Familial HIV/AIDS and Educational Expectations of South African Youth

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I. Introduction

This paper considers the relationship between indirect exposure of HIV/AIDS and youth educational expectations in Cape Town, South Africa. South Africa has more individuals living with HIV/AIDS than any other country in the world, and the most children living with HIV/AIDS amongst all Sub-Saharan African countries (UNAIDS Report Annex 214-216). Therefore, it stands that many South African youth know individuals with HIV/AIDS, which may alter schooling expectations. South Africa's high HIV/AIDS rates along with poor educational opportunities for South African youth might suggest that these youth face significant challenges in preparing for the future (Powell 2013).

The relationship between exposure to chronic illnesses and youth educational expectations is unexplored, both on the dimension of prevalence and the dimension of developing regions. Providing insight into the mechanism by which indirect exposure to HIV/AIDS illness impacts educational expectations can be valuable for South African health policy makers combatting the disease. This insight may extend to other HIV/AIDS stricken communities and reveal to policy makers previously hidden effects of the disease on affected populations. Understanding how familial HIV/AIDS alters youth educational expectations may also point to social and economic pressures worthy of future examination, and provide some basis for modeling how youths form of educational expectations in the face of familial and community hardship.

This paper uses a model for youth educational expectations created by Beautel and Anderson (2007). I consider the significance of including indirect exposure to HIV/AIDS as a regressor in the Beutel and Anderson model, and then apply this model to multiple waves of the Cape Area Panel Study (CAPS). This allows for consideration of the effect of indirect exposure to HIV/AIDS on youth educational expectations in the short and long run.

II. Background and Review of the Literature

Background

In order to properly understand and interpret the mechanisms that impact youth educational expectations, it is necessary to contextualize HIV/AIDS in South Africa.

Over 17% of adults in South Africa live with HIV/AIDS (UNAIDS). However, this oft-cited statistic underestimates the impact of HIV/AIDS on South African communities. 22% of youth respondents aged 13 to 16 in Cape Town, South Africa knew someone dead or suffering from HIV/AIDS in 2002, three years later 33% knew someone who had died or was suffering from HIV/AIDS (Lam). According to a National HIV Survey (Shisana 2009), HIV prevalence between 2002 and 2005 held relatively steady among South African adults, suggesting that we cannot discount new information as a mechanism through which youth become indirectly exposed to HIV/AIDS. Young adults are learning about the dangerous and impacts of HIV/AIDS through their exposure to the disease at the same time as they start to form expectations about their educational achievements.

Review of the Literature

This paper most closely follows Beutel and Anderson which examine the relationship between race and youth educational expectations in Cape Town, South Africa (2007). Beautel and Anderson (2007) consider the impact of race, familial composition, and educational attainment on young adult educational expectations and create a model for educational expectations using the first wave of the Cape Area Panel Study (CAPS) (Lam 2008). Beutel and Anderson find significant variation between the educational expectations of youth from different racial groups in South Africa and identify age, school enrollment, and academic achievement as significant predictors of youth educational expectations.

Beutel and Anderson's basis for modeling youth educational expectations comes in part from the work of Sewell, Haller, and Portes (1969), who attempt to determine how youth educational achievement is affected by variables including socioeconomic status, own educational expectations, previous educational achievement, and the expectations of significant individuals. Many of the variables identified by Sewell et. al. are used in Beautel and Anderson's model of youth educational expectations. However, the Sewell model does not take into consideration the potential impact of familial illness on youth educational expectations (Sewell 1969). Beutel and Anderson examine how family social capital (the amount of time that family members spend together) impacts child and parental educational expectations across time using multiple waves of CAPS (2008).

Obtaining an upper estimate of the potential impact of familial HIV/AIDS on youth educational expectations may not be possible through examination of the previous literature. Thies argues that youth with chronic illness face higher absenteeism, and a lack of accommodation by educational systems may contribute to lower educational performance (2009). However, the literature does not speak to the indirect impact of illness on youth educational expectations or performance.

There is, however, literature regarding the impact of HIV/AIDS on the household. Households may be quite impacted by experiencing HIV/AIDS; the World Bank suggests that Tanzanian households experiencing illness expenditures towards health increase while overall expenditures as well as food expenditures decrease (Shisana). Adults in South Africa who are HIV-positive were 6 to 7 percentage points more likely to be unemployed than HIV-negative adults (Levinsohn 2011). Therefore, South African youth who with family members ill with HIV/AIDS may be in households earning less income, and spending a great percentage of income on healthcare. The potential death of an income earner due to HIV/AIDS is significant for a majority of South African households surveyed by Collins and Leibbradt (2007), both due to funeral costs and loss of income. This is a common finding and assumption in literature - Arndt and Lewis's model of HIV/AIDS's impact on South African macroeconomic performance assumes that AIDS affected households are not able to save, and increase spending on family wellbeing (2000).

Household composition is impacted not only by illness but also by differences in educational quality between South African schools. Difference in quality of education has been cited as a motivation for fostering – when children do not live in the same household as their biological parents. Studies on fostering in sub-Saharan Africa find that fostered children are more likely to be enrolled in school than non-fostered biological siblings, which supports the idea that fostering may be used to provide youth with educational opportunities (Akresh 2005). In 2002, approximately 28% of youth in the Cape Area did not live with either either of their biological parents (Lam 2008). Fostering may occur due to the death of close family members, potentially from HIV/AIDS illness, however as previously discussed there is evidence that youth seek high quality education.

III. Data and Empirical Strategy

Empirical Strategy

I study the effect of exposure to HIV/AIDS on youth educational expectations by adding additional 'indirect exposure to HIV/AIDS' regressors to Anderson and Beutel's model of youth educational expectations.

I first consider a linear probability model derived from the Beutel and Anderson specification to examine whether indirect exposure to HIV/AIDS improves estimation of youth expectation to achieve various levels of education. Specifically, I observe the effect of independent variables selected by Anderson and Beutel as well as 'indirect exposure to HIV/AIDS' on the likelihood that a given youth expects to achieve at least a certain level of education. The short run linear probability model is provided in Eq. (1).

Eq (1):

$$\begin{aligned} &Educational\ Expectation_{i,t} \\ &\quad = \beta_1 Age_{i,t} + \beta_2 Female_{i,t} + \beta_3 Number\ of\ Biological\ Parents_{i,t} \\ &\quad + \beta_4 HH\ Head\ Matriculated_{i,t} + \beta_5 LNE\ Score_i + \beta_6 \#\ Younger\ than\ 13\ in\ HH_{i,t} \\ &\quad + \beta_7 \#\ between\ 13\ and\ 22\ in\ HH_{i,t} + \beta_8 Race_i + \beta_9 Currently\ Enrolled_{i,t} \\ &\quad + \beta_{10} Has\ failed\ school\ year\ prior\ to\ age\ 13\ _i + \beta_{11} HIV\ Exposure_{i,t} + \varepsilon_{i,t} \end{aligned}$$

where
t = Year [2002, 2005]
i = Observation (Young Adult)

While Beutel and Anderson's model only uses wave 1 regressors and outcomes from CAPS, I take advantage of the longitudinal nature of CAPS. I create short and long run linear probability models as well as short and long run ordinal logit regression models. Long run models are created by using wave 1 regressors and wave 3 youth educational expectations. The long run linear probability model is provided in Eq (2).

Eq (2):

$$\begin{aligned} Educational\ Expectation_{i,t+1} &= \beta_1 Age_{i,t} + \beta_2 Female_{i,t} + \beta_3 Number\ of\ Biological\ Parents_{i,t} \\ &+ \beta_4 HH\ Head\ Matriculated_{i,t} + \beta_5 LNE\ Score_i + \beta_6 \#\ Younger\ than\ 13\ in\ HH_{i,t} \\ &+ \beta_7 \#\ between\ 13\ and\ 22\ in\ HH_{i,t} + \beta_8 Race_i + \beta_9 Currently\ Enrolled_{i,t} \\ &+ \beta_{10} Has\ failed\ school\ year\ prior\ to\ age\ 13\ _i + \beta_{11} HIV\ Exposure_{i,t} + \varepsilon_{i,t} \end{aligned}$$

where
t = Year [2002, 2005]
i = Observation (Young Adult)

I then replicate Anderson and Beutel's ordinal logit regression model and add 'indirect exposure to HIV/AIDS' regressors. Eq. (3) shows the replication of Anderson and Beutel with the addition of β_{11} which captures whether panel respondents were exposed to HIV/AIDS.

Eq (3):

$$P(Educational\ Expectation_{i,t}) = \left[\frac{1}{1 + \left[\frac{1}{e^{\left(\begin{array}{c} \beta_1 Age_{i,t} + \beta_2 Female_{i,t} + \beta_3 Number\ of\ Biological\ Parents_{i,t} + \\ \beta_4 HH\ Head\ Matriculated_{i,t} + \beta_5 LNE\ Score_i + \beta_6 \#\ Younger\ than\ 13\ in\ HH_{i,t} + \\ \beta_7 \#\ between\ 13\ and\ 22\ in\ HH_{i,t} + \beta_8 Race_i + \beta_9 Currently\ Enrolled_{i,t} + \\ \beta_{10} Has\ failed\ school\ year\ prior\ to\ age\ 13\ _i + \beta_{11} HIV\ Exposure_{i,t} + \varepsilon_{i,t} \end{array} \right)}} \right]} \right]$$

Access to both waves 1 and 3 of CAPS also allows me to control for characteristics inherent to each youth and isolate the effect of regressors which change over time on youth educational expectations. The model regressors that do not change across waves for respondents, such as gender and LNE score, are absorbed in the first-difference estimate, shown in Eq (4).

Eq. (4):

$$\begin{aligned}\Delta Educational\ Expectation_{i,t} &= \beta_3 \Delta Number\ of\ Biological\ Parents\ living\ w_{i,t} + \beta_4 \Delta HH\ Head\ Matriculated_{i,t} \\ &+ \beta_6 \Delta \#\ Younger\ than\ 13\ in\ HH_{i,t} + \beta_7 \Delta \#\ between\ 13\ and\ 22\ in\ HH_{i,t} \\ &+ \beta_9 \Delta Currently\ Enrolled_{i,t} + \beta_{11} \Delta HIV\ Exposure_{i,t} + \varepsilon_{i,t}\end{aligned}$$

where
t = Time / CAPS Wave # [1 or 3]
i = Observation (Young Adult)

Data

Introducing Data

The Cape Area Panel Study (CAPS) is a longitudinal study of the population of Cape Town, South Africa. It consists of five waves conducted between 2002 and 2009. CAPS contains both household and youth questionnaires for most waves, allowing for insight into the lives of Cape Town youth respondents and the characteristics of households where they live.

There are 5,291 youth respondents in wave 1 of CAPS, including 2,152 blacks, 2,005 coloreds, and 597 whites. CAPS is unbalanced - there are more respondents in wave 1 than wave 3 as households and youths moved from Cape Town or failed to respond. Black and colored households with youth responded to the first CAPS household questionnaire at rates of 88.8% and 82.3% respectively, while white households with youth responded at a 48.2% rate. Beutel and Anderson (2007) suggest that white households may have faced higher opportunity costs associated with responding to the questionnaire than other households due to greater constraints on time, possibly due to employment or enrollment in school

I consider the possibility that there is nonrandom selection of youth who fail to respond in wave 3. This possibility would result in biased estimates when wave 3 responses are included in regressions. Youths who dropped out between waves 1 and 3 were flagged and regressed against the empirical model created by Beutel and Anderson with additional 'indirect exposure to HIV/AIDS' regressors. The regression is seen below in Eq (5).

Eq (5):

$$\begin{aligned}Attrited\ Between\ Wave\ 1\ and\ Wave\ 3_{i,t} &= \beta_1 Age_{i,2002} + \beta_2 Female_{i,2002} + \beta_3 Number\ of\ Biological\ Parents_{i,2002} \\ &+ \beta_4 HH\ Head\ Matriculated_{i,2002} + \beta_5 LNE\ Score_{i,2002} \\ &+ \beta_6 \#\ Younger\ than\ 13\ in\ HH_{i,2002} + \beta_7 \#\ between\ 13\ and\ 22\ in\ HH_{i,2002} \\ &+ \beta_8 Race_{i,2002} + \beta_9 Currently\ Enrolled_{i,2002} \\ &+ \beta_{10} Schoolyear\ failed\ prior\ to\ age\ 13_{\ i,2002} + \beta_{11} HIV\ Exposure_{i,2002} + \varepsilon_i, t\end{aligned}$$

The regression outcome of Eq (5) can be found in Table 1. The joint 'Indirectly Exposed to HIV/AIDS' regressors are almost significant at the alpha = 0.10 level. In order to ensure that models which contain wave 3 responses are not biased with respect to regressors of interest, all models exclude youth who attired between waves 1 and 3. However, this does not result in a balanced panel as many youth who did respondent in both waves failed to respond to particular questions of interest. Excluding youth who failed to respond to one or more relevant questions would result in a much smaller sample.

Furthermore, only youth who have completed grades 7 through 9 by the first wave of CAPS are included in analysis. The panel data set used for the duration of the paper, unless explicitly stated otherwise, includes 1,657 respondents – 703 blacks, 816 coloreds, and 138 whites.

Descriptive Statistics

Table 2 provides unweighted descriptive statistics of youth respondents in waves 1 and 3 by race. For each variable and wave, I conduct oneway ANOVA tests to determine whether variable means vary across racial group within the sample.

The literacy numeracy evaluation (LNE) score in Table 2 are derived from a CAPS-conducted test administered to all youth respondents in wave 1 only. It consists of literacy and numeracy questions and is included as a measure of educational aptitude instead of measures such as GPA, which may be inconsistent across schools.

Educational attainment and educational expectation ordinal variables are detailed in Table 3. These ordinal variables are used to construct dummy variables regarding educational expectations and attainment for heads of households as well as youth respondents.

Table 4 contains variables which measure the extent of a youth respondent's indirect exposure to HIV/AIDS. Youth respondents were asked whether friends, family members, neighbors, or acquaintances currently had HIV/AIDS or died because of HIV/AIDS. Dummy variables for knowing individuals with HIV/AIDS and knowing individuals who died because of HIV/AIDS were constructed from these responses and are shown in Table 4. However, it may be more valuable to think of youth indirect exposure to HIV/AIDS – the combination of knowing individuals with HIV/AIDS or knowing people who have died from HIVAIDS. Table 4 also provides descriptive statistics of two ways to consider indirect exposure to HIV/AIDS. The 'Exposure to HIV/AIDS (not family)' dummy variable flags whether youth reported knowing anyone with HIV/AIDS or dead due to HIV/AIDS who is not an immediate or extended family member. An 'Exposure to HIV/AIDS through immediate family' dummy variable captures respondents whose family members have HIV/AIDS or died due to HIV/AIDS. In wave 1, there were 348 youth who reported being exposed to HIV/AIDS; of those, 90 youth reported that their exposure to HIV/AIDS was through family members.

We also observe youth sexual health and awareness as outcomes of Anderson and Beutel's model of youth educational expectations with the added 'HIV/AIDS impact regressors.'

IV. Analysis

Linear Probability Model: Expectation to Matriculate High School

Table 5 reports the results of short run, long run, and fixed effect linear probability models which predict whether youth expect to matriculate high school. Column (1) provides a short run linear regression using wave 1 regressors from the Beutel and Anderson model and wave 1 expected educational achievement. In the short run, female youth respondents report expected matriculation high school 2.8 percentage points higher than male peers.[1] Column (2) shows the effect of adding 'exposure to HIV' regressors to the wave 1 short run linear probability model. These 'exposure to HIV/AIDS Impact' regressors are neither individually or jointly significant in the short run model for wave 1. Columns (3) and (4) replicate the short run linear probability model with wave 3 regressors. The biggest difference between the short run linear probability models using wave 1 and wave 3 regressors is the significantly larger 'Currently Enrolled' regressor. However, it is probable that this significantly larger coefficient is explained due to the proximity to matriculation for many panel respondents.

Exploiting the longitudinal nature of CAPS, I consider using wave 1 responses to predict wave 3 expected educational achievement, an average gap of 3 years. Column (5) shows a long run linear probability model with wave 3 expectation to matriculate high school regressed against wave 1 responses. The addition of 'exposure to HIV' regressors to the long run linear probability model, shown in column (6), does not help predict whether youth are more likely to expect to matriculate high school in wave 3. Columns (7) and (8) show the regression outcomes of a differenced model, which looks at the change in each youth's responses across waves. I fail to reject that indirect exposure to HIV/AIDS between waves 1 and 3 helps predict changes in youth expectation to matriculate high school.

A limitation of the linear probability models discussed above is that youth ordinal educational expectation responses are flattened. Conducting the same linear probability models with an expected educational attainment level of graduating university, rather than matriculation of high school, yields the same lack of significance of 'Exposure to HIV' regressors.

Ordinal Logit Regression

One shortcoming of the linear probability model is that it does not take advantage of the ordinal educational expectations captured by CAPS. By using an ordinal logit model to predict youth educational expectations, I can fully use youth expected education responses. Table 6 contains Beutel and Anderson's ordinal logit regression results in column (1), and attempted replication in column (2). Replication uses the unbalanced data set from wave 1 used by Beutel and Anderson, and is not quite successful, though coefficient values are nearly identical between Beutel and Anderson's results and attempted replication. One explanation for deviation between the two is that CAPS has been updated and some youth responses have been affected as a result, resulting in small differences when replication is attempted. In column (3), Beutel and Anderson's regressors are used to predict wave 1 ordinal educational expectations of respondents in the balanced panel set. Columns (3) through (6) report regression results using odds ratios. Interpretation of odds ratio is as follows: holding all else equal, a female youth respondent is 1.19 times more likely to expect to achieve the highest ordinal educational education value than an otherwise equivalent male respondent. Column (4) uses Beutel and Anderson's regressors as well as the 'Exposed to HIV/AIDS' regressors to predict youth ordinal educational expectations

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[1] This is consistent with literature suggesting that that more than half of higher education students are women (IEASA 2011).

in wave 1. Here, indirect exposure to non-familial HIV/AIDS significantly increases the odds that a youth will have higher educational expectations. Not shown, a similar regression using overall indirect exposure to HIV/AIDS also suggests that any exposure to HIV/AIDS prior to wave 1 significantly increases the odds that a youth has higher educational expectations in wave 1 responses.

Once again taking advantage of the longitudinal nature of CAPS, I examine the relationship between wave 1 regressors on wave 3 youth ordinal educational expectations. Column (5) displays the results of this regression. Age in wave 1 as well as race continues to help predict youth ordinal expected education in wave 3, as does parental education level, enrollment in school in wave 1, and higher LNE scores. Adding wave 1 'Exposed to HIV/AIDS' regressors to the ordinal logit model, displayed in column (6), does not does not alter the regression significantly. However, exposure to HIV/AIDS appears to have a different short term relationship with educational than its long term relationship with educational expectation. Both 'Exposure to HIV/AIDS' through the family and non-family regressors have changing odds ratios which demonstrate this effect.

Indirect exposure to HIV/AIDS outside of the family prior to wave 1 increases wave 1 odds of higher educational expectations, all else equal. However, in the long run, indirect exposure to HIV/AIDS outside of the family prior to wave 1 decrease odds of higher expected educational achievement in wave 3. The two odds ratios' 90% confidence intervals are non-interloping, suggesting that this difference may be significant. This also occurs in overall indirect exposure to HIV/AIDS. One possible story for the changing effect of exposure to HIV/AIDS on educational expectations is that between waves 1 and 3, youths who were exposed to HIV/AIDS prior to wave 1 continue to receive indirect exposure to HIV/AIDS, and this is somehow connected with a decline in educational expectations relative to their peers.

We now consider predicting ordinal educational expectations of the black and colored population groups in the short and long run, shown in Table 7. Column (1) shows the results of an ordinal logit model for blacks using wave 1 regressors and wave 1 ordinal educational expectation. The very large odds ratio associated with failing out of school is concerning – one tentative explanation is that black youths are more likely to drop out of school in order to pursue education at another school. Black youth exposed to HIV/AIDS outside of the family prior to wave 1are significantly more likely to have higher educational expectations in wave 1. However, this does not carry over to wave 3, as wave 1 exposure to HIV/AIDS is not a significant predictor of wave 3 educational expectations for black youth. For colored youth however, wave 1 exposure to HIV/AIDS appears to have a very significant negative effect on wave 3 educational expectations, as shown in column (4). All else equal, colored youth exposed to HIV/AIDS outside of the family prior to wave 1 have 0.49 the odds of having the highest educational expectations compared to youth who were not exposed. This stark different suggests that exposure to HIVAIDS does have a relationship with youth educational expectations. Evidence of this relationship is more evident through non-familial indirect exposure to HIV/AIDS than through indirect exposure through the family. Significant differences between short run and long run coefficients of indirect exposure to HIV/AIDS suggest that

HIV/AIDS Exposure and Knowledge of HIV/AIDS

Sexual health and awareness of HIV/AIDS may be correlated with how youth value education and how exposure to HIV/AIDS impacts educational expectations. Therefore, it may be useful to examine the relationship between exposure by HIV/AIDS and a number of sexual health characteristics, including sexual activity and knowledge of HIV/AIDS.

I first explore whether youth who are impacted by HIV/AIDS are more likely to consider themselves to be at high risk of HIV/AIDS. A comparison between youth who are exposed to HIV/AIDS and those who are not prior to wave 1 reveals significant differences in self-labeling as at 'severe risk' of HIV/AIDS, as shown in Table 8. Youth who are impacted by HIV/AIDS are less likely to consider themselves to be at 'No' or 'Low' risk from HIV/AIDS, and more likely to consider themselves to be at 'Severe Risk' of HIV/AIDS. We may reject the null hypothesis at the 90% confidence level that HIV Risk is the same for youth who are indirectly exposed to HIV/AIDS and those who are not.

Table 9 shows outcomes of a linear probability model using Beutel and Anderson's regressors and 'Exposure to HIV/AIDS' regressors to predict whether youth have had sex. Column (1) predicts whether youth had sex prior to wave 1 based on wave 1 responses. As expected, older youth are more likely to have had sex. Being enrolled in school also appears to significantly decrease the probability that a young adult has had sex. Exposure to HIV/AIDS outside of the family is another significant predictor of having had sex prior to wave 1. It is possible that youth exposed to HIV/AIDS are also exposed to methods of contracting HIV/AIDS, such as sexual activity, more so than youth who are not exposed to HIV/AIDS. Column (2) uses a linear probability model to predict youth who become sexually active between waves 1 and 3. Exposure to HIV/AIDS is not a good predictor of whether youth become sexually active between waves 1 and 3; though higher parental educational achievement and being enrolled in school in wave 1 predict that youth will be less likely to become sexually active between waves 1 and 3.

Unreliable Respondents

Through multiple waves of CAPS, some youth are not consistent in their responses to questions regarding gender, parental education, their own maximum educational attainment, and other pertinent subjects. I flag respondents who give untrustworthy responses and consider whether, using a linear probability model with the same regressors employed through this paper, it may be possible to predict whether certain respondents are unreliable. Table 10 shows the result of a linear regression of unreliable youth respondents against Beutel and Anderson's regressors as well as 'Exposed to HIV/AIDS' regressors. The best predictor of unreliability is exposure to HIV/AIDS – youth who have been exposed to HIV/AIDS are much more likely to have been unreliable at least once in their wave 1 and wave 3 responses.

V. Conclusions

Attempts to include an 'Exposure to HIV/AIDS' regressor in a linear regression of youth educational expectations did not eliminate potential omitted variable bias or improve the predictive power of the model. However, within the ordinal logit model there was some success in identifying a relationship between exposure to HIV/AIDS and youth educational expectations.

Moreover, the long run effect of indirect exposure to HIV/AIDS prior to wave 1 is established as significantly different from indirect exposure's short run effect. The indirect exposure effect, and the difference between short and long run effect of indirect exposure to HIV/AIDS, appears to be markedly different by race, as seen in Table 7.

Some of the mechanisms by which educational expectations may be influenced include sexual activity and knowledge of dangerous activities associated HIV. The significance of 'Indirect Exposure to HIV/AIDS' regressors in Table 9 suggests a causal relationship between indirect exposure to HIV/AIDS and sexual activity. Furthermore, youth who have been exposed to HIV/AIDS are more likely to feel at high risk of contracting HIV/AIDS.

Further work can be done to exploit the longitudinal nature of CAPS. Beutel and Anderson offer one model to predict the educational expectations of South African youth, but the ability to control for heterogeneity by individual allows for investigation into new mechanisms through which youth educational expectations are formed.

VI. Literature Review

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VII. Appendix

Table 1

Linear Probability of attrition between waves 1 & 3 against Beutel and Anderson model regressors and HIV/AIDS impact regressors

	(1)
Female	0.014
	(0.018)
Age	-0.006
	(0.006)
Colored	-0.105***
	(0.022)
White	0.025
	(0.045)
LNE Score	0.000
	(0.001)
Has failed school-year prior to age 13	-0.005
	(0.020)
Currently Enrolled	-0.107***
	(0.027)
1 Biological Parent	-0.132***
	(0.026)
2 Biological Parents	-0.209***
	(0.026)
# YA in HH <= 13	-0.009
	(0.007)
# YA in HH <13<=22	-0.011
	(0.009)
HH Head Graduated HS	0.047
	(0.038)
Exposure to HIV/AIDS (not family)	-0.030
	(0.025)
Exposure to HIV/AIDS through immediate family	-0.007
	(0.042)
Constant	0.624***
	(0.123)
N	2136
r2	0.069

Table 2

Descriptive Statistics of Regressors

		Black				Colored				White					
		N = 703				N = 816				N = 135					
Variable	Wave	Mean	St. Dev.	Min	Max	Mean	St. Dev.	Min	Max	Mean	St. Dev.	Min	Max	F	p
Age	1	17.12	2.17	14	22	16.56	2.25	14	22	15.03	0.92	14	18	91.62	0.00*
	3	20.07	2.21	16	22	19.38	2.26	16	22	17.90	1.02	16	21	56.80	0.00*
Gender [0 = Male, 1 = Female]	1	0.55	0.50	0	1	0.52	0.50	0	1	0.51	0.50	0	1	4.94	0.00*
	3	0.55	0.50	0	1	0.52	0.50	0	1	0.51	0.50	0	1	0.52	0.59
Num. of Biological Parents living with	1	1.04	0.76	0	2	1.32	0.72	0	2	1.69	0.50	0	2	99.26	0.00*
	3	1.30	0.75	0	2	1.46	0.70	0	2	1.67	0.55	0	2	10.76	0.00*
Head of House Received College Diploma/Degree	1	0.06	0.23	0	1	0.04	0.20	0	1	0.43	0.50	0	1	206.7	0.00*
	3	0.04	0.21	0	1	0.05	0.23	0	1	0.27	0.45	0	1	30.07	0.00*
Head of House Max. Educational Attainment[1]	1	1.56	0.89	1	5	1.54	0.85	1	5	3.20	1.28	1	5	269.6	0.00*
	3	1.65	0.76	1	5	1.70	0.85	1	5	2.71	1.17	1	5	52.22	0.00*
Own Educational expectation[1]	1	3.64	0.97	1	5	3.10	1.11	1	5	3.70	1.00	1	5	49.96	0.00*
	3	3.07	1.27	1	5	2.41	1.37	1	5	3.84	1.02	1	5	68.64	0.00*
Educational expectation: Graduate University	1	0.71	0.45	0	0	0.45	0.50	0	1	0.67	0.47	0	1	57.37	0.00*
	3	0.55	0.50	0	0	0.31	0.46	0	1	0.72	0.45	0	1	54.75	0.00*
LNE score	1	21.65	7.16	0	44	26.15	6.85	0	43	37.31	5.08	21	45	425.0	0.00*
Currently Enrolled	1	0.79	0.41	0	1	0.64	0.48	0	1	0.99	0.09	0	1	61.26	0.00*
	3	0.52	0.50	0	1	0.30	0.46	0	1	0.83	0.38	0	1	246.3	0.00*
School Quality [1=Excellent, 5=Bad]	1	2.34	0.92	1	5	2.21	0.76	1	4	1.74	0.66	1	3	20.5	0.00*
	3	2.16	0.85	1	5	2.09	0.84	1	5	1.67	0.77	1	4	36.4	0.00*
Failed a Year of Schooling prior to Age 13	1	0.55	0.50	1	0	0.51	0.50	0	1	0.17	0.38	0	1	56.9	0.00*

Table 3

Education Level Ordinal Variables

Corresponding Education Level for Ordinal Variables

Ord. Var	Educational level	Population Group					
		Black		Colored		White	
		W1	W3	W1	W3	W1	W3
1	Less than Matriculation	0.014	0.166	0.091	0.410	0.027	0.033
2	Matriculation	0.177	0.211	0.233	0.126	0.128	0.081
3	Some College	0.094	0.071	0.224	0.152	0.174	0.171
4	Degree from College / University	0.581	0.485	0.387	0.262	0.477	0.447
5	Postgraduate Degree	0.131	0.066	0.063	0.047	0.197	0.268

Table 4

Unweighted HIV/AIDS related Summary Statistics

		Black				Colored				White					
		N = 703				N = 816				N = 135					
Variable	Wave	Mean	St. Dev.	Min	Max	Mean	St. Dev.	Min	Max	Mean	St. Dev.	Min	Max	F	p
Categorized as at 'Severe' Risk of HIV/AIDS	1	0.08	0.26	0	1	0.06	0.23	0	1	0.02	0.12	0	1	5.02	0.00*
	3	0.07	0.25	0	1	0.05	0.23	0	1	0.05	0.23	0	1	0.53	0.58
Know someone with HIV/AIDS	1	0.21	0.41	0	1	0.08	0.27	0	1	0.06	0.24	0	1	30.38	0.00*
	3	0.49	0.50	0	1	0.12	0.32	0	1	0.12	0.32	0	1	120.0	0.00*
Know someone died due to HIV/AIDS	1	0.34	0.47	0	1	0.13	0.33	0	1	0.04	0.20	0	1	73.65	0.00*
	3	0.56	0.50	0	1	0.14	0.35	0	1	0.08	0.27	0	1	148.1	0.00*
Exposure to HIV/AIDS (not family)	1	0.30	0.46	0	1	0.10	0.30	0	1	0.04	0.20	0	1	34.88	0.00*
	3	0.36	0.48	0	1	0.16	0.37	0	1	0.14	0.35	0	1	30.87	0.00*
Exposure to HIV/AIDS through immediate family	1	0.09	0.29	0	1	0.03	0.17	0	1	0.01	0.12	0	1	20.76	0.00*
	3	0.28	0.45	0	1	0.04	0.19	0	1	0.01	0.12	0	1	81.53	0.00*

Table 5

Linear Probability Models with Beutel and Anderson regressors and added HIV/AIDS regressors

VIII.	SR				LR		First Difference	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	2002	2002	2005	2005	2002-2005	2002-2005	2002-2005	2002-2005
Female	0.028*	0.028*	-0.008	-0.002	-0.027	-0.025		
	(0.011)	(0.011)	(0.032)	(0.032)	(0.021)	(0.021)		
Age	-0.006	-0.007	-0.010	-0.011	-0.033***	-0.033***		
	(0.004)	(0.004)	(0.013)	(0.013)	(0.007)	(0.007)		
Colored	-0.090***	-0.090***	-0.193***	-0.240***	-0.272***	-0.283***		
	(0.015)	(0.015)	(0.047)	(0.052)	(0.025)	(0.026)		
White	-0.069**	-0.069**	-0.128*	-0.175**	-0.171***	-0.182***		
	(0.023)	(0.023)	(0.053)	(0.059)	(0.035)	(0.035)		
LNE Score	0.002*	0.002*	0.009***	0.009***	0.008***	0.008***		
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)		
Has failed school-year prior to age 13	-0.016	-0.016	-0.006	-0.008	0.012	0.011		
	(0.013)	(0.013)	(0.039)	(0.039)	(0.024)	(0.024)		
Currently Enrolled	0.067**	0.067**	0.334***	0.323***	0.211***	0.209***	omitted	omitted
	(0.025)	(0.025)	(0.073)	(0.074)	(0.037)	(0.037)		
1 Biological Parent	0.017	0.017	-0.023	-0.012	-0.008	-0.010	-0.019	-0.023
	(0.017)	(0.017)	(0.067)	(0.068)	(0.030)	(0.030)	(0.078)	(0.079)
2 Biological Parents	0.011	0.011	0.042	0.049	0.028	0.026	0.031	0.026
	(0.018)	(0.018)	(0.064)	(0.065)	(0.031)	(0.031)	(0.083)	(0.085)
# YA in HH <= 13	0.002	0.002	-0.022	-0.022	-0.025**	-0.025**	0.042	0.042
	(0.004)	(0.004)	(0.023)	(0.023)	(0.008)	(0.008)	(0.025)	(0.025)
# YA in HH <13<=22	-0.000	-0.000	-0.004	-0.005	-0.009	-0.009	-0.014	-0.014
	(0.004)	(0.004)	(0.016)	(0.016)	(0.010)	(0.010)	(0.024)	(0.024)
HH Head Graduated HS	0.010	0.010	0.014	0.021	0.063**	0.063**	0.072	0.072
	(0.012)	(0.012)	(0.042)	(0.042)	(0.023)	(0.023)	(0.044)	(0.044)
Indirect exposure to HIV/AIDS (not family)		-0.000		-0.075		-0.030		-0.012
		(0.014)		(0.042)		(0.027)		(0.041)
Indirect exposure to HIV/AIDS through immediate family		0.001		-0.104		-0.088		0.034
		(0.023)		(0.064)		(0.053)		(0.051)
Constant	0.966***	0.967***	0.597	0.672*	1.098***	1.113***	-0.091***	-0.093***
	(0.088)	(0.088)	(0.312)	(0.312)	(0.151)	(0.151)	(0.022)	(0.023)
N	1368	1367	503	503	1446	1445	486	486
r2	0.076	0.076	0.221	0.229	0.252	0.254	0.022	0.023

Table 6
Ordinal Logit Model: Replication of Beutel and Anderson and additional HIV/AIDS Impact regressors

	SR				LR	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.077	0.147	0.177	0.167	-0.115	-0.107
	(0.105)	(0.093)	(0.105)	(0.105)	(0.102)	(0.102)
Odds Ratio		1.158	1.19	1.18	0.891	0.902
Age	-0.166***	-0.123***	-0.090*	-0.092*	-0.184***	-0.183***
	(0.033)	(0.032)	(0.036)	(0.036)	(0.034)	(0.034)
Odds Ratio		0.884	0.913	0.914	0.831	0.832
Colored	-1.350***	-1.294***	-1.378***	-1.316***	-1.270***	-1.307***
	(0.244)	(0.112)	(0.127)	(0.130)	(0.122)	(0.126)
Odds Ratio		0.274	0.252	0.265	0.280	0.273
White	-1.416***	-1.301***	-1.357***	-1.279***	-0.261	-0.305
	(0.237)	(0.206)	(0.242)	(0.244)	(0.239)	(0.241)
Odds Ratio		0.272	0.257	0.275	0.770	0.747
1 Biological Parent	0.040	0.081	0.124	0.112	-0.071	-0.063
	(0.118)	(0.124)	(0.148)	(0.149)	(0.142)	(0.143)
Odds Ratio		1.083	1.131	1.127	0.931	0.931
2 Biological Parents	-0.041	0.080	0.059	0.046	0.085	0.092
	(0.138)	(0.129)	(0.151)	(0.151)	(0.146)	(0.147)
Odds Ratio		1.083	1.060	1.055	1.088	1.091
# YA in HH <= 13	-0.038	-0.032	-0.051	-0.051	-0.102**	-0.103**
	(0.040)	(0.036)	(0.041)	(0.041)	(0.039)	(0.039)
Odds Ratio		0.968	0.950	0.949	0.902	0.902
# YA in HH <13<=22	0.039	0.022	-0.004	-0.006	-0.080	-0.080
	(0.055)	(0.044)	(0.051)	(0.051)	(0.049)	(0.049)
Odds Ratio		1.021	1.060	0.995	0.992	0.923
HH Head Graduated High School	0.345***	0.304***	0.281*	0.285*	0.322**	0.319**
	(0.111)	(0.099)	(0.113)	(0.113)	(0.110)	(0.110)
Odds Ratio		1.355	1.323	1.323	1.380	1.386
Currently Enrolled	0.594***	0.553***	0.594***	0.612***	0.840***	0.839***
	(0.170)	(0.146)	(0.168)	(0.169)	(0.154)	(0.154)
Odds Ratio		1.738	1.810	1.838	2.317	2.314
Proportion of school-years failed prior to age 13	-1.101	-0.989	-1.173	-1.197	-0.776	-0.795
	(0.641)	(0.670)	(0.776)	(0.777)	(0.701)	(0.702)
Odds Ratio		0.371	0.309	0.303	0.460	0.456
LNE Score	0.060***	0.056***	0.062***	0.062***	0.036***	0.036***
	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Odds Ratio		1.057	1.064	1.064	1.036	1.036

Exposure to HIV/AIDS (not family)				0.316*		-0.161
				(0.143)		(0.137)
Odds Ratio				1.372		0.851
Exposure to HIV/AIDS through immediate family				0.238		-0.174
				(0.230)		(0.231)
Odds Ratio				1.269		0.840
N	1762	1760	1368	1363	1446	1441
chi2		304.30	250.96	254.63	441.11	438.70

Table 7

Ordinal Logit Model by Race: Short Run and Lagged Educational Expectations

(odds ratio only)	Black		Colored	
	(1)	(2)	(3)	(4)
Female	1.17	1.208	1.123	0.749
	(0.191)	(0.187)	(0.172)	(0.115)
Age	0.857***	0.804***	0.975	0.858*
	(0.043)	(0.036)	(0.055)	(0.047)
1 Biological Parent	1.236	0.750	1.117	1.324
	(0.250)	(0.143)	(0.277)	(0.314)
2 Biological Parents	0.961	0.893	1.027	1.369
	(0.207)	(0.592)	(0.233)	(0.316)
# YA in HH <= 13	1.012	1.002	0.881*	0.832*
	(0.062)	(0.068)	(0.051)	(0.049)
# YA in HH <13<=22	0.998	1.001	1.01	0.818*
	(0.074)	(0.068)	(0.076)	(0.064)
HH Head Graduated High School	1.252 *	1.025	1.307**	1.578**
	(0.214)	(0.169)	(0.209)	(0.623)
Currently Enrolled	1.827 ***	1.789***	1.991**	2.716***
	(0.459)	(0.400)	(0.492)	(0.623)
Proportion of school-years failed prior to age 13	9.439*	2.948	0.013***	0.070*
	(10.334)	(2.868)	(0.015)	(0.079)
LNE Score	1.042 ***	1.017	1.070***	1.040**
	(0.012)	(0.010)	(0.013)	(0.012)
Exposure to HIV/AIDS (not family)	1.392*	1.080	1.371	0.491**
	(0.259)	(0.187)	(0.335)	(0.125)
Exposure to HIV/AIDS through immediate family	1.339	0.982	1.088	0.639
	(0.371)	(0.262)	(0.500)	(0.327)
Long Run Educational Expectations	NO	YES	NO	YES
N	611	634	621	685
chi2	52.42	69.96	117.13	227.73

Table 8

Comparing HIV Risk across groups

Perception of own HIV Risk in Wave 1	'None / Low'	'High Risk'
Not Exposed to HIV/ AIDS	0.885 (0.009)	0.054 (0.006)
Exposed to HIV/AIDS	0.845 (0.019)	0.084 (0.015)
Ho: Difference = 0 H1: Difference !=0	P = 0.07	P=0.06

Table 9

Linear Probability that youth have had sex:

(1): Prior to Wave 1

(2): Between Waves 1 and 3

	(1)	(2)
Female	-0.028	0.008
	(0.018)	(0.029)
Age	0.086***	0.034**
	(0.006)	(0.012)
Colored	-0.233***	-0.191***
	(0.022)	(0.039)
White	-0.224***	-0.229***
	(0.034)	(0.061)
LNE Score	-0.000	-0.001
	(0.001)	(0.002)
Has failed school-year prior to age 13	0.060**	-0.007
	(0.022)	(0.035)
Currently Enrolled	-0.222***	-0.083*
	(0.032)	(0.058)
1 Biological Parent	-0.013	-0.0368
	(0.026)	(0.046)
2 Biological Parents	-0.002	-0.072
	(0.027)	(0.046)
# YA in HH <= 13	0.011	0.013
	(0.007)	(0.012)
# YA in HH <13<=22	-0.010	0.002
	(0.009)	(0.014)
HH Head Graduated HS	-0.010	-0.061
	(0.021)	(0.032)
Exposure to HIV/AIDS (not family)	0.062*	0.027
	(0.027)	(0.046)
Exposure to HIV/AIDS through immediate family	0.095*	-0.032
	(0.045)	(0.082)
Constant	-0.798***	0.150
	(0.135)	(0.242)
N	1626	1045
R^2	0.435	0.092

Table 10

Linear Probability Model of unreliable respondent youth:

	(1)
Female	-0.016
	(0.016)
Age	0.012
	(0.006)
Colored	0.071***
	(0.020)
White	0.036
	(0.031)
LNE Score	-0.002
	(0.001)
Has failed school-year prior to age 13	-0.018
	(0.019)
Currently Enrolled	-0.053
	(0.028)
1 Biological Parent	-0.005
	(0.024)
2 Biological Parents	-0.011
	(0.024)
# YA in HH <= 13	-0.003
	(0.006)
# YA in HH <13<=22	-0.001
	(0.007)
HH Head Graduated HS	-0.039*
	(0.018)
Exposed to HIV/AIDS	0.336***
	(0.028)
Constant	-0.021
	(0.121)