Trends Over Time in the High School Dropouts

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ABSTRACT

Over the last three decades. the high school dropout rate declined and the high school completion rate increased. This study identifies causes for the decline in the dropout rate over the periods using decomposition analysis. Traditional cross-section analysis was inadequate to perform this task. Using the two cohort surveys of the National Longitudinal Survey of Youth (NLSY) in the 1980s and 2000s, we separated changes in characteristics into two parts: explained change and unexplained change. Results of the research suggest that the common explanations for the characteristic of school dropout account for little of the decline of the rate. Relatively unnoticeable factors such as location and regions contributed to the decline of the dropout rate while socioeconomic, personal, familial factors contributed to increase the dropout rate.

INTRODUCTION

High school dropout is a major concern for educators, parents, and politicians. The U.S. economy requires increasingly well-skilled and well-educated laborers and those who do not complete a high school education are a burden to society. For example, about half of welfare recipients and half of the prison population lack high school degrees and dropouts' earnings lag far behind those of degree holders in all aspects (Educational Testing Service, 1995; National Research Council, 1993; U.S. Department of Education, 1999).

Over the years, substantial research efforts have focused on the topic of school achievement and the prevention of dropout. The 1980's and 1990's were periods of major change in education in the U.S. and there was a growing effort to improve the high school graduation rate during this time. In the 1990s, most states and school districts adopted some form of Outcomes Based Education (OBE). Unlike traditional education models such as project-based learning, OBE does not specify or require any particular style of teaching or learning. Instead, it requires students to demonstrate that they have learned the required skills and content (Crump, 2004). States created committees to adopt standards and a performance based assessment to evaluate learning outcomes. Towards the 2000s, the term "high standards" was adopted instead, often resulting in very difficult tests. In the 2000s, many states are slated to require passing these types of tests to get a diploma, compared to the earlier tradition that any student who got a D or better average and attended for 4 years would graduate with one.

As a result of various efforts to prevent dropout, there has been a general decline in the dropout rate and an increase in the high school completion rate over the last three decades. The high school graduation rate for all 18- to 24-year-olds increased from 82.8 percent in 1972 to 86.5 percent in 2001, though progress in recent years has slowed (Bradley, Stricherz, Hoff, Bowman, Darcia, Fine, Galley, and Archer, 2001). The National Center for Education Statistics (NCES) reports that the status dropout rates, the proportion of 16 through 24-year-olds who are not in school and have not completed high school, declined by 23 percent between the late 1970s and 1993 (NCES, 1993). There are, however, few studies which address the source of this change.

In this paper we investigate possible causes for the decline in the dropout rate over the last two decades using decomposition analysis. Traditional cross-section analysis was inadequate to perform this task. Using the two cohort surveys of the National Longitudinal Survey of Youth (NLSY) in the 1980s and 2000s, we separated changes in characteristics into two parts: explained change and unexplained change.

The structure of the paper is as follows. In the next section, the trend of high school dropouts between the NLSY79 and NLSY97 cohorts will be discussed. In Section III the decomposition of dropout contributing factors and its implications will be considered. The discussion and conclusion are presented in the final section.

TREND OF THE HIGH SCHOOL DROPOUTS

The data used for this analysis was gathered from two administrations of the National Longitudinal Study of Youth, NLSY79 and NLSY97. The NLSYs consist of a nationally representative sample of 9,000-12,500 youths who were 12 to 16 years old as of December 31, 1978 and 1996. Youths have been re-interviewed on an annual basis. To determine the status of high school completion, researchers examined the two initial surveys, NLSY79 and NLSY97, and compared them with surveys completed when the youths were 20 to 24 years old. The survey years used in determining the dropout status were 1987 and 2005. The number of observations included in the analysis is 10,458 for NLSY79 and 7,687 for NLSY97.

The NLSY studies collected extensive information about youths' behavioral, personal, educational, and familial experiences over the years. Among the data collected, eight dropout contributing factors were selected as statistically significant for both surveys. They include: (a) students with minority race (MINORITY), (b) gender of the youth (MEN), (c) whether the student lived with both biological parents as of the initial survey year (BIO), (d) mother's permissiveness (MOM), (e) number of household members (HHSIZE), (f) whether the student lived in a metropolitan area (MSA), (g) whether the student lived in the south or west (SOUTH/WEST), and (f) students who were suspended (SUSPENDED) from school at least once. Two series of NLSYs were recoded to be comparable for the analysis across years. Some important factors in dropout research including GPA and SES are not included in the analysis due to lack of data from NLSY97.

NLSY79 and NLSY97 show that the dropout rate has declined from 18.1% to 14.0% over the past two decades (see Table 1). This result is consistent with other studies including the Nation's Report Card (NCES, 2008). According to the Nation's Report Card in 2008, the dropout rate for Whites and Blacks declined by nearly 40% between 1972 and 2000, while Hispanic young adults remained fairly constant. When the behavioral, personal, and familial factors mentioned above were controlled for, race was not a significant characteristic determining dropout status. There are few studies addressing the characteristics of the declining dropout rate over this period of time.

Table 1 reports the mean value of eight dropout contributing factors in NLSY79 and NLSY97. Factors that showed significant changes over the period are MINORITY, BIO, SOUTH/WEST, and SUSPENDED. The portion of minority students has increased significantly, from 42.4% to 47.6%. This reflects a general increase in minority population as seen in the census from 19.7% in 1990 to 24.9% in 2000 (U.S. Census Bureau, 2000). The percentage of students living with biological parents (BIO) has decreased from 67.3% to 48.9%. Geological factors including youths living in metropolitan areas (MSA) and SOUTH/WEST show an increase in the percentages during this time period. The portion of students who were suspended from school at least once increased from 24.9% to 29.1%. Traditionally, increases in MINORITY, MEN, HHSIZE, and SUSPENDED lead to an increase in the dropout rate while increases in BIO, MOM, and MSA tend to reduce the dropout rate (e.g., Suh, Suh, & Houston, 2007).

Table 1
Mean Value of Dependent and Independent Variables

Variables	NLSY79	NLSY97
DROPOUT	0.181	0.140
MINORITY	0.424	0.476
MEN	0.493	0.506
BIO	0.673	0.489
MOM	2.614	2.473
HHSIZE	4.546	4.561
MSA	0.789	0.817
SOUTH/WEST	0.551	0.598
SUSPENDED	0.249	0.291

Note. N=10,458 for NLSY79 and N=7,687 for NLSY97.

Table 2 reports estimated regression coefficients and partial effects of eight independent variables. Due to the categorical nature of the dependent variable, the logistic regression was used for the analysis. As expected, most of the coefficients show the same sign as those from prior research (e.g., Suh et al., 2007). The coefficient of SUSPEND, 0.957 for NLSY79 and 1.155 for NLSY97, is largest in absolute value among all independent variables, meaning that whether youths graduate high school depends critically on the experience of suspension. A positive coefficient indicates that the probability of dropping out increases as the value of a predictor increases. A positive association with dropping out is found if the youth is male (MEN), has more household members (HHSIZE), or was suspended from school (SUSPENDED). On the other hand, the probability of dropping out of school decreases if the youth lives with biological parents (BIO), in the south/west region (SOUTH/WEST), or the mother is permissible (MOM). The partial effects in the logistic regression model are given as coefficient*p*(1-p), where p is the mean dropout rate for the dependent variable, which is 0.181 for NLSY79 and 0.140 for NLSY97. For the MINORITY variable the partial effect is 0.011 for NLSY79, meaning the possibility of dropping out of school increases by 1.1% if the youth is a minority. The predicted probability is strongest for SUSPEND for the 1979 cohort, followed by BIO and SOUTH/WEST. Suspended youths are 14.2% more likely to drop out of school, while youths living with biological parents are 10.1% more likely to graduate high school. For the 1997 cohort, SUSPENDED is the strongest factor in predicting the dropout, followed by BIO and HHSIZE.

The coefficient shows either an increase or decrease in absolute value, indicating the changing level of impact on dropping out of school from the 1980s to 2000s. The value of the coefficient for the independent variable increased for MEN, BIO, MOM, HHSIZE, and SUSPENDED, while it showed a decrease for MINORITY, MSA, and SOUTH/WEST. A significant increase in the value of the coefficient occurred for BIO (from -0.679 to –1.015), HHSIZE (from 0.07 to 0.155), and SUSPENDED (from 0.95to1.15).

Table 2
Logistic Regression Coefficients

Independent Variable	NLSY79		NLSY97	
	Coefficient	Partial effect	Coefficient	Partial effect
Constant	-0.825	-	-1.935	-
MINORITY	0.073	0.011	0.060	0.007
MEN	0.114	0.017	0.124	0.015

BIO	-0.679	-0.101	-1.015	-0.122
MOM	-0.071	-0.011	-0.074	-0.009
HHSIZE	0.074	0.011	0.155	0.019
MSA	-0.063	-0.009	-0.056	-0.007
SOUTH/WEST	-0.215	-0.032	-0.140	-0.017
SUSPENDED	0.957	0.142	1.155	0.139

Note. Nagelkerke R^2 is 0.209 for NLSY79 and 0.179 for NLSY97.

DECOMPOSITION ANALYSIS FOR SCHOOL DROPOUT

Using the two cohort surveys from the National Longitudinal Survey of Youth (NLSY) in the 1980s and 2000s, researchers separated changes in characteristics into two parts: explained change and unexplained change. The decomposition is expressed as:

$$\text{ln (dropout rate change)} = \text{Characteristic change* coefficient} + \text{Coefficient change* characteristic + error term,}$$

where ln indicates the natural logarithm. The first term of the right-hand side, Characteristic change* coefficient, captures how the change in dropout pattern is made due to the change in characteristics (the 8 variables in this paper). If the goodness of fit of the regression model is great, this term accounts for a majority of the overall change in the dropout rate. The second term on the right-hand side, Coefficient change * characteristic, measures the change in the dropout rate due to differences in coefficients of the regression model. This denotes the unexplained part of the change because the majority of the change is due to the difference in the regression coefficients between the two cohorts. For different sets of data, the coefficient of a characteristic will be the same or different depending on the characteristic. When the change in the coefficient is small, the unexplained portion of the change will be negligible. Since the regression analysis and data cannot detect the reason for changing coefficients, this part of change is considered to be an "unexplained change."

Table 3 presents the results of the decomposition of the change in the dropout rate from 1980s to 2000s. Among explained changes in independent variables, two geological variables, MSA and SOUTH/WEST, contributed to lowering the dropout rate. The remaining six factors actually raised the probability of dropout for the last two decades. Among them, family factors including BIO and MOM significantly increased the risk of dropping out. As shown in Table 1, an 18.4% decrease in youths living with biological parents is the main cause of the increase in the dropout rate. SUSPENDED also contributed to the raise the probability of dropping out of school. The role of race (MINORITY), gender (MEN), and household size (HHSIZE) played to increase the dropout rate as well, though the impact was limited.

Table 3
Decomposition of the change in the dropout rate

Independent Variable	Explained change	Unexplained change
MINORITY	0.003	-0.006
MEN	0.002	0.005
BIO	0.156	-0.195
MOM	0.010	-0.008
HHSIZE	0.002	0.369
MSA	-0.002	0.006
SOUTH/WEST	-0.008	0.043
SUSPENDED	0.044	0.053
Constant	0.000	-1.110

Total	0.207	-0.843

DISCUSSION
A number of features from the decomposition analysis can be noted. First, the decrease in the dropout rate is due to the influence of MSA and SOUTH/WEST while the general students' academic achievement level has basically remained the same (National Center for Education Statistics, 2008). Traditionally, students in the metropolitan areas and EAST/NORTH CENTRAL regions showed a lower dropout rate than their counterparts who live in rural areas and SOUTH/WEST regions. The gap in the dropout rate based on location or region has been narrowed by 25% during the past two decades, from 4% to 3%. Among four regions, the most notable improvement in the dropout rate has occurred in the WEST region where the rate fell from 21% for the NLSY79 cohort to 13% for the NLSY97 cohort. Two factors might have contributed to this trend: policy influence and relocation of business to suburban and SOUTH/WEST regions. Since the late 1990s and early 2000s, U.S. education policy focus has shifted toward outcome-based education. The "No Child Left Behind" policy by the federal government and similar policies at the local government level were adopted during the early 2000s. Faced with limited resources and strict policy enforcement, school administrators and teachers in disadvantaged school districts may be lowering the standards for high school graduation to meet the graduation requirements. Relocation of big firms since the late 1980s and the information and technological boom in the WEST region could have helped suburban and SOUTH/WEST school districts by bringing in more resources and contributing to a better social environment.

Second, traditional cross-section analysis can't explain the long run trend of school dropout. When a specific cohort is studied, researchers identify at-risk students as those who exhibit academic, behavioral, or attitudinal problems that lead to school dropout (Janosz, Blanc, Boulerice, & Tremblay, 2000; Chavez, Belkin, Hornback, & Adams, 1991; National Collaboration for Youth, 1989; Rumberger, 1983; Wells, 1990). However, when the research interest is focused on the change in the characteristics of dropouts, most at-risk variables can't explain the changing pattern of the dropout rate. For example, poor academic achievement (GPA) in high school is one of the most frequently cited predictors of school dropout (e.g., Battin-Pearson et al., 2000). The average GPA has remained the same during the 1980s and 2000s, and thus it couldn't deliver any information on the changing rate of dropout. For this reason, frequently cited predictors of school dropout including GPA and low socio-economic status were not included in this research. As shown in Table 3, the dropout rate should have increased significantly in the 2000s due to the rising portion of students who fall into the high risk category (see Column 2 of Table 3). Yet, few researchers have addressed the changing characteristics of dropout over the long-term.

Third, family factors have become more important in predicting dropout. Due to the change in the family structure, the number of students who live with biological parents has significantly decreased and mothers' parenting skills have changed (Fetsch, Yang, & Pettit, 2008; Oberlander, Shebl, Magder, & Black, 2009). As shown in Table 1, there has been an increase in the proportion of minority students and male students over the last two decades. All these changes contributed to the increase in the probability of dropping out. Using the NLSY97 cohort group, Suh et al. (2007) found that family-related variables have been strong indicators for dropout and have shown the stable relationship across various at-risk groups. Future research needs to investigate how to tackle family factors in order to reduce the dropout rate.
Finally, the explained component of the change in the dropout rate is positive. In other words, the changes in independent variables have tended to increase the dropout rate and the actual decrease in the dropout rate is due to a significant influence of omitted or missing variables. As mentioned

above, possible candidates for missing variables are education policy change, sources of demographic variables, or school variables. When we consider that the explanatory power (R^2) of a typical dropout regression model is less than 0.2, further research needs to be devoted to find missing variables so that trend changes in the dropout rate can be addressed properly.

CONCLUSION
When the long run dropout contributing factors are considered, the traditional cross-section study is irrelevant due to the changing influence of the independent variables and the differential change of predictable variables. This research extended the existing literature by applying the concepts of trend analysis and decomposition technique. The result of the decomposition analysis shows that only two regional factors, MSA and SOUTH/WEST, contributed to lowering the dropout rate while other traditional predictors of dropout contributed to raising the dropout rate. Frequently cited familial and behavioral factors contributed to a raise in the probability of dropping out even though the actual dropout rate decreased. If this trend continues, the outlook for high school dropouts and improvements in academic achievement appears to be bleak. An increase in the explained change in the dropout rate was fully offset by a decrease in the unexplained portion of the independent variables and the resulting net change was a decrease in the dropout rate. The unexplained change in the dropout rate is due to the change in the coefficients of independent variables. The overwhelming majority of the unexplained change is due to a decrease in the constant in the regression model.

Over the years, there has been substantial research conducted on the topic of preventing dropouts. However, there were few studies done investigating the changing pattern and its contributing factors on dropout. This research points to the finding that unknown independent variables are necessary to understand the changing pattern of dropout in the long run. This study also suggests that researchers need to study the long- term determinants of dropping out of high school so that teachers and school administrators can target the students most inclined to drop out. They can then improve the students' chances of economic success in the future by encouraging them to complete high school.

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