During the second half of the twentieth century, the state of Louisiana experienced substantial declines in poverty (see Figure 1). In 1959, four in ten (39.5%) Louisiana residents lived in poverty (U.S. Census Bureau 1971). This figure declined substantially from 1959 to 1969 dropping to 26.3% (U.S. Census Bureau, 1971). Louisiana's poverty rate continued to decline from 1969 to 1999. By 1999, Louisiana's poverty rate had dropped to 19.6% despite a severe economic downturn in the late 1980s and early 1990s (U.S. Census Bureau, 2003, 2010). Statistics from the 2008 American Community Survey indicate that Louisiana is experiencing continued success in poverty reduction with a poverty rate of 17.3% (U.S. Census Bureau, 2009).

Figure 1. Percent in Poverty 1970-2008, Louisiana and U.S.

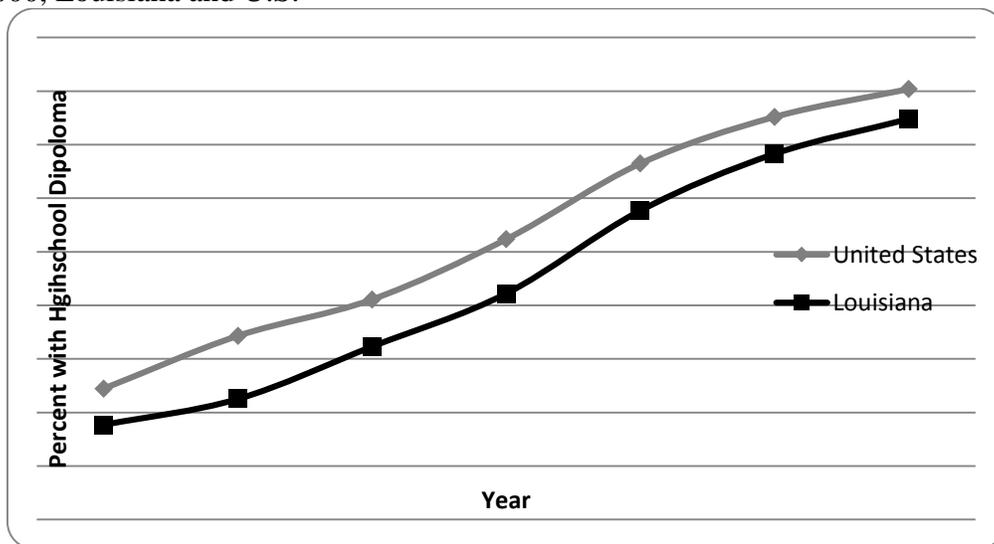


In contrast, the U.S. experienced only modest declines in poverty that occurred largely between 1960 and 1970. In 1959, 22.1% of the U.S. population lived in poverty as compared to 13.7% in 1969 (U.S. Census Bureau 1971). While the poverty rate was nearly cut in half during the 1960s, the remaining decades saw little change in the national poverty rate (U.S. Census Bureau, 1971). From 1979 to 1999, the poverty rate varied between 12.4 to 13.1% (U.S. Census Bureau, 2003, 2010). Thus, progress towards the amelioration of poverty has stalled for nearly three decades with recent statistics from the 2008 American Community Survey suggesting that the U.S. poverty rate has grown to 13.2% (U.S. Census Bureau 2009).

With respect to education, both the U.S. and Louisiana demonstrate a similar

longitudinal trend in educational attainment. Figure 2 presents the percentage of the population age 25 and over that are high school graduates from 1940-2000. Both Louisiana and the U.S. show a consistent trend of increases in educational attainment over time. The key difference between the Louisiana and U.S. trend is that Louisiana lags the U.S. in all decades. However, it is important to note that the difference between Louisiana and the U.S. narrows over time. For example, in 1970, the gap between the U.S. and Louisiana in terms of the percent of the population age 25 and older with a high school diploma was 10.1% (52.3% in the U.S., 42.2% in Louisiana). By 2000, this gap had declined to 5.6% (80.4% in the U.S., 74.8% in Louisiana).

Figure 2. Percent of Population Age 25 and Older with a High school Diploma 1940 to 2000, Louisiana and U.S.



An important conclusion that can be drawn from the trends in poverty and educational attainment is that Louisiana demonstrates continued declines in poverty that correspond to a trend of increasing levels of educational attainment. In contrast, trends for the U.S. show that increasing educational attainment stopped

corresponding with changes in poverty in 1970. Following 1970, the U.S. poverty rate stabilized while educational attainment increased. This finding is important because Louisiana appears to deviate from the national trends in poverty and educational attainment.

DATA AND METHODS

In this paper we address the following question: is there a relationship between poverty and education attainment in Louisiana? To examine the relationship between the poverty rate and educational attainment, we examine data from the 1970, 1980, 1990, and 2000 Census. The units of analysis for our study are the 64 Louisiana parishes measured in each of the four time periods. We select parishes as the unit of analysis because parish boundaries are stable over time. In addition, parishes are governmental units that are responsible for the distribution of federal and state funds and implementing intervention programs (Lobao & Hooks, 2003).

We address our research question using a fixed effect longitudinal regression model (for a full description, see Alison 2005). The unit of analysis of our data is a parish year. The data includes information on 64 parishes measured at four time points: 1970, 1980, 1990, and 2000. Fixed effect models are useful for longitudinal poverty analysis because the model accounts for all of the time invariant characteristics of the units of analysis. For our analysis, this is accomplished by including binary variables for all parishes in the analysis (one parish is excluded as a reference category). In doing so, the binary variables account for all between county differences in average levels of poverty and the analysis is restricted exclusively to within parish changes in the poverty. In addition to the binary variables for each parish, the model also includes binary variables for each decade (2000 is the reference category in our models). Note that with the exception of the binary control variables for each parish, all variables included in the model are time varying characteristics for each parish.

The dependent variable in our analysis is the percent of the population living in poverty. Our dependent variable is

measured at four points in time, 1970, 1980, 1990, and 2000. Poverty is defined by the Census Bureau using household income thresholds based on household size. The Census based measure of poverty is the only parish level poverty measure available from 1970 to 2000.

The key independent variable in our analysis is the percent of the population age 25 and over not completing high school in 1970, 1980, 1990, and 2000. Following our expectations derived from prior studies, we expect that the percent of the population not completing high school will be directly associated with the rate of poverty for the parish. Other independent variables in our model are based on findings from prior research. These include measures of demographic structure and labor force characteristics.

In terms of demographic structure, prior studies have documented that children have experienced an increasing likelihood of living in poverty due to increases in the percent of families that are female headed (Bianchi, 1999; Lichter & Jayakody, 2002). We control for this trend by including the percent of the population under age 18 in our model. Along a similar vein we control for the percent of households that are female headed.

A second important demographic variable identified in poverty studies the race of community residents. Prior studies suggest that the relative presence of minority residents in a community is associated with higher poverty rates because these residents may face discrimination from majority race residents (Massey & Denton, 1993; Friedman & Lichter, 1998; Voss, Long, Hammer, & Friedman, 2006). For example, Blalock (1967) argues that the relative presence of a minority group impacts the economic well-being of that group through discrimination. To address this issue, we measure race using the percent of the

population that identifies as Black or African American. A third demographic variable included in our model is the percent of the population age five and older that lived in the same county five years prior. For example, in 1990 this variable measures the percentage of the population age five and older that lived in that county in 1985. This variable is included in the model because fast growing communities possess economic opportunities that attract newcomers (Frey & Liaw, 2005). Thus, a high rate of population stability would be associated with higher poverty rates because population stability reflects a lack of economic opportunities attracting in new residents.

Our models also include variables measuring characteristics of the labor force.

Prior research indicates that the unemployment rate is directly associated with rates of poverty (Cotter, 2002). High rates of unemployment suggest a lack of employment opportunity in the community which adversely impacts household income levels. A second labor force measure included in our analysis is the percent of the population employed in manufacturing. Manufacturing employment is often associated with lower levels of poverty because these jobs provide high paying jobs for workers that do not possess a post-high school education (Cotter, 2002; Rupasingha & Goetz, 2007). Descriptive statistics for all variables included in our analysis appears in Table 1.

Table 1. Descriptive Statistics for Variables in the Model

	1970		1980		1990		2000	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
% Age 25+ Not Completing High School	64.80	8.74	49.76	8.55	37.85	7.86	30.28	7.18
Percent Unemployed, Age 16+	6.17	1.65	6.98	1.96	10.75	2.67	8.05	2.25
Percent Black	32.00	14.60	29.89	13.88	30.45	14.10	31.28	14.62
Percent of Families with Children that are Female Headed	11.63	3.80	15.68	5.40	21.58	6.91	26.52	6.73
Percent Employed in Manufacturing	6.62	2.04	8.49	2.78	19.19	5.61	25.69	6.74
Population Size, Ln	80.33	9.60	82.73	7.58	85.63	7.05	83.45	6.19
Percent in Poverty	33.33	11.57	22.21	7.72	27.07	8.07	21.97	6.25

RESULTS

Table 2 reports the results of our fixed effect longitudinal regression analysis. In these models we test the hypothesis that increases in the share of the population not completing high school is associated with higher rates of poverty within each county. We estimate two models using PROC GLM in SAS following the fixed effect method for longitudinal data for continuous variables measured at three or more points in time described by Allison (2005). Note that regression coefficients derived from PROC GLM in SAS are Ordinary Least Squares estimates. We selected a fixed effects rather than a mixed effect model to account for all

time invariant between parish differences, some of which may be unobserved. In the estimation of our models, we weight each parish by the size of the population. We do so because in an unweighted analysis ecological units containing a small number of persons have the same influence in the model as those units containing a large share of residents. To adjust for this bias, we weight our models by the size of the parish population.

Table 2. Fixed Effect Panel Model of Poverty for Louisiana, 1970-2000+

	Model 1		Model 2	
	b	s.e.	b	s.e.
% Age 25+ Not Completing High School	0.56 ***	0.10	0.18 *	0.08
Percent Unemployed, Age 16+	----	----	0.24	0.15
Percent Black	----	----	0.47 ***	0.07
Percent of Families with Children that are Female Headed	----	----	0.32 **	0.11
Percent Employed in Manufacturing	----	----	-0.18 *	0.07
Population Size, Ln	----	----	8.85 ***	1.78
Year				
1970	-12.15 ***	3.16	11.09 ***	3.03
1980	-10.90 ***	1.73	2.73	1.71
1990	0.16 ***	0.82	5.56 ***	0.89
2000 (Contrast)	----	----	----	----
Intercept	6.21	4.62	-89.90 ***	19.34
R2	0.90		0.95	

+Note model contains binary variables for parishes.

* p<.05, ** p<.01, ***p<.001

In Models 1 and 2, we examine the relationship between the poverty rate and the percent of the population not completing high school. Fit statistics estimated from Model 1 indicate that 76% of the variation in poverty rates in Louisiana Parishes occurs between parishes and 24% of variation in poverty rates occurs within parishes over time. This finding indicates that not accounting for between county differences could yield misleading regression coefficients.

The results presented in Model 1 suggest that the percent of the population not completing high school is significantly associated with the rate of poverty over the 1970-2000 time period. A one unit increase in the percent of persons age 25 and over not completing high school is associated with a .56 unit increase in the percent of persons living in poverty. Given that the unit of measurement for both variables is a percent, a one percent increase in high school

completion among parish residents would have resulted in an approximately half-percent drop in the rate of poverty during the 1970-2000 time period. It is also important to note that this model contains binary variables for each parish to account for unobserved difference between parishes that do not change over time.

We further explore this relationship in Model 2. In this model we include an array of control variables identified from prior research. After accounting for these variables, our model indicates that the percent of the population age 25 and older not completing high school remains a significant predictor of the percent in poverty. A one percent increase in the percent of persons age 25 and over not completing high school is associated with a .18% increase in the percentage of persons living in poverty. This finding suggests that our result is robust because it is obtained after controlling for a host of covariates of poverty. The model also explains nearly all the variance in the rate of poverty with an R2 of .95. Similar to Model 1, model

contains binary variables for each parish to account for unobserved heterogeneity.

Findings for the control variables largely conform to prior research findings. The percent of families with children that are female headed and the percent of the population that is black with higher percentages of persons living in poverty. Parishes with increases in the share of labor force employed in manufacturing experienced decreasing percentages of the population in poverty.

CONCLUSIONS

In recent years, the State of Louisiana has forwarded policy to increase high school completion rates (Louisiana Legislature, 2009). At the same time, other policy makers have recognized the need to reduce the rate of child poverty by 50% over the next ten years (Executive Department, 2008). Given the simultaneous implementation of these two efforts, we seek to address the question: is increasing high school completion a viable mechanism to reduce rates of poverty for Louisiana communities? Prior research at the national level has largely ignored the role of educational attainment, while regional analyses have yielded mixed findings.

A key finding emerging for our work is that classical human capital and status attainment traditions emerging out of economics and sociology, respectively, are relevant over time for parishes in Louisiana (see Becker, 1964; Blau & Duncan, 1967). Our analyses suggest that after accounting for other covariates of poverty, educational attainment is a key predictor of poverty for Louisiana parishes and provides support for the argument that the stock of human capital in a community is associated with population well-being.

An extension of our findings is to identify how the impact of educational attainment on poverty may be mediated by

other factors, such as family structure. For example, research on urban poverty highlights the role of marriage markets on changing family structure in inner cities (see Massey and Denton 1993). A lack of marriageable men may be due in part to a lack of economic opportunity in communities with low educational attainment. In turn, women are less likely to marry and the rate of nonmarital fertility increases. Thus, researchers should consider structural equation models that better capture feedback loops and mediating processes.

A key limitation of our work is the limitation of our analysis to parishes. By analyzing ecological units, we cannot reach conclusions about the likelihood an individual will live in poverty based on individual-level educational attainment. Thus, it is difficult to parse out the impact of ecological-level educational attainment from individual-level and our discussion is limited to improving the level of educational attainment in a community. One approach to address this issue would be to estimate a multilevel model using cohorts of Louisiana residents from multiple decades. This provides an opportunity to contrast the impact of individual-level effect of dropping out of high school with the ecological-level effect of living in a community with a low level of educational attainment.

With respect to Louisiana and public policy aimed at reducing poverty, our analyses provide two important findings regarding the relationship between educational attainment and poverty. First, Louisiana differs from national trends in terms of poverty and educational attainment. At the national level, the poverty rate changed little from 1980-2008, while the percent of the population completing high school continued to increase. In contrast, Louisiana experienced declining poverty rates from 1970-1980 and 1990 to 2008 and,

like the national trend, Louisiana continued to reduce the percent of the population not completing high school. This finding was further supported in our multivariate longitudinal analysis that accounted for a variety of other measures often associated with poverty.

Based on the level of support for our hypothesis regarding educational attainment and poverty, our analysis suggest that educational attainment may be a viable anti-poverty tool in Louisiana and improvements in educational outcomes may improve rates of poverty. Given Louisiana's strong economic ties to oil and natural gas production, one policy approach is to invest in trade based high school programs to allow greater access to stable, higher paying jobs with large manufacturers that provide quality benefits. More importantly, policy efforts need to be directed at identifying students at-risk for dropping out to provide alternative pathways to graduation that may be more applicable to the labor market.

A second approach involves recruiting employers to parishes with low levels of educational attainment. In the past, economic development efforts have focused on attracting production facilities to rural areas. These employers would job opportunities to local residents and draw in new migrants from other regions. However, an alternative policy approach may be to help stimulate entrepreneurship and grow businesses locally. Regardless of the method for job creation, our study suggests that educational institutions need to be more closely linked to the needs of local businesses.

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