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Abstract
As the cost of higher education rises, a growing body of theory and research suggests that asset holding in the form of savings and net worth positively influence education expectations and outcomes. Native Hawaiians, like other Indigenous peoples, have disproportionately low college enrollment and graduation rates tied to a history of colonization. Using data from an Individual Development Account (IDA) program for Native Hawaiians, I examine the trajectories through the program and find: (a) welfare receipt and unemployment reduces the chances of IDA enrollment; (b) net worth increases the probability of IDA graduation; and (c) IDA graduates were more likely to gain a college degree over time compared to non-graduates. The study provides empirical evidence to the debate on asset-based interventions for Indigenous peoples.

Keywords
Native Hawaiian, assets, Individual Development Account, post-secondary education, social development

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Pathways to Higher Education for Native Hawaiian Individual Development Account Participants

Native Hawaiians face numerous contemporary social problems that are deeply rooted in the history and process of colonization. One of the key issues facing the fast-growing Native Hawaiian population is the disproportionately lower rate of higher educational attainment. Matched savings programs have been implemented in several contexts to promote long-term asset accumulation. Presently, there is rather limited knowledge about how asset-based programs affect Indigenous participants who aspire to higher education. This study examines enrollment, graduation, and college degree attainment outcomes for a large matched savings program that served Native Hawaiians in the early 2000s.

Background and Context

Native Hawaiians are defined here as individuals with ancestry traceable to the Hawaiian Islands prior to the arrival of Captain James Cook in 1778. The colonization process that ensued introduced a foreign political system that eventually overturned the Hawaiian monarchy. Subsequent policy changes effectively restructured Hawaiian land rights, as well as the Hawaiian school system. This rapid shift left many Native Hawaiians stripped of land, language, and culture (Benham, 1996; Boutilier, 1992).

Presently, Native Hawaiian and other Pacific Islanders (NHPI) experience disproportionately high poverty rates in the United States. Nationally, Census data showed that 21.5% of NHPIs experienced poverty in the previous 12 months (United States Census Bureau, 2011a). In Hawai'i, where most of the NHPI population resides, NHPIs have the highest poverty rate, at 21.1%, among the ethnic categories measured. This poverty rate is nearly double the rate for Whites (11.4%) and even higher compared to Asians (7.0%) (United States Census Bureau, 2011b). This reality is intricately linked with low-wage employment, large family size, and low educational attainment (Pobutsky, Bradbury, & Tomiyasu, 2011).

Education and Native Hawaiians

Native Hawaiians have a long tradition of valuing formal learning and education. Prior to colonization, parents strongly supported children's education, largely through oral comprehension and transmission of knowledge (Chun, 2005). The education systems, like other aspects of society, changed radically with colonization. The education policy of colonization was heavily influenced by Christian values whereby schools were the instrument for assimilation (Benham, 1996, 2004; Boutilier, 1992). Educators and policy makers rationalized that Native Hawaiian children deserved universal education that would prepare them for the labor market. Education in English was seen as key part of the education process. In June of 1896, Act 57 of the Constitution of the Republic of Hawai'i established English as the official language of the public school system. This change systematically eroded Hawaiian sovereignty (Benham, 1996, 2006; Ofahengaue Vakalahi, 2011). Since the 1960s, a Native Hawaiian cultural renaissance has occurred with strong efforts to shift the education system to be more culturally responsive and rooted in Native Hawaiian context and values. The importance placed on education continues today: More than 4 in 5 households expect their children to continue studies beyond high school (Thomas, Kanaʻiaupuni, Balutski, & Freitas, 2012). This value in education starts early in the life cycle with parents highly committed to early learning. Kaomea (2012) documented the nature of Native Hawaiian parental involvement in early childhood education.

Nevertheless, there are serious challenges to educational achievement for Native Hawaiians. For example, the Native Hawaiian functional illiteracy rate was 30%, much higher than the overall state average of 19% (Tibbetts, 1999). More recently, a 2005 assessment showed a gap of 10 percentile points in reading and math for Native Hawaiian students compared to state averages on achievement test scores (Kanaʻiaupuni, Malone, & Ishibashi, 2005). According to recent data from the State of Hawai'i Department of Education, Native Hawaiians have the lowest timely high school graduation rates of the major ethnic groups in the state: 70% of Native Hawaiians graduate in four years compared to 78% for all others in the state (Kamehameha Schools, 2009). Further, Native Hawaiians lag behind state averages in math by 6 to 10 percentile points and in reading by 6 to 9 percentile points (Kamehameha Schools, 2009). The 2010 Census data reveal that 20% of who identify as NHPI, either alone or in combination with other races, have a bachelor's degree or higher compared to 31% of Whites (U.S. Department of Health and Human Services, 2011). These disparities suggest difficult challenges in the trajectories to higher education for Native Hawaiians.

Higher Education in Hawai'i

Studies across ethnic groups reveal gaps in higher education for Native Hawaiians. Asian American and Native Hawaiian youth are overrepresented (18%) in the community college system and underrepresented (8%) in the four-year university system (Orsuwan, 2011). Additionally, higher education retention rates are low among Native Hawaiians. In 2003, the University of Hawai'i reported that approximately 65% of Native Hawaiian youth attending community college dropout within three years. Among those who do not dropout within three years, only 15% go on to earn a degree (Hagedorn, Lester, Moon, & Tibbetts, 2006). In Hawai'i, the ratio of four-year degree enrollment among Native Hawaiians compared to Chinese was .66:1 and was .50:1 compared to Japanese (Kanaʻiaupuni et al., 2005). Nationally, 10.6% of adult Native Hawaiians have a bachelor's degree, compared to 17.7% of the total U.S. population (United States Census Bureau, 2011a). In 2010, the percentage of Native Hawaiians with a graduate degree was less than half that of the Whites (11.7%) (U.S. Department of Health and Human Services, 2011).

Since Hawai'i became a state in 1959, the federal government has engaged in a number of initiatives to address the education gap among Native Hawaiians. Among other efforts, the Native Hawaiian Education Act (NHEA) of 1988, which was reauthorized in 2002, established a council to coordinate, assess, and make recommendations for improving education among Native Hawaiians (Thomas et al., 2012). In addition to the Native Hawaiian Education Council, the NHEA has aimed to link Native Hawaiians to federal, state, and local supports, enhance and develop innovative educational programs, and encourage Native Hawaiian people to get involved in the development and implementation of education (Native Hawaiian Education Council, 2013).

Few studies have sought to understand the mechanisms explaining relatively low post-secondary retention and graduation rates among Native Hawaiians. A number of potential factors are worthy of consideration. Many attribute the observed education gaps to systemic factors, both historical and contemporary, such as economic, political, and educational policies that marginalize Native Hawaiians (Benham, 2006; Castagno & Brayboy, 2008; Kawakami, 1999; Warikoo & Carter, 2009). Life events, such as family caregiving, parenthood, unexpected medical problems, play a role in disrupting the educational trajectory through higher education for Native Hawaiians as they do for other Indigenous

groups (Ives et al., 2012). A 1988 study by the University of Hawai'i found "a lack of self-identification with the college, a non-supportive campus environment, and inadequate childcare" as barriers to vocational academic success (cited in Hagedorn et al., 2006, p. 25). In addition to these factors, financing higher education is a great concern. According to Thomas and colleagues (2012), a majority of university students cited paying for college as "the most challenging and stressful aspect of college enrollment" (p. 358). One respondent explained, "Pretty much I had to work and had a job all through college to pay for it… when the tuition started getting up to three, four, and five grand, then I had to work full-time" (Thomas et al., 2012, p. 358).

The cost of attending college has increased much faster than inflation. For example, in the first decade of the twenty first century, the cost of undergraduate tuition, room, and board at U.S. public institutions rose 42 percent (National Center for Education Statistics, 2013). To cover these costs, many students take on student loans. Federally, legislation such as the 2010 Health Care and Education Reconciliation Act has reformed student loan repayment requirements. Despite these actions, up-front costs of higher education are expected to rise. Interventions to promote higher education for Native Hawaiians must address the financial aspects of university enrollment.

Assets and Education

Starting in the late 1980s, social welfare researchers began focusing on the importance of economic resources beyond household income such as assets and net worth. Assets are typically described as financial or non-financial. Non-financial assets are real assets such as land, buildings, homes, and education. Financial assets include liquid money in savings and checking accounts, retirement funds, investment bonds, and equities. Assets have been shown to be important for educational trajectories in numerous ways. First, asset holding appears to have positive psychological impacts, such as expectations that children would attend college (Kim, Sherraden, & Clancy, 2013). Others explained that asset accumulation might provide the conditions necessary to shape a college-bound identity (Oyserman, 2013). The Identity-Based Motivation (IBM) theory asserts that assets increase one's personal expectations, either for their own future or for their children's future. For instance, if a youth knows that they will have the resources to attend post-secondary education then they are more likely to develop a self-image or personal identity that includes a school-focused orientation. Thus, in some scenarios, assets can make higher education more feasible *and* change how people, including children, plan for their future (Elliott & Sherraden, 2013; Sherraden, 1991).

The empirical evidence has shown that holding financial assets seems to be associated with increased chances of college enrollment: 55% of adolescents without savings failed to attend college after high school graduation compared to only 26% of similar adolescents who had savings (Elliott & Beverly, 2011). Similarly, for college graduation, Loke (2013) reported that having a net worth greater than zero had a positive significant relationship with college graduation.

Individual Development Accounts

The Individual Development Account (IDAs) is an intervention that promotes short-term savings and long-term asset development (Sherraden, 1991). Funds accrued in IDAs can be used to purchase a home, pay for post-secondary education, or invest in small businesses. IDAs were introduced in legislation passed under the Assets for Independence Act (AFIA) in 1998, which included over $150

million dollars annually to support IDA-type programs. IDA programs are usually administered by community-based non-profits with accounts owned at local financial institutions. IDA-style matched saving mechanisms have been implemented in several countries, including Canada (learn$ave), South Korea, the United Kingdom, Singapore, and Uganda, among others (Loke & Sherraden, 2009).

In the U.S., IDA participants usually work with case managers to choose a target savings goal, make monthly deposits, and attend financial education classes. As in other matched-savings programs, such as retirement plans, accumulated IDA savings are matched with government and philanthropic funds, usually with ratios anywhere from 1:1 to 7:1. When participants reach their target saving goal, their savings are withdrawn with the additional matched IDA subsidy and used to purchase the identified asset goal (Schreiner & Sherraden, 2007).

IDAs offer several attractive features. The institutional structure of IDAs encourages incremental saving (Schreiner & Sherraden, 2007). This feature is guided by the theory that institutional structures, like rules, incentives, and subsidies, help individuals save beyond their usual savings thresholds (Beverly & Sherraden, 1999; Han, Grinstein-Weiss, & Sherraden, 2009). The matched subsidy increases returns and makes asset-based goals more attainable by helping funds accrue faster (Schreiner & Sherraden, 2007). For education savers, the logic is that IDAs build a pool of financial assets that can ease the financial burdens of post-secondary education (e.g., tuition costs, computer and software, fees, etc.). Effectively, the education savings distribute the financial responsibility between the student, their family, and federal and state governments (Elliott & Sherraden, 2013). In comparison to home and business IDA savings, scholars have noted that the potential for IDAs to promote higher education has not been realized because post-secondary institutions have sometimes been reluctant to cooperate with community organizations that administer IDAs (Kezar, Lester, & Yang, 2010).

Who applies and enrolls in IDAs? IDA programs are selective in that only those who are aware, interested, and motivated apply to and enroll in the program. There are no known studies of how IDA participants compare to the low-income population. Some have examined how enrollees compare to the general low-income population. For example, Grinstein-Weiss, Yeo, Despard, Casalotti, and Zhan (2010) found that, compared to a representative population of the low-income population, IDA participants were more likely to be female, Black, single, and urban residents with higher levels of education and were more likely to be employed full-time. Rothwell and Han (2010) examined the differences of Native Hawaiian IDA applicants who applied, but did not enroll for the entire program. They reported that children in the household and saving for education increased the risk of having "second thoughts" about participation. Vehicle ownership and positive net worth was associated with a reduced probability of second thoughts.

Matched withdrawals from IDAs. Previous research has examined the process of dropping out of the IDA program. One study defined "dropout" as having total saving of less than $100 throughout the duration of the program (Schreiner & Sherraden, 2005). Using data from the 14 sites of the American Dream Demonstration project, Schreiner and Sherraden (2005) reported that income and welfare receipt was not related to dropout. Compared to not owning assets, owning several types of assets reduced the risk of dropping out (e.g., checking and savings accounts, home with mortgage, free and clear car ownership, and financial investments) (Schreiner & Sherraden, 2005). Additionally, program design features such as match rate and direct deposit reduced the likelihood of dropping out in that

study. Using the same data from the 14 ADD sites, others have defined dropout as not making a matched withdrawal from the program and examined the role of bank account ownership (Yeo, Despard, Casalotti, Zhan, & Grinstein-Weiss, 2010). The findings show a clear connection between participants who enrolled with a bank account compared to those without: Bank account owners had higher average deposits ($22.24 compared to $19.49), more frequent deposits (.52 compared to .38), and less frequency of dropout (25% compared to 50%). In multivariate models, bank account ownership and education (college graduate vs. no high school) were negatively associated with dropout (*OR* = .58 and .41, respectively). Employment status was not statistically significantly related to dropout. A recent study on the $ave NYC program also examined a similar form of dropout, referred to in the article as account closure (Manturuk, Dorrance, & Riley, 2012). The key finding was that a one-point increase in financial hardship (measured by difficulty paying for food, housing, utilities, or medical care) was associated with a 24% increase in the hazard function for account closure.

Long-term educational outcomes. The best evidence of the long-term impact on post-secondary education comes from the longitudinal evaluation of a randomized IDA experiment. After 10 years, there was a statistically significant impact on education enrollment for IDA participants compared to non-participants and a strong positive effect on increased educational attainment for men but not women (Grinstein-Weiss et al., 2013). Very little is known about long-term outcomes among Indigenous IDA participants. Rothwell (2011) examined the long-term influence of IDA participation on Native Hawaiian IDA participants. Using a longitudinal quasi-experimental design comparing participants to non-participants, he reported a strong IDA effect on attaining a college degree and net worth, but no influence on business ownership. There are no known studies of the long-term influence of IDAs on Indigenous education savers.

Method

Research Questions

This study examines the chronological trajectories through a large IDA program for Native Hawaiian participants who were saving for post-secondary education. Three critical steps are examined: enrollment, graduation, and long-term education. As such, the study is guided by three research questions:

a. Among education savers within a large IDA program, what are the demographic factors associated with program enrollment (participation)?

b. Of those who enrolled, some graduated and some didn't. What are the demographic and institutional factors associated with graduation among education savers?

c. What are the factors associated with post-secondary education graduation over the long-term?

The findings presented are important for Indigenous policymakers and other stakeholders so they will understand which types of individuals may be best suited to participate in IDA programs designed to promote post-secondary education. Further and equally important, the findings fill gaps in knowledge about which types of participants are at-risk of either not enrolling or not graduating within the program.

The IDA program

The study used data collected from an IDA program that ran from 1999 to 2005. The program was administered by a statewide non-profit community-based social services program operating in five Hawaiian Islands and funded by numerous private sector, government, and community partners. The agency, established in 1975, is well-known in the Native Hawaiian community and provides a host of services such as community economic development, business assistance, employment preparation, training, and library services. This particular IDA program was among a number of first generation IDAs funded by the Assets for Independence Act (AFIA). Today, AFIA continues to be the main source of funding for national IDA programs. At the time, the IDA program under study was considerably larger than the national average with 550 opened IDA accounts compared to the AFIA average of 90 accounts per program (Department of Health and Human Services, 2006).

The new IDA program was marketed via the agency's professional networks. Recruitment took place by word of mouth and professional referral both within the agency and from other social service agencies. Interested persons then applied to the program. In the application phase, participants met with case managers and completed background information forms. Applicants identified their asset goals as first-time home purchase, post-secondary education fees, business, or home repair. Of the 780 individuals who applied to the program, 550 eventually enrolled by opening an IDA savings account. Participants were offered individualized case management and financial literacy classes targeted to their specific savings goal. Participants were eligible for the matched withdrawal if they made at least a minimum monthly deposit of $10 and fulfilled other obligations. Participants could miss up to three minimum monthly deposits per year.

Education savers in the program were eligible to receive a 2:1 matched rate. Matched rates were capped at $500 per year for two years. Upon opening an account, participants established a monthly savings goal based on the maximum match cap over the course of the program. For example, the match cap was set at $1,000 for post-secondary education. Therefore, a typical monthly savings goal would be the match cap divided by the total number of months in program (i.e., total months in program = 24 and, therefore, a typical monthly savings goal would be $42). Based on this, and upon meeting program requirements, savings of up to $1,000 would be matched with a subsidy of $2,000, for a total matched withdrawal of $3,000 paid directly to the vendor. For the education savers, the most common payee was a university to cover some of the costs associated with tuition and fees.

Participants

Participants were recruited via advertisement and referral from local social service providers on each Hawaiian Island: Hawai'i, Kaua'i, Moloka'i, Maui, and O'ahu. In the application stage, participants provided proof of Hawaiian ancestry, verified by birth certificate. Eligibility was based on reported household incomes at 200% or below the federal poverty line and assets worth approximately $10,000 or less, excluding the value of the primary residence and one vehicle. Households that received Temporary Aid for Needy Families (TANF) or who were eligible for the Earned Income Tax Credit (EITC) automatically met the income eligibility criteria for the program.

Data Collection

Data was collected at the application and enrollment stages on a rolling basis between 1999 and 2003. Applicants were asked to complete a 49-item Participant Background Information Form that assessed demographic characteristics, income, assets, and liabilities. At the time of application, participants signed a consent form for their information to be used in subsequent program evaluations. In 2008, a multi-modal follow-up survey of IDA participants was conducted, referred to here as Wave 2. The 2008 study was given exempt status from the University of Hawai'i Committee on Human Studies.

Measures

I examined three outcome variables. First, *enrollment* was the process of officially joining the program by opening an account, which was measured dichotomously (1/0). Of the 225 education savers who applied to the program, 87 did not enroll for reasons unknown to the program staff. The second outcome variable was matched withdrawal for post-secondary education purposes, which was measured dichotomously (1/0). Of the 138 participants who saved in the program, 45 made matched withdrawals. Matched withdrawal is referred to here as *graduation*. The third outcome variable was measured over time as a *gain in post-secondary degree* and was measured dichotomously (1/0). Participants who gained a college degree between the time of enrollment and the Wave 2 survey were represented as 1 and compared to those who did not gain a post-secondary degree over the same time interval (coded as 0).

Several independent variables were included. These variables were measured at the time of application to the program. Continuous variables included age at the time of enrollment, household size, and years of education. An income-to-needs ratio was calculated as total household income adjusted by the poverty threshold. Therefore, a household living at the poverty threshold was scored 1. When income surpassed the poverty threshold, the income-to-needs ratio was positive and vice-versa. The benefit of the ratio is that it includes income and poverty status in one measure while adjusting for household size. Categorical variables included female (1/0), married (1/0), and receipt of Temporary Aid for Needy Families (TANF). Full-time employment status was dummy coded for full-time or more.

To examine the influence of assets, a net worth variable was created. Net worth was calculated as total financial and non-financial assets minus total debts. An inverse hyperbolic sine (IHS) transformation was applied to the net worth variable to address heavy skewness. The IHS is calculated via the following:

$$ihs\ (x) = \log \sqrt{x^2 + 1 + \mathrm{x}}$$

where x is reported net worth. Compared to the standard natural log transformation, the IHS transformation maintains negative and zero values while addressing the non-normality of the distribution (Friedline, Masa, & Chowa, 2012). The origins and applications of the IHS are fully outlined by Pence (2006).

Analysis

A series of four multivariate logistic regression models were produced to address the first two research questions on enrollment and graduation. A linear spline was introduced for the net worth variables in

models 2 and 4. The purpose of using spline regression is to analyze the non-linear relationship between net worth and the dependent variables. Several knots were established and compared using procedures outlined by Royston and Sauerbrei (2007). Ultimately, two knots were chosen that divided the distribution into three segments: the lower category from lowest net worth to -$2,210 (IHS value -8.39), the middle category from -$2,209 to $2,000 (IHS value 8.29), and the upper category at $2,001 and higher. Bivariate descriptive statistics are reported to address the third research question. Null-hypothesis significance testing was not appropriate for these bivariate relationships due to low statistical power.

Results

Table 1 presents descriptive information on the sample at enrollment. Bivariate analyses (chi-square test for categorical variables; one-way analysis of variance for continuous variables) indicated statistically significant differences ($p < .05$) between enrollees and non-enrollees. Welfare receipt in the past was more prevalent among non-enrollees ($n = 60$; 72%) compared to enrollees ($n = 61$; 48%). The difference between enrollees and non-enrollees was apparent along employment: Whereas 31% ($n = 39$) of enrollees worked full-time, only 11% ($n = 9$) of the non-enrollees worked full-time. The distribution of net worth was considerably higher among enrollees (median = $160) compared to non-enrollees ($0; $p = .05$).

Table 2 shows results from multivariate logistic regression model predicting enrollment in the IDA program. The sample size was reduced from 218 to 184 after accounting for missing variables. The first model was significantly different from zero (χ^2, [df = 9, $N = 184$] = 30.83, $p < .01$). I found that full-time employment and receipt of TANF (welfare) were significantly associated with program enrollment after application. Those who were employed full-time compared to unemployed were nearly 4 times ($OR = 3.97$) more likely to enroll. Similarly, those who had a history of TANF receipt were less likely than those without a history to enroll ($OR = .31$). Net worth was added in model 2 (χ^2, [df = 12, $N = 184$] = 34.74, $p < .01$). With the addition of the net worth variables, the relationships between employment status and welfare receipt remained unchanged. A one-unit change in net worth was not statistically significantly related to enrollment for any of the three groups created via the regression splines. A log-likelihood ratio test of the two models revealed no significant increase in the model's ability to predict enrollment. Additional models were run to assess the influence of categorical asset ownership such as home ownership, stocks and investments, checking account, and savings account. These variables had no meaningful relationship to the enrollment process and did not add significantly to the model (results available upon request).

Table 1. Descriptive Statistics by Enrollment

Variable		Not enrolled *N* = 84	Enrolled *N* = 134	Test statistic
Age	*M*	29.5	27	*n.s.*
	SD	(9.97)	(11.68)	
Female	*n*	71	99	*n.s.*
	%	(85)	(74)	
Married	*n*	27	35	*n.s.*
	%	(33)	(26)	
Household size	*M*	4	4	*n.s.*
	SD	(1.97)	(1.98)	
Years of education	*M*	12.69	12.51	*n.s.*
	SD	(1.26)	(1.22)	
Employed full-time	*n*	9	39	$\chi^2 = 11^{***}$
	%	(11)	(31)	
TANF history	*n*	60	61	$\chi^2 = 12.5^{***}$
	%	(72)	(48)	
Income-to-needs ratio	*M*	.98	1.13	$F = 3.27^{*}$
	SD	(.48)	(.61)	
Net worth	*Mdn*	0	160	$F = 5.81^{*}$
	$	(14,488)	(60,493)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, *n.s.* = not significant

Table 2. Multivariate Logistic Regression Model Predicting IDA Enrollment

	Model	
	1	**2**
Age	1.015 [0.984, 1.048]	1.012 [0.979, 1.045]
Female	0.666 [0.266, 1.670]	0.631 [0.248, 1.606]
Married (*ref.* non-married)	0.499 [0.225, 1.105]	0.483 [0.215, 1.087]
Household size	1.162 [0.966, 1.398]	1.139 [0.945, 1.372]
Years of education	0.944 [0.729, 1.223]	0.962 [0.737, 1.255]
Employed full-time (*ref.* other employment)	3.967** [1.636, 9.620]	3.964** [1.621, 9.696]
TANF history	0.307** [0.145, 0.647]	0.361* [0.166, 0.784]
Income-to-needs ratio	1.267 [0.674, 2.382]	1.047 [0.526, 2.082]
Net worth 1: < - $2,210		1.016 [0.599, 1.725]
Net worth 2: - $2,211 > and ≤ $2,000		0.993 [0.567, 1.740]
Net worth 3: > $2,000		1.515 [0.829, 2.768]
AIC	234.3	236.4
N	184	184

Note. Exponentiated coefficients; 95% confidence intervals in brackets.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A third model was run to predict graduation once enrolled in the program among the 138 education savers (Table 3). The final model was reduced to 111 observations after listwise deletion of missing data. The model was significantly different from a null model at predicting IDA graduation (χ^2, [df = 9, N = 111] = 17.78, $p < .05$). Again, being employed full-time was strongly related to graduation. Whereas full-time employment increased the probability of enrollment, I found that, compared to the "other" employment category, those who were employed full-time were less likely to graduate ($OR = .27$). A fourth model was produced that was significantly different than a null model (χ^2, [df = 12, N = 111] = 25.21, $p < .01$). The use of the spline regression indicated a non-linear relationship between net worth and IDA graduation. The coefficients represent the change in the slope from the preceding interval (StataCorp., 2009); therefore, net worth accumulation through the low net worth section of the distribution was associated with a lower likelihood of graduation ($OR = .38$). A percent increase in net worth through the next segment of the distribution was associated with increased odds of matched withdrawal ($OR = 2.72$). Above the upper spline knot threshold, a percent increase in net worth was not statistically significantly associated with a matched withdrawal. A log-likelihood ratio test of the difference between models revealed that model 4 was a modest improvement over model 3 ($p = .06$). Additional models assessing the influence of categorical asset variables on matched withdrawal were tested but did not yield statistically significant results (results not shown but available by request).

Next, I examined data for the 53 program participants who saved for education in the IDA program and completed the Wave 2 survey. In total, 15 participants (28%) gained a college degree over time. Descriptive analysis comparing participants who had gained college degrees to those who did not showed that college degree gainers were younger on average (28.15 compared to 31.55) and had higher income to needs ratios (1.38 compared to 1.09). Further, 46.67 percent ($n = 7$) of the college degree gainers had received TANF in the past compared to 54.05 percent ($n = 20$) in the group who did not gain a degree. Among the 53 survey responders, 22 were IDA program graduates. Importantly, among the 22 IDA graduates, 40% ($n = 9$) earned a college degree. This is much higher than the 19% ($n = 6$) of program non-graduates who also gained a college degree.

Discussion

Like Indigenous populations worldwide, Native Hawaiians face large gaps in educational attainment. Similar to other Indigenous groups, Native Hawaiians actively struggle to maintain historical connections to land, language, and culture (Thomas et al., 2012). In this study, I examine factors associated with enrollment and graduation from a matched saving program serving Native Hawaiians who saved for higher education. This is the first known study specifically on IDA-related educational outcomes for Native participants. Further, the study is unique because it follows participants on average five years after enrollment to explore factors associated with college degree attainment. Results from this study have a number of implications for Indigenous policymaking in other contexts.

Table 3. Multivariate Logistic Model Predicting IDA Graduation

	Model	
	3	**4**
Age	0.981 [0.942, 1.020]	0.971 [0.929, 1.014]
Female	0.890 [0.312, 2.542]	0.892 [0.300, 2.654]
Married (*ref.* non-married)	1.449 [0.484, 4.341]	1.641 [0.499, 5.391]
Household size	0.858 [0.673, 1.093]	0.847 [0.654, 1.097]
Years of education	1.158 [0.820, 1.636]	1.117 [0.767, 1.627]
Employed full-time (*ref.* other employment)	0.268* [0.0961, 0.749]	0.218** [0.0721, 0.657]
TANF history	0.610 [0.246, 1.508]	0.605 [0.229, 1.597]
Income-to-needs ratio	2.552* [1.123, 5.796]	1.923 [0.755, 4.898]
Net worth 1: < - $2210		0.378* [0.158, 0.901]
Net worth 2: - $2211 > and ≤ $2000		2.725* [1.079, 6.881]
Net worth 3: > $2000		1.397 [0.795, 2.453]
AIC	140.1	138.7
N	111	111

Note. Exponentiated coefficients; 95% confidence intervals in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Findings raise questions about access to interventions that promote higher education. Specifically, interventions need to reach the more socio-economic challenged segments of the population. After controlling for other variables, the full-time employed and those who had never received TANF were more likely to actually enroll in the IDA program compared to applicants who did not work full-time and who had received TANF. It is possible that many people heard of the program and completed the initial paperwork, but, after the application, they likely had second thoughts about participating. These findings largely align with the only other study of the full-program enrollment data (Rothwell & Han, 2010). Surprisingly, the net worth variables were not related to program enrollment.

In this article, we gain a better understanding of the characteristics associated with program success. While employment was negatively associated with graduation, the income-to-needs ratio was positively related to matched withdrawal: The higher the income-to-needs ratio the more likely individuals were to graduate from the program. This counters some previous research on IDA savings performance that found income to not be related to average monthly saving deposits or drop-out (Schreiner & Sherraden, 2005, 2007). Those involved in planning education interventions for Indigenous populations are encouraged to consider income and employment status.

The examination of net worth on educational trajectories in this study is a contribution to the literature. Persons with negative net worth (in this study below -$2,000) may face difficulties to save. It is possible that participants prioritized paying down urgent debts before setting aside money into the savings account, which is a rational behavior in many scenarios. Further, the results for the middle of the net worth distribution indicate that households with zero net-worth plus or minus a few thousand dollars are perhaps best positioned to take advantage of the opportunities provided in matched savings programs.

The study uses longitudinal data to examine the percentage of participants who gained college degrees over time. In this small sample, those who graduated from the program were much more likely to gain a college degree compared to non-graduates. The large differences, while not definitive, are suggestive that saving in an IDA program may play a positive influence on post-secondary education gain among some Indigenous groups.

Limitations

This study is limited by many of the methodological challenges facing applied research. The study was retrospective; as such, the administrative data used contained only basic demographic and economic variables. As a result, there is considerable variance in the models predicting enrollment and graduation that goes unexplained. Better information on psychological, social, and environmental factors is needed. Because of selection bias (participants self-selected into the program), we cannot conclude the IDA caused the college degree gain (findings are suggestive). It is plausible that characteristics associated with program enrollment are highly correlated with college degree obtainment. This could be overcome in the future with the implementation of random assignment to a treatment and control group. Further, it would be valuable to know how the matched withdrawal was actually used (e.g., for university tuition, computer, textbooks, etc.). Unfortunately, these records were not comprehensively collected and recorded by program staff.

Implications

This study shows that certain segments of the target population are benefitting from this education intervention while others are not. This problem is not exclusive to Native Hawaiians. To be more effective, matched savings programs targeting higher education need to reach persons with complex socioeconomic histories of unemployment and welfare receipt. For interventions that are selective with eligibility criteria, the recruitment process plays an essential role in reaching the most disadvantaged. In some scenarios, it may be possible to provide universal access to a population. However, universal access requires considerable administrative start-up effort and may not be financially and politically feasible (see for example, the UK's abandoned attempt to provide a universal Child Trust Fund). Further, it seems programs might focus on net worth as a particularly important barrier to program graduation.

Based on over 15 years of IDA implementation and research in the US, it has been established that, given the right institutional supports, the poor can and do save (Schreiner & Sherraden, 2007). Such interventions, implemented in culturally relevant ways, have the potential to promote social development among Indigenous populations (Rothwell, 2011). However, additional prospective research is needed to better understand the extent to which IDAs promote asset accumulation and goal attainment over the long-term (Richards & Thyer, 2011). Given the unique histories and socio-economic exclusion, research is critically needed to examine the unique trajectories experienced by Indigenous participants.

This study provides suggestive longitudinal evidence that the IDA program benefitted Native Hawaiian education savers. Moving forward, there is a great need to understand the "black box" of this and similar interventions. Qualitative perspectives may provide great insight into this process. One recent paper explores the perceived impacts of IDA participation among Native Hawaiians with some commenting favorably on the Hawaiian-specific cultural adaptations that were made within the program (Rothwell, Bhaiji, & Blumenthal, 2013). There is a great need to better understand what may be unique about the Indigenous aspects of such asset-based programs. Which institutional features work for which populations under specific settings? Better empirical research on matched savings can inform the active debate on Aboriginal Post-Secondary Savings Accounts proposed in Canada (Helin, 2006).

The affordability of higher education is a major barrier for many populations. Economic resources such as financial assets influence how people finance college. Matched savings programs—while not a panacea—represent one of many promising interventions to promote higher education and reduce educational disparities. To be more effective, matched savings programs for Indigenous participants must better understand and address which types of participants are succeeding and which are at-risk of being left behind.

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