Effects of Education Savings Accounts on Student Engagement: Instrumental Variable Analysis

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Abstract

As interest in youth financial inclusion continues to grow substantially, emerging research points to positive associations between students'savings and their educational outcomes. However, there is no definitive data on how assets alter student engagement, particularly in resource-limited settings. This study contributes knowledge by assessing the causal effects of education savings accounts on student engagement. We evaluate causal effects by using instrumental variable methods and data from a pilot study that assessed the viability of different education funding mechanisms for junior high-school students in Ghana. Results show that the offering of an education savings account to young people with an opt-out option has great promise for improving education account ownership. Results also show that simply having an account is not strongly predictive of school engagement. Instead, it is when people begin to save into the account that it positively shapes their school engagement. The finding speaks to the value of policies that support young people to cultivate a savings habit and to build their financial knowledge and skills. Efforts should be made to understand better how social workers and teachers could be adequately trained to provide financial counseling and financial education assistance to students within the community or school settings.

Keywords Saving · Asset effect · Student engagement · Sub-Saharan Africa · Instrumental variable

Introduction

Student engagement, defined as the commitment, investment, participation, and ability for students to identify with the goals, values, and academic activities of their school (Fredricks, Blumenfeld, and Paris 2004), is crucial for students' academic success (Archambault et al. 2009). When barriers to student engagement are identified and proactive steps implemented, students stand a greater chance for success as school dropout reduces and performance improves. The underlying assumption of student engagement is that students are self-motivated, and they demonstrate metacognition, academic achievement, and prosocial behaviors within and outside the school environment (Guo et al. 2014; Hamilton 2013; Okumu et al. 2016). In contrast, unengaged students demonstrate poor academic performance, low knowledge retention, drop out of school and engage in risky behaviors (Archambault et al. 2009; Wang and Peck 2013).

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A host of factors, ranging from personal dispositions to structural factors, determine student engagement. Dispositions such as future orientation, social support, and perceived family economic insecurity shape individuals' ability to effectively engage in school (Ansong et al. 2017, 2018a; Archambault et al. 2009; Wang et al. 2018b). Using a sample of 135 Ghanaian students, Ansong et al. (2017) found that among student's social support systems, classmate support was more predictive of student's ability to engage in school activities. Using similar data, Ansong et al. (2018a) found that the effect of family economic insecurity on student participation and involvement in school was either positive or negative. Students with positive future orientation were more likely to be engaged in school. The authors highlighted the need for further research to better explain the pathways to student engagement. This paper focuses on the economic determinants of student engagement, especially the role of young people's (ages 15–24 years old) financial savings. Because young people are 44% less likely to save in banks and other formal institutions, efforts to promote youth financial inclusion has grown substantially globally (World Bank 2014). A key motivation for the push for financial inclusion among young people is the idea that learning to manage and save money is an essential part of successfully transitioning from adolescence to adulthood (Dueck-Mbeba et al. 2015). Indeed, there is a growing trend of Ministries of Education across many developing countries partnering with youth development organizations to develop curricula to teach financial skills and knowledge at the primary and secondary school levels (Shephard et al. 2017). Besides financial education, many youth development organizations are supporting low-income youth with savings programs such as matched savings accounts. Matched savings accounts are individual savings accounts that allow foundations, corporations, individuals, and governments to match the savings deposited by the youth or their families. Research is showing that such programs foster asset accumulation among youth (Chowa and Ansong 2010; Karimli et al. 2015).

The ability to own assets provides individuals and families not only with an assurance of financial security and socioeconomic well-being, but also with a path out of poverty (Prina 2015; Wang et al. 2018a). At the household level, one of the most important benefits of savings is the ability to invest in the education and skills development of young members of the household (Ansong 2013; Ansong et al. 2018b; Demirguc-Kunt et al. 2017; Wang et al. 2018a). Moreover, when people accumulate financial assets, the saving process shapes their healthy behaviors (Ogunlesi and Ogunlesi 2012; Ssewamala et al. 2018), and improve mental health functioning (Ssewamala et al. 2018; Wang et al. 2014). In addition, having assets creates opportunities for further asset accumulation through kickstarting income-generating activities (Nam et al. 2013). Conversely, the lack of savings can exacerbate a household's financial insecurity, which can be a chronic source of stress that takes a toll on individuals' health and psychological

well-being (Ansong et al. 2018a; Godin and Kittel 2004; Huang et al. 2014; Kagotho et al. 2018), and educational outcomes (Ansong et al. 2018b; Clark et al. 2018; Curley et al. 2010; Ssewamala et al. 2010).

Research on the impact of youth financial inclusion has also grown, although the predictive role of children's savings on outcomes such as school engagement is underexplored. Previously, assets-based studies have primarily focused on the effects of assets on educational outcomes, with no specific emphasis on student engagement. For instance, in Uganda, Ssewamala et al. (2010) examined the impact of social capital on savings and educational performance of children orphaned to HIV participating in a family-level economic strengthening program. In Ghana, Clark et al. (2018) focused on how financial literacy and savings influence girl's education. This study helps fill this gap and examines whether asset holding by young people may be a potential leverage point for policies and practices aimed at improving educational outcomes in lower-resource settings. Although a body of emerging work has examined the effects of assets on psychological and educational outcomes, this work has not produced definitive data regarding how young people's assets alter their schooling behavior, particularly in Ghana (Ansong et al. 2015a, 2017; Chowa and Masa 2015). The current study contributes to the literature by addressing the following questions: (a) Does children's access to a savings account dedicated to their education alter their school engagement? (b) Do more savings in the account lead to higher behavioral engagement?

Asset Theory

The term *assets* refers to "financial and property holdings or the stock of tangible wealth in a household" (Shobe and Page-Adams 2001, p.111). This definition encompasses savings accumulated through informal channels (e.g., saving at home) and formal channels (e.g., saving with licensed financial institutions). The asset theory asserts that apart from improving individual and household consumption, "asset accumulation alters thinking and behavior" (Sherraden et al. 2004, p. 28; see also Sherraden 1991). This assertion is consistent with theories of planned behavior and planned action in that economic conditions are part of the socio-environmental factors that influence intentions, and in turn, stimulate behavior (Karimli and Ssewamala 2015). Some theorists have suggested that the asset effect is not only a function of accumulated assets but also a function of the *process* of accumulating assets; therefore, the asset effect can be direct or indirect (Bynner and Paxton 2001). In Ghana, assets are conceptualized as both personal and family assets used to create a sense of economic security (Adjei et al. 2009). Examples of assets include financial savings, land, a house, livestock, automobiles, machines for productions, and durable household goods.

Assets and Student Engagement

Student engagement is a multidimensional construct. The current study focused on the behavioral domain of student engagement. The study adopted Reschly and Christenson's (2012) conceptualization of student behavioral engagement as "participation in academic, social, or extracurricular activities," which differs from emotional engagement defined as "comprised of affect in interactions with teachers, peers, schoolwork, and the school" (p. 10).

A synthesis of the literature on the school-related effects of economic resources showed that both asset holding, and the lack of assets could affect the behavioral and the emotional aspects of student engagement. For instance, a young girl's awareness that her parent has saved money for her schooling has the potential to make a substantial difference in the girl's decision to pursue higher education (Shobe and Page-Adams 2001). When asset holding reduces household income volatility (Lerman and McKernan 2008), families can afford school expenses, thus enabling their children to remain in school and engage meaningfully in their school's academic, social, and extracurricular activities. Using data from the USA, Elliott and Beverly (2011) and Zhan and Sherraden (2011) found that parental asset holding predicted children's overt school behaviors such as regular school attendance. Additionally, other studies have suggested that financial distress, such as the inability to afford transportation to school, is predictive of behavioral problems at school (Ackerman et al. 2004; Evans et al. 2013).

While most of the studies suggest that asset holding has positive outcomes, a handful of studies have reported mixed or adverse findings. The mixed results are primarily a function of gender differences (Lincove 2009) and differences in the types of assets examined (Chowa and Masa 2015). Although the scholarship on the behavioral impact of savings and financial inclusion in sub-Saharan Africa is still developing, prior work suggests that gender differences exist in expected behavior because of early gender socialization (Otieno and Yeboah 2004). Girls are not expected to do as well in school, are not expected to be family breadwinners when they become adults, and face barriers that boys do not, such as domestic duties.

Another reason for the mixed findings in the asset-effect literature are the differences in the types of assets examined (Chowa and Masa 2015). For instance, studies conducted in Ghana and Uganda have found a negative association between agricultural assets (e.g., land and livestock ownership) and child outcomes because such assets take children away from attending school and completing schoolwork (Chowa and Masa 2015; Chowa et al. 2010). Using data from 135 Ghanaian students, Alhassan et al. (2017) found that in some rural settings, some young people have little option but to divide their afterschool time between working on homework and assisting parents on the farm. Although much of the prior work has shown the positive effects of parent and family economic resources on child outcomes, what remains unknown is whether asset holding by students themselves will improve their level of school engagement.

Assets and Psychosocial Factors

The conceptualization of asset effects also suggests indirect influence of psychosocial factors such as future orientation and emotional engagement (Ansong et al. 2013; Scanlon and Adams 2009). McLoyd et al. (2011), p. 115 defined future orientation as "attitudes and behaviours that lead individuals to form expectations, and give personal meaning to future events." Future orientation reflects hopes and expectations for various life domains in the future, and this forward-thinking orientation guides the developmental course of individuals by allowing them to plan, set goals, explore options, and make commitments (Ansong et al. 2013; Seginer 2009; Shobe and Page-Adams 2001). In clarifying how assets are associated with future orientation, Shobe and Page-Adams (2001) explained that economic resources provide people with opportunities to hope, plan, and dream about their future. According to Sherraden (1991), holding assets changes individuals' cognitive patterns, which in turn, improves their orientation toward the future, long-term thinking, and planning.

A wide range of studies from developed and developing countries have established that increasing the levels of asset holding or access to economic opportunities and resources can influence individuals' propensity to plan for the future (Ansong et al. 2013; Chowa and Masa 2015; Scanlon and Adams 2009). In the USA, though income is strongly and positively associated with students' future orientation (Padawer et al. 2007), asset holding by low-income households had a positive influence on youth's future orientation (McLoyd et al. 2011). That is, assets may have a compensatory effect concerning future orientation among households with limited incomes. Similar findings have been reported for Uganda by Ansong et al. (2013) who found that asset-building programs increased youth's future orientation.

Emerging empirical studies focused solely on youth have suggested positive associations exist between young people's future orientation and positive behavioral outcomes and psychological well-being. When individuals see themselves in a positive future state, they are more likely to form positive attitudes and less likely to engage in risky behaviors—behaviors that will help them achieve the desired end state (Chowa and Masa 2015). By focusing their attention on future plans and positive motivations, youth may avoid engaging in behaviors that could jeopardize their future selves or result in psychological distress. Most future orientation studies tend to examine the construct as a precursor of behavior, where future orientation of youth was found to predict behaviors positively (Burtless 1999; Alm 2011). For instance, positive future

orientation was associated with academic achievement among youth (Adelabu 2007), lower incidences of misconduct (Chen and Vazsonyi 2013), higher perceived academic self-efficacy (Kerpelman et al. 2008), and pursuit of higher education (Peetsma 2000). Youth with higher levels of future orientation also are less likely to engage in violent behaviors over time (Stoddard et al. 2011). The evidence reviewed above suggests that assets shape future orientation, and that future orientation shapes positive behavioral outcomes among youth.

In the education literature, it is overwhelmingly clear and unequivocal that emotional engagement is an antecedent of behavioral engagement (Ansong et al. 2017, 2018a; Pekrun and Linnenbrink-Garcia 2012). Using data from Ghana, Ansong and colleagues (Ansong et al. 2018a), found that students who perceived their families as economically insecure were less likely to be emotionally engaged in school. Lack of assets affects student's concentration in school and might be associated with other problem behaviors, including both emotional and behavioral engagement (Ansong et al. 2018a). Thus, some scholars argue that emotional engagement is the most relevant predictor of students' behavioral engagement in the classroom (Davis et al. 2012). Thus, if emotional engagement is a precursor to behavioral engagement, then it may play a significant role in the relationship between assets and behavioral engagement.

Current Study

Based on Sherraden's (1991) theory of asset-based welfare supported by the theory of planned behavior and empirical studies, offering young people opportunities to own a savings account dedicated to their education can have both direct and indirect asset effects on engagement. Proponents of the asset theory suggest that assets have a motivational impact and therefore it matters who owns the savings account (Ansong et al. 2015b). This idea that the ownership structure matters is well articulated by Friedline and Schuetz (2014) when they explained that "when savings accounts are not in children's names, children might not associate [those] savings accounts with their own aims or may perceive them to be an extension of the self, losing some power to shape children's attitudes and expectations…" (p. 9). In other words, children's savings have a robust asset effect because children can more easily associate their personal assets with their own lives. Therefore, we hypothesize that young people's *ownership of a savings account* dedicated to their education has motivational effects on their engagement at school (Hypothesis 1).

Secondly, we expect the effects to be stronger when a young person is saving into the account than when he/she merely has an account. To have a strong influence on their behavioral engagement, young people who are offered the opportunity to save must first begin to accumulate savings to the point where the accumulated savings start to serve as a catalyst to reinforce their behavior in school. Thus, we hypothesized that the influence of access to savings accounts on students' behavioral engagement would be transmitted through the initial effect on students accumulating financial resources (Hypothesis 2). Although most youth are not engaged in paid employment, and therefore might save only small amounts of money, Shobe and Page-Adams (2001) have suggested that small asset accumulations can generate large effects. While Friedline and Schuetz (2014) and Shobe and Page-Adams's (2001) conceptualization are sound, it is worth applying rigorous analytic framework to test the extent to which access to a savings account for education and the amount of savings accumulated into the account shape children's school engagement.

Methods

Data Source and Sample

Data for the study came from a 2014 pilot study that examined different models for funding the education of low-income families in Ghana. Nonprobability (availability) sampling was used to select one public junior high school in a large slum area of Ashaiman District and two schools in a rural community in Dangme West District, both in the Greater Accra region of Ghana. The rural schools were assigned to 1 of 2 treatment arms and the school in the urban slum was assigned the comparison group ($n = 42$). Treatment arm 1 ($n = 45$) was promised a USD 100 scholarship. Upon completion of junior high school, the scholarship money was deposited into a savings account, with the goal to use the savings to pay for senior high school tuition and school supplies. Treatment arm 2 ($n = 48$) was offered education savings account under the name of the study participant. At the end of the observation period, all deposits into the account, whether from the parent or the youth, were matched at a 1:1 rate and capped at USD 100. No other support besides the scholarship and the savings account with matched savings were provided by the intervention. All third-year students in the three schools were invited to participate in the study ($N = 135$). Surveys were self-administered at the beginning of the academic year (before intervention rollout) and nine months later. The Institutional Review Board at the University of North Carolina in Chapel Hill approved procedures for the pilot study.

Measures

Instrument and Endogenous Variables

The first endogenous variable is account ownership. It is a binary measure of whether respondents in either of the

treatment groups opened a bank account that the research project offered. The second endogenous variable was *child savings,* a posttest continuous variable that measured the amount of money the child had set aside for later use. Both data were obtained through bank administrative records. In all tested models, the instrumental variable was the treatment assignment variable indicating whether respondents were assigned to one of the treatment groups or the comparison group. In testing hypothesis 1 (effect of account ownership), the study does not focus on treatment arm 1 (the scholarship group) because of lack of a strong instrument.

Outcome Variable

Behavioral engagement was assessed using a five-item, 5-point response scale (1 = *never*, 5 = *always*) through a survey with the youth. At follow-up, respondents indicated the extent to which they typically work hard on schoolwork, participate in class discussions, pay attention in class, and listen carefully in class. The five items were summed to create a cumulative behavioral engagement score (alpha = .79), with higher scores indicating a greater level of engagement. The items developed initially by Skinner et al. (2009) have been tested and validated in the Ghanaian context (Ansong et al. 2017).

Exogenous Regressors

We included two psychosocial regressors (*future orientation* and *emotional engagement*) and two demographics regressors (age and gender) to improve the estimation; all four were obtained through a survey with the youth. Future orientation was assessed using 12 items and an 11-point response scale ranging from 0 (*strongly disagree*) to 10 (*strongly agree*) (see Chowa et al. 2015). The items broadly assessed student orientation toward success (alpha = .89) and uncertainty about the future (alpha = .89). Emotional engagement was assessed with five items on the follow-up survey. All items used a 5-point response scale (1 = *never*, 5 = *always*). These items were developed by Skinner et al. (2009), and have been shown to have good psychometric properties in the Ghanaian context (Ansong et al. 2017). The items were summed to create a cumulative emotional engagement score (alpha = .79), with higher scores indicating a greater level of emotional engagement. Gender was measured as a binary variable with females coded as 1 and males coded as 0. Age was measured in years and ranged from 12 to 23 years.

Analytic Approach

To estimate the effects of account ownership and savings amount on school engagement, we used instrumental variable with two-stage least squares (2SLS) to control for unmeasured confounding to obtain an estimate of the average effect in two separate models (Baiocchi et al. 2014). In the absence of an RCT, we chose instrumental variable analysis over alternative causal inference methods because it is arguably more suited to answering policy questions (Stukel et al. 2007). Moreover, the current study deals with variables that are within the domain of economics, hence an econometric approach such as instrumental variable analysis is best suited for savings data. In a 2007 study, Stukel and colleagues assessed alternative causal inference methods and found that compared to methods such as propensity score matching, instrumental variable analysis produced estimates of treatment effects closer to RCT estimates.

In both the account ownership and saving amount models in the current study, the first stage takes the form:

$$\text{Endogenous regressor} = \alpha_1 + \beta_1 \text{treatment} + \beta_2 W + e$$

where endogenous regressor is account ownership (Model 1) or savings amount (Model 2), treatment is the dummy variable indicating whether one is assigned to treatment or comparison group (in Model 1) or assigned to matched savings treatment group or not (in Model 2), w is a vector of four exogenous regressors, α_1 is a constant, and e is an error term. We then substituted the predicted values for account ownership (or savings amount in Model 2) in the second-stage model where behavioral engagement is the outcome as expressed below:

$$\begin{aligned} \text{Behavioral engagement} = \alpha_2 \\ + \widehat{\beta}_3 \text{account ownership/savings amount} \\ + \beta_4 W + u \end{aligned}$$

For both Model 1 and Model 2, we also tested comparative models based on limited-information maximum likelihood (LIML) and generalized method of moments (GMM) estimators. These alternative estimators are asymptotically equivalent to 2SLS. We performed sensitivity tests using the conditional approach (*condivreg* in Stata). Assuming the treatment assignment variable was a weak instrument, the conditional approach would be appropriate because it is not based on the standard asymptotic theory (Cameron and Trivedi 2010). Lastly, OLS regression models were conducted to provide a comparative estimate of the relationship between account ownership (or savings amount in Model 2) and student engagement. We used Stata 15 to perform all statistical analyses (StataCorp LP, College Station, Texas), including the Durbin Wu-Hausman test (*estat endogenous* command in Stata) to confirm the validity of account ownership as endogenous in Model 1 and child savings in Model 2, and Stock and Yogo's (2005) test of weak instrument to assess the relevance and credibility of the treatment assignment variable as an instrument. Because both all models were just-identified (i.e., one instrument for one endogenous regressor), there was no need to test for overidentifying restrictions (Cameron and Trivedi 2010). All continuous variables were centered at the grand

mean for intuitive interpretation of results. Log transformation was also applied to the *savings amount* variable to reduce the skewness from 5.77 to 0.32.

We assess each hypothesis and statistical significance with a .05 significance level. However, given the recommendation to emphasize estimation and confidence interval with a lower threshold (e.g., 75% or 85%) for pilot studies (Lee et al. 2014), we also report the 90% confidence interval that corresponds to a .10 significance level. A post-hoc power calculation for instrumental variable analysis using the *PharmIV* Stata command (Walker et al. 2017) and the recommended significance threshold for pilot studies (Lee et al. 2014) yielded statistical power between 72 and 86% to detect a medium to strong effect, as expected for a small pilot study. Also, per the recommended $N < 70$ threshold for pilot and feasibility studies (Teare et al. 2014) the current study's analytic sample size (132) exceeds the lower threshold. Notwithstanding these power estimations, we caution that as a pilot study at the *initial implementation and formative evaluation* phase of the successive evidence-building process, interpretation of results should stay true to the phased-based evidence-building approach by focusing on whether the results are in the desired direction (Shadish et al. 2002; Testa et al. 2014).

Results

Descriptive Results

Ages of the study participants ranged from 12 to 23 years ($M = 16$ years, $SD = 1.81$, *Median* = 16); an age range that is representative of about 20% of Ghana's population. Although it is not typical to observe junior high school students in their 20s nationwide, it is not unusual in rural areas. All statistical models were based on the entire sample because excluding 20-year-olds did not significantly change the results. The sample had slightly more girls (55%), representing a sex ratio of 0.82 male/female, which is slightly below Ghana's sex ratio of 0.99 male/female for the same age group. The mean behavioral engagement score of 22.7 ($SD = 2.54$, range 13–25), was lower than the mean emotional engagement score of 13.74 ($SD = 1.52$, range 9–15). Given the highest possible score of 25, a mean score of 23 indicates a high level of student engagement. The mean future orientation score was 78.58 ($SD = 16.50$, range 22–120), suggesting that most students looked forward to a positive future.

At baseline, respondents saved an average of 11.39 Ghanaian cedis, GHS (Median = 2, SD = 39.62), and 6.85 at endline (Median = 5, SD = 20.02). In the context of rural Ghana, 11 GHS could offset part of the cost of basic school supplies. At baseline, boys reported saving significantly more money (M = 14.12, SD = 7.63) than girls (M = 9.15, SD = 2.12, $t = 0.68$, $p = .49$) although the difference was not

statistically significant. By endline, girls had saved 8.88 GHS more than boys ($t = -2.12$, $p = .04$).

Table 1 compares the characteristics of the two treatment groups and the comparison group at baseline and shows that the groups are comparable on all but two variables (emotional engagement, $F = 5.87$, $p < .01$ and female, $x^2(2) = 8.67$, $p = .01$). As shown in the Table, at baseline, the scholarship group had the most savings ($M = 15.22$, $SD = 61.14$) followed by the comparison group ($M = 12.36$; $SD = 18.26$) and the matched savings group ($M = 4.92$, $SD = 14.28$). However, these baseline differences were not significant ($F = 0.66$, $p = .52$). By endline, the scholarship group ($M = 3.04$, $SD = 5.41$) and the comparison group ($M = 10.69$, $SD = 12.23$) experienced reduction in their savings while the matched savings group experienced an increase ($M = 6.83$, $SD = 29$; $F = 1.28$, $p = .28$).

Ordinary Least Squares Regression Results

Results of the OLS models are given in the sixth columns of Tables 2 and 3. In the *savings ownership* OLS model (Table 2), neither account ownership ($b = -0.12$, Robust $SE = 0.50$, $p = .45$), nor treatment assignment ($b = -1.80$, Robust $SE = 0.85$, $p = .13$) was a significant predictor of behavioral engagement at the .05 significance level. In the *savings amount* OLS model (Column 6 of Table 3), child savings was not associated with behavioral engagement at the .05 significance level ($b = 0.10$, Robust $SE = 0.18$, $p = .57$). Even if the significance is reduced to 90% confidence interval because of the use of pilot data (Lee et al. 2014), none of the coefficients would be significant. However, treatment assignment was a significant predictor ($b = 0.79$, Robust $SE = 0.26$, $p < .01$).

Instrumental Variable Results: Account Ownership Model

In the account ownership models, the treatment assignment variable was found to be a stronger instrument in the reduced models, so the unadjusted models were selected as the final models. We rejected the null hypothesis of weak instrument because the partial F-statistics (17.23) met the recommended cut-off (10). In other words, treatment assignment is a relevant instrument, and the just-identified IV model produced a more precise estimation compared to the OLS model. The statistically significant result of the Durbin Wu-Hausman test ($p = .03$) also confirmed the validity of account ownership as endogenous. Treatment assignment (the instrument) had a substantial and significant effect on account ownership ($\beta = -0.69$).

Using the .05 significance level as cut-off, the results show that the data do not support the hypothesis of asset effects of children's account ownership on their behavioral engagement. As shown in Table 2, when the IV method is used to account for confoundedness, account ownership was not positively

Table 1 Characteristics of the two treatment and comparison groups at baseline

	Scholarship M(SD)/%	Matched savings M(SD)/%	Comparison M(SD)/%	Statistic	p value
Sample size	n = 42	n = 48	n = 42		
Child savings	15.22(61.14)	4.92(14.28)	12.36(18.26)	F = 0.66	.52
Behavioral engagement	23.2(2.11)	22.76(2.78)	22.14(2.69)	F = 1.93	.15
Future orientation	57.47(5.15)	55.85(9.22)	58.26(2.57)	F = 1.54	.22
Emotional engagement	14.07(1.39)	14.09(1.28)	13.12(1.66)	F = 5.87	< .01
Age	16.11(1.89)	16.44(1.70)	15.55(1.76)	F = 2.38	.10
Gender (female)	27.27%	27.27%	45.45%	$X^2(2) = 8.67$	.01

predictive of behavioral engagement based on the 2SLS (β = 0.75, *Robust SE* = 0.39, *p* = .06), LIML (β = 2.48, *Robust SE* = 1.28, *p* = .06), or GMM estimation method (β = 2.09, *Robust SE* = 0.79, *p* < .05), or the conditional test approach (β = 2.48, *Robust SE* = 1.36, *p* = .07). However, because this is a pilot study, if we use the suggested lower threshold of 90% confidence interval (Lee et al. 2014), our pilot data would provide some preliminary evidence of account ownership effect based on the 2SLS model (95% CI [0.10, 1.39]), LIML model (95% CI [0.35, 4.61]), and GMM model (95% CI [0.35, 4.61]).

Instrumental Variable Results: Savings Amount Model

Assignment to matched savings account was a strong instrument. It had a substantial and significant effect on child savings at the .001 significance level. As shown in Table 3, in all the instrumental variable analyses, the partial F-statistics (19.27) met the recommended cut-off (10) as well as the 5% Wald test distortion rate of 16.38, thus leading to a rejection of the null hypothesis of weak instrument and greater confidence in assignment to matched savings account as a relevant instrument. Results of the Durbin Wu-Hausman test were all statistically significant at the .05 significance level, confirming the validity of child savings as endogenous.

We assessed the effects of children's savings on their behavioral engagement. Because the unadjusted and adjusted models produced identical results, the parsimonious unadjusted models were selected as the final models. Overall, the results show that the data support

Table 2 Instrumental variable and OLS results: adjusted standardized coefficients of the effects of savings account ownership on behavioral engagement based on different estimation methods

	2SLS β(RSE) 95% CI 90% CI	LIML β(RSE) 95% CI 90% CI	GMM β(RSE) 95% CI 90% CI	Conditional test β(RSE) 95% CI 90% CI	OLS β(RSE) 95% CI 90% CI
Account ownership	0.75 (0.38) [− 0.02, 1.51] [0.10, 1.39]	2.48 (1.28) [− 0.07, 5.03] [0.35, 4.61]	2.48 (1.28) [− 0.07, 5.03] [0.35, 4.61]	2.48 (1.36) [− 0.22, 5.18] [− 0.22, 5.18]	− 0.12 (0.50) [− 1.12, 0.88] [− 0.96, 0.71]
Treatment					− 1.80 (0.85)* [− 3.50, − 0.10] [− 3.22, 0.38]
intercept	− 0.56 (0.30) [− 1.15, 0.04] [− 1.06, 0.06]	20.16 (1.00)*** [18.17, 22.15] [18.49, 21.82]	20.16 (1.00)*** [18.17, 22.15] [18.49, 21.82]	20.16 (0.91)*** [18.35, 21.97] [18.35, 21.97]	22.71 (0.72)*** [21.28, 24.14] [21.28, 24.14]
Strong instrument and endogeneity tests					
Partial F-Statistic	17.23				
Durbin/ GMM C x^2	4.35*				
Wu-Hausman	4.44*				

β, Standardized coefficients; *RSE*, robust standard errors; *CI*, confidence interval; *2SLS*, two-stage least squares; *LIML*, limited information maximum likelihood; *GMM*, generalized method of moments; *OLS*, ordinary least squares

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

Table 3 Instrumental variable and OLS results: adjusted standardized coefficients of the effects of savings amount on behavioral engagement based on different estimation methods

	2SLS β(RSE) 95% CI 90% CI	LIML β(RSE) 95% CI 90% CI	GMM β(RSE) 95% CI 90% CI	Conditional test β(RSE) 95% CI 90% CI	OLS β(RSE) 95% CI 90% CI
Child savings	2.09 (0.79)* [0.50, 3.68] [0.76, 3.42]	2.09 (0.79)* [0.50, 3.68] [0.76, 3.42]	2.09 (0.79)* [0.50, 3.68] [0.76, 3.42]	2.09 (0.87)* [0.35, 3.84] [0.35, 3.84]	0.10 (0.18) [−0.26, 0.46] [−0.19, 0.40]
Age	0.16 (0.18) [−0.20, 0.52] [−0.14, 0.46]	0.16 (0.18) [−0.20, 0.52] [−0.14, 0.46]	0.16 (0.18) [−0.20, 0.52] [−0.14, 0.46]	0.16 (0.21) [−0.26, 0.58] [−0.26, 0.58]	0.02 (0.12) [−0.21, 0.26] [−0.18, 0.22]
Female	−1.03 (0.33)** [−1.69, −0.37] [−1.58, −0.48]	−1.03 (0.33)** [−1.69, −0.37] [−1.58, −0.48]	−1.03 (0.33)** [−1.69, −0.37] [−1.58, −0.48]	−1.03 (0.45)** [−1.93, −0.13] [−1.93, −0.13]	−0.66 (0.22)** [−1.11, −0.21] [−1.04, −0.29]
Future orientation	0.11 (0.14) [−0.16, 0.38] [−0.12, 0.33]	0.11 (0.14) [−0.16, 0.38] [−0.12, 0.33]	0.11 (0.14) [−0.16, 0.38] [−0.12, 0.33]	0.11 (0.15) [−0.20, 0.42] [−0.19, 0.42]	0.13 (0.14) [−0.14, 0.41] [−0.09, 0.36]
Emotional engagement	0.36 (0.22) [−0.07, 0.80] [−0.002, 0.73]	0.36 (0.22) [−0.07, 0.80] [−0.002, 0.73]	0.36 (0.22) [−0.07, 0.80] [−0.002, 0.73]	0.36 (0.17)* [0.02, 0.70] [−0.02, 0.69]	0.36 (0.17)* [0.02, 0.70] [0.07, 0.64]
Treatment					0.79 (0.26)** [0.24, 1.04] [0.35, 1.23]
Intercept	0.77 (0.24)** [0.28, 1.26] [0.36, 1.18]	0.77 (0.24)** [0.28, 1.26] [0.36, 1.18]	0.77 (0.24)** [0.28, 1.26] [0.45, 1.49]	0.03 (0.24) [−0.44, 0.51] [0.36, 1.18]	0.03 (0.24) [−0.44, 0.51] [0.36, 0.43]
Strong instrument and endogeneity tests					
Partial F-Statistic	19.27	19.27	19.27		
Durbin/ GMM C x^2	4.41*		4.41*		
Wu-Hausman	5.29*				

β, standardized coefficients; *RSE*, robust standard errors; *CI*, confidence interval; *2SLS*, two-stage least squares; *LIML*, limited information maximum likelihood; *GMM*, generalized method of moments; *OLS*, ordinary least squares

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

the hypothesis of asset effects of children's savings on their behavioral engagement. After using the IV methods to adjust for confoundedness, the savings that children accumulated on their own were positively related to their behavioral engagement ($\beta = 2.09$, *Robust SE* = 0.79, $p < .05$, 95% CI [0.50, 3.68]) regardless of the estimation methods. The significant standardized coefficient based on all four estimation methods (2SLS, LIML, GMM, and Conditional approach) shows that on average, a one standard deviation increase in children's personal savings yielded a 2.09 standard deviation increase in behavioral engagement. In other words, students' level of school engagement would have been 2.09 standard deviations higher for the comparison students if they had been assigned to the matched savings group and had started saving in their accounts.

Discussion

The last decade has seen significant advances in research on youth assets in resource-limited countries. Large-scale randomized studies and quasi-experiments such as YouthSave in Ghana, AssetsAfrica in Uganda, and the SUUBI program in Uganda have shaped the understanding of how institutional factors (e.g., distance, availability, and eligibility restrictions) drive the propensity of young people to save (Chowa et al. 2012). Equal interest exists in how youth's savings shape their lives and well-being. The current study contributes to this knowledge by examining associations between youth assets and behavioral engagement in school, with a particular focus on the effects of matched savings accounts.

Overall, our findings demonstrate the importance that children's savings for future educational needs have on their

engagement in academic work. Positive savings habit could result from students receiving a matched savings account, which in turn, could lead to educational engagement. This finding supports our hypothesis of a strong behavioral effect when children have the opportunity to accumulate savings, and it is also consistent with the assets effects framework that young people's savings alter their behavior (Sherraden 1991; Shobe and Page-Adams 2001; Chowa and Masa 2015). We suggest that larger confirmatory studies build on our findings, particularly with longitudinal and larger representative samples, to explore the pathways to realizing asset effects as well as possible threshold effects. If confirmed, the evidence of the key role of children's savings would strengthen researchers' and policymakers' confidence in the effects of asset-building interventions and programs on students' educational outcomes, especially in low-income communities.

A nuanced insight from the findings is that although young people's active participation in asset accumulation matters, they first need access to mechanisms to save. Without access to savings accounts of their own, young people may have to rely on their parents' accounts, which may not have the same motivational effect, compared to if children own the accounts as articulated by Ansong et al. (2015b) and Friedline and Schuetz's (2014). Although this study did not compare account ownership in the name of family members, the findings of the present study broadly support prior research indicating that young people's personal assets and savings have stronger and more positive impacts compared to assets and savings belonging to their household or parents (Ansong et al. 2015b; Elliott and Sherraden 2013). The emerging finding in the field is that direct asset holding by young people may be just as consequential if not more consequential than parental and familial asset ownership.

Also, when young people are offered the opportunity to own an account for their education, it matters whether they are given the option to opt in or opt out. In this study, the comparison group was never offered the opportunity to own an account. The scholarship group, on the other hand, was automatically given an account but could opt out. The matched savings group was also offered the opportunity to own an account but they had to opt in. As the results show, none of the children in the comparison group opened a savings account during the nine-month observation period, compared to 94% of those in the scholarship group, and 68% of those in the matched savings group. This finding suggests that the offering of personal education savings accounts to young people with an opt-out option might hold greater promise for improving the rate of education savings account ownership by young people.

Implications

This study's findings of the connections between financial resources and student engagement add to the emerging evidence that informs policy discourse on inclusive asset-based programs and policies in resource-limited countries. First, the finding that savings are related to school engagement speaks to the need for interventions that encourage young people to save at an early age. Students may need incentives to begin or continue saving. Thus, local and national policies are needed that reward young people who cultivate the habit of saving for future needs. Such policies could be designed in conjunction with financial institutions that provide young savers with favorable terms, waivers, and protections. With such incentives, young people are more likely to develop the habit of saving and continue saving as they envision a favorable future. However, banks in various countries will not allow children younger than a certain age to open their own account and require that accounts either be jointly owned by the child and her or his parent/guardian or where the parent/guardian is the custodian of the account. Though these accounts are not owned "free and clear" by children/youth, it is still an asset held in their name, which is consistent with this study.

Second, the evidence of a substantial effect of young people's savings has practical implications concerning growing global interest and efforts to promote child and youth financial capability (Mandell et al. 2012). Given the emerging evidence in the asset-building field, it is ever more critical to teach children at an early age to cultivate a savings habit and build financial knowledge and skills. Elementary and high schools could integrate content on personal finance into math curricula and host school-based savings programs in partnership with banks.

Third, overall, our findings have implications for social worker and teacher training and development. Schools of social work and teacher preparation institutions need to work with financial institutions and community organizations toward designing practical financial capability courses that prepare teachers to provide financial education, financial counseling, and budgeting assistance to young people. A study on teacher training in personal finance reinforced the need to develop and adopt financial capability curricula to ensure the next generation of teachers are prepared to engage in financial coaching and to provide financial capability support in diverse practice settings (Way and Holden 2009). Researchers, educators, and practitioners are keenly interested in the concepts of savings and financial inclusion. The fact that savings, under the umbrella of *financial capability*, features prominently in the American Academy of Social Work and Social Welfare's (2014) list of 12 Grand Challenges for the twenty-first century and as well as grand challenges of other business and social science fields underscore the importance that most social scientists attach to financial inclusion and the assets-building.

Limitations and Conclusion

There are data limitations to this pilot study; therefore, results should be interpreted with caution. The limited sampling frame (students from three schools) and the use of nonprobability sampling to select the schools limit the extent to which results can be generalized to other contexts. As explained earlier, because the partial F-statistics of the first-stage regressions were above recommended threshold (10), coupled with the moderately strong instrument (correlation between instrument and endogenous regressor = .34, $p < .001$), the magnitude of the small sample bias is negligible and therefore the small pilot study sample is not a major concern (Boef et al. 2014; Burgess and Thompson 2012; Martens et al. 2006). Also, this study's use of a quasi-experimental design and the possibility of unmeasured confounding present a threat to internal validity with possible implications for the credibility of the results. However, the advantage of using instrumental variable analysis is the ability to control for unmeasured confounders (Baiocchi et al. 2014), and deal with the omitted variable problems (Becker 2016), thus, limiting the threat to internal validity. Nonetheless, we recommend larger confirmatory studies with more representative samples to improve the external validity of the results. We suggest that such confirmatory trials consider insights from the current study including the effect size to estimate the optimal sample size needed. At the minimum, the parameter estimates for the current study could serve as informative priors for future Bayesian modeling of the effects of savings on school behavior. In the absence of adequately powered follow-up studies with different populations, readers should exercise caution in causal attributions.

As savings and asset-building programs become policy priorities in both developed and developing countries, the robust evidence-base on effects of assets has become ever more important. This study sought to contribute to the evidence in the specific area of asset effects on student engagement. The findings underscore that young people's accumulated assets may positively predict their behavior in school.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Ethical Approval and Consent to Participate The study protocols were reviewed and approved by the Institutional Review Board of the University of North Carolina, Chapel Hill as it relates to the protection of human subjects and vulnerable populations.

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