Supplementary Files

Table S1. Included Variables and Specification

Variable	Individual Items	Aggregation of Measure
ART adherence *(outcome variable)*	1. How many times did you take your ARVs or HIV medicine yesterday? 2. How many times did you take your ARVs or HIV medicine the day before yesterday? 3. How many times did you take your ARVs or HIV medicine three days ago? 4. Did you miss taking any of your ARV pills or HIV medicine in the last week? 5. How many times did you not take your medication last weekend?	Binary indicator, coded 0 for no adherence if taken less than all required doses in the past three days or missed at least one dose in the past week or missed at least one dose on the past weekend or is currently not on ART (i.e., defaulting); coded 1 otherwise
Economic wellbeing *(predicting variable)*	Please indicate which of the following you can afford at home: 1. 3 meals a day 2. School fees 3. Visit to the doctor when you are ill, and all the medicines you need 4. School uniform 5. Enough clothes to keep you warm and dry 6. Toiletries to be able to wash every day 7. School equipment 8. More than one pair of shoes	Continuous additive scale ranging from 0-8, whereby 0 indicates access to no basic necessities, and thus very low economic wellbeing, and 8 indicates access to all eight basic necessities, and thus higher economic wellbeing
Having sufficient money to travel to the clinic *(structural mediator)*	I didn't have enough money for transport to get to the clinic	Binary indicator whereby 1 indicates having sufficient money and 0 indicates not having sufficient money for transport
Having sufficient food to take with medicine *(structural mediator)*	It has been difficult for me to take my medicine when I haven't eaten	Binary indicator whereby 1 indicates having sufficient food to take with medication and 0 indicates not having sufficient food
Internalised HIV stigma *(internal mediator)*	1. Lundi is very careful whom he/she tells that he/she has HIV. Are you careful who you tell? 2. Sometimes Lundi feels that he/she is not as good as other kids because he/she has HIV. Do you ever feel this way? 3. Sometimes Lundi feels like he/she would rather die than live with HIV. Do you ever feel this way? 4. Sometimes Lundi feels like he/she is a bad person because he/she has HIV. Do you ever feel this way? 5. Sometimes Lundi feels ashamed that he/she is HIV-positive. Do you ever feel this way?	Continuous additive scale ranging from 0-14, whereby higher scores indicate higher internalised stigma, then reverse coded for the purpose of this analysis (i.e. higher scores indicate less stigma)

	6. Sometimes Lundi feels that it is his/her fault that he/she is HIV-positive. Do you ever feel this way? 7. Sometimes having HIV makes Lundi feel contaminated and dirty inside. Do you ever feel this way? Response options: Not at all, sometimes, all the time	
Anxiety and depression *(internal mediator)*	Depression measure: For each group of 3 statements, pick out which best describes how you have felt in the last 2 weeks: 1. Nothing will ever work out for me, I am not sure if things will work out for me, Things will work out for me OK 2. I am sad once in a while, I am sad many times, I am sad all the time 3. I look ok/good!, There are some bad things about my looks, I look ugly 4. I hate myself, I do not like myself, I like myself 5. I do not feel alone, I feel alone many times, I feel alone all the time 6. I do most things OK, I do many things wrong, I do everything wrong 7. I have enough friends, I have some friends but wish I had more, I don't have any friends 8. I feel like crying every day, I feel like crying many days, I feel like crying once in a while 9. Nobody really loves me, I am not sure if anybody loves me, I am sure that somebody loves me 10. Things bother me all the time, Things bother me many times, Things bother me once in a while Anxiety measure 1. I worry a lot of the time. 2. I worry about what my carers will say to me. 3. I feel that others do not like the way I do things. 4. It is hard for me to get to sleep at night. 5. I worry about what other people think about me. 6. I feel alone even when there are people with me. 7. I worry about what is going to happen. 8. Other children are happier than I am. 9. I have bad dreams. 10. I wake up scared some of the time. 11. I worry when I go to bed at night.	Depression measure: Continuous additive scale ranging from 0-20, whereby higher scores indicate higher depression Anxiety measure: Continuous additive scale ranging from 0-14, whereby higher scores indicate higher anxiety Combined measure: sum of the depression score and anxiety score, then reverse coded for the purpose of this analysis (i.e. higher scores indicate less depression and anxiety)

| | 12. I am nervous.
13. A lot of people are against me.
14. I often worry about something bad happening to me.
Response options: Not at all, sometimes, all the time | |

Table S2. Multivariable logistic regressions testing associations between self-reported ART adherence and undetectable viral load

	Undetected Viral Load Wave 1		Undetected Viral Load Wave 2	
	OR [95% CI]	p-value	OR [95% CI]	p-value
Self-reported ART adherence	1.457* [1.02-2.08]	0.037	1.447* [1.01-2.07]	0.045
Age	0.928* [0.87-0.99]	0.032	0.971 [0.90-1.05]	0.433
Female	1.117 [0.81-1.56]	0.516	0.935 [0.67-1.32]	0.700
Rural Location	0.948 [0.65-1.37]	0.777	0.618* [0.43-0.90]	0.012
Orphanhood	0.661* [0.46-0.94]	0.022	0.809 [0.57-1.15]	0.242
Informal housing	0.707 [0.47-1.06]	0.094	1.151 [0.72-1.84]	0.557
Horizontal infection	0.877 [0.53-1.44]	0.604	0.829 [0.49-1.40]	0.482
Overall health status	0.459* [0.23-0.92]	0.027	0.518 [0.23-1.19]	0.123

N=650 adolescents in wave 1, and N = 598 adolescents in wave 2. 95% CI – 95% confidence interval

Table S3. Observed within-person changes in household poverty over time

	% of participants who experienced a decrease/ an increase in poverty between waves	
	Wave 1-Wave 2	Wave 2–Wave 3
+1 basic need (decrease in poverty)	14.33%	15.80%
+3 or more basic needs (decrease in poverty)	9.74%	20.83%
-1 basic need (increase in poverty)	14.61%	12.36%
-3 or more basic needs (increase in poverty)	27.51%	18.60%

Notes: N=933 adolescents.

Table S4. Multivariable Fixed-Effects Logit Regression: Association between Household Economic Wellbeing (Access to Basic Needs) and ART Adherence

	Coefficient (SE)	Lower 95% CI	Upper 95% CI	p-value
Explanatory variable				
Economic wellbeing	0.06* (0.03)	0.01	0.11	0.028
Control variables				
Age	-0.12 (0.12)	-0.35	0.12	0.331
Rural residence	0.07 (0.28)	-0.49	0.62	0.816
Household size	0.03 (0.03)	-0.02	0.07	0.224
Orhanhood status	-0.25 (0.22)	-0.69	0.18	0.224
Timepoint 2	0.18 (0.21)	-0.23	0.60	0.393
Timepoint 3	0.92** (0.35)	0.23	1.60	0.008

Notes: N=933 adolescents, 2799 observations over three waves. *p<0.05, **p<0.01, ***p<0.001. 95% CI - confidence interval. Household wellbeing is an additive index composed of access to and ownership of eight selected basic needs.

Table S5. Multivariable Random-Effects Logit Regression: Association between Household Economic Wellbeing (Access to Basic Needs) and ART Adherence

	Coefficient (SE)	Lower 95% CI	Upper 95% CI	p-value
Explanatory variable				
Economic wellbeing	0.07** (0.02)	0.03	0.12	0.001
Control variables				
Sex	-0.08 (0.11)	-0.29	0.13	0.449
Age	-0.02 (0.02)	-0.07	0.02	0.286
Rural residence	0.08 (0.12)	-0.15	0.31	0.500
Household size	-0.00 (0.01)	-0.03	0.03	0.925
Orhanhood status	0.11 (0.11)	-0.10	0.32	0.306
Horizontally infected	-0.47** (0.15)	-0.76	-0.17	0.002
Timepoint 2	0.03 (0.11)	-0.19	0.25	0.787
Timepoint 3	0.61*** (0.13)	0.40	0.86	<0.001

Notes: N=933 adolescents, 2799 observations over three waves. *p<0.05, **p<0.01, ***p<0.001. 95% CI - confidence interval. Household wellbeing is an additive index composed of access to and ownership of eight selected basic needs.

Table S6. Structural equation path model: Structural and internal economic pathways to improved ART adherence

	Past-week ART adherence	Money to go to clinic	Food to take with medication	Lower internalised HIV stigma	Lower depression and anxiety
Economic wellbeing - *within*	0.03* [0.00-0.06]	0.07*** [0.04-0.11]	0.03* [0.00-0.06]	0.04* [0.00-0.07]	0.07* [0.01-0.14]
Economic wellbeing - *between*	0.03 [-0.01-0.07]	0.14*** [0.10-0.19]	0.02 [-0.02-0.06]	0.02 [-0.02-0.06]	0.21*** [0.13-0.30]
Money to go to clinic - *within*	0.10* [0.00-0.21]				
Money to go to clinic - *between*	0.11 [-0.04-0.25]				
Food to take with medication - *within*	0.23*** [0.10-0.37]				
Food to take with medication - *between*	0.21** [0.04-0.37]				
Lower internalised HIV stigma - *within*	0.05* [0.00-0.09]				
Lower internalised HIV stigma - *between*	0.02 [-0.02-0.06]				
Lower depression and anxiety - *within*	0.03*** [0.01-0.06]				
Lower depression and anxiety - *between*	0.07*** [0.04-0.10]				
Model Fit					
AIC	*32597.42*				
BIC	*32983.00*				

Notes: *p<0.05, **p<0.01, ***p<0.001. N=2785 due to item missings and listwise deletion. Pathways with binary dependent variables were estimated in a probit regression model and pathways with continuous dependent variables were estimated in a linear regression model. Analyses control for participants' sex (time-invariant), age, household size, and urban/rural location; standard errors are robust and clustered at the individual level. Model based on nonadaptive Gauss–Hermite quadrature to facilitate convergence.