



Center for Social Development

GEORGE WARREN BROWN SCHOOL OF SOCIAL WORK

Saving in Individual Development Accounts

Latent Growth Curve Modeling

Chang-Keun Han
Center for Social Development
Washington University

2007
revised

CSD Working Papers
No. 06-17

Campus Box 1196 One Brookings Drive St. Louis, MO 63130-9906 • (314) 935.7433 • www.gwbweb.wustl.edu/csd



Washington University in St. Louis

Saving in Individual Development Accounts: Latent Growth Curve Modeling

This article examines saving patterns of participants in Individual Development Accounts (IDAs) using initial deposit and growth rate of savings in latent growth curve modeling (LGCM). This study uses data on low-income households from the American Dream Demonstration (ADD), the first large-scale demonstration program of IDAs. Contrary to a linear growth of savings examined by average values, LGCM revealed that participants saved much less 18 month after opening an IDA account. In addition, LGCM showed that individual participants have significant variations in initial deposits and growth rate of savings, and income type appears to explain some of these variations. While regular income is positively associated with initial deposits, irregular income is positively related to saving growth slope. Turning to institutional features, since direct deposit facilitates savings, users of direct deposit make more frequent deposits and have a much steeper rate of savings growth.

Key words: *Individual Development Accounts, saving patterns, latent growth curve modeling, initial level, slope*

Asset ownership matters. Asset ownership may increase self-sufficiency and the well-being of individuals and households in a way distinct from earning income and wages (Sherraden, 1991; Spilerman, 2000). Also, asset building may revitalize neighborhoods or communities (Weber & Smith, 2003). However, wealth in the United States is very unequally distributed. The most striking feature of the wealth distribution is degree of concentration. The richest one percent of households owns about one-third of the total wealth (measured as net worth) in the economy, and those in the top five percent hold more than half. At the other extreme, a significant fraction of households have zero or negative net worth or no assets at all (Cagetti & De Nardi, 2004).

Overall, low-income households are excluded from institutional structures designed to support asset accumulation. Furthermore, existing asset-based policies are regressive in that they primarily benefit those who already hold considerable assets (Sherraden, 1991). Employing a capacity and developmental perspective, Sherraden (1991) proposed a theory where institutional features are expected to influence saving of low-income households. In accordance with institutional saving theory, he suggested a savings instrument, Individual Development Accounts (IDAs), for low-income households. One critical proposition of institutional saving theory and IDAs is that the disadvantaged can save with institutional supports.

The author would like to thank the following foundations for support of this paper: the Ford Foundation, Charles Stewart Mott Foundation, FB Heron Foundation, and Metropolitan Life Foundation for funding American Dream Demonstration (ADD); the Corporation for Enterprise Development for implementing the ADD; the Center for Social Development for managing research projects and monitoring data. I appreciate Michael Sherraden, director of the Center for Social Development, for thoughtful comments. Finally, I thank Julia Stevens for editing the paper. Send correspondence to Chang-Keun Han, Brown School of Social Work, Washington University in St. Louis, One Brookings Drive, Campus Box 1196, St. Louis, MO 63130.

A considerable body of evidence has found that when given the support of an IDA program, the poor are able to save. Although saving is more difficult for low-income households, IDAs were found effective in helping participants to save. Most notably, participants in the American Dream Demonstration (ADD), which was the first large-scale demonstration of IDAs in the United States, saved an average of \$40 gross deposit per month, and \$2,586 of matched withdrawals during the 4-year demonstration period (Schreiner, Clancy, & Sherraden, 2002). In addition, empirical evidence has shown that institutional features, controlling for individual socioeconomic characteristics, are significantly and meaningfully associated with explaining saving in IDAs (Curley, 2004; Grinstein-Weiss, Wagner, & Ssewamala, 2005; Han, 2007; Han & Sherraden, 2007; Schreiner et al., 2002; Ssewamala & Sherraden, 2004).

Although this study builds upon the previous research, this study asks different questions of saving patterns in IDAs: Do participants in IDAs have different trajectories of savings? And to what degree are individual and institutional characteristics associated with the trajectories of savings in IDAs? Compared with previous research where deposit frequency has been analyzed using cross-sectional data (Curley, 2004; Han, 2007; Han & Sherraden, 2007), this study used longitudinal data and latent growth curve modeling (LGCM) to examine saving trajectories in IDAs. The focus of this study is to analyze the trajectories of IDA participants who have different saving patterns. Since initial deposits and growth rates of savings are expected to vary among participants in IDAs, LGCM may provide better understanding of saving patterns in IDAs. In addition, this study examines how individual or institutional factors are related to initial levels and growth rates of savings in IDAs.

Overview

Individual Development Accounts in ADD

In the decade since the inception of the first IDA program in the 1990s, the number of IDA programs in the US has exploded. In total, it is estimated that there are about 500 IDA programs and 20,000 accounts nationwide (Sherraden, 2005). While more than 40 states have some type of IDA policy, most IDA programs are run by community-based, non-profit organizations. Funded from public and/or private sectors, IDA programs provide subsidies through matched deposits. Match rates are usually 1:1 or 2:1, but sometimes range higher to attract people to the program. Match rates generally depend on resources available to the program and the participant's saving purpose. IDA program participants withdraw matched savings for particular uses, such as home purchase, post-secondary education, and microenterprise (Schreiner, Clancy, & Sherraden, 2002).

The American Dream Demonstration (ADD) was the first large-scale test of IDAs. Developed by the Corporation for Enterprise Development (CFED) and the Center for Social Development (CSD) at Washington University in St. Louis, ADD involved 14 IDA programs that established more than 2,000 IDA accounts in low-income communities. Participants in ADD are generally characterized as "working poor," who are more likely to be employed, own a bank account, and to have a higher education status than low-income households in general. However, the participants tend to be among the more disadvantaged in that they are likely to be female, single, and African American (Schreiner et al., 2002).

Tulsa IDA Program

This study is based on data collected at the Tulsa, Oklahoma, IDA program operated by the Community Action Project of Tulsa County (CAPTC). The Tulsa IDA program is one of a series of local programs initiated under ADD. CAPTC is a multi-service community agency whose target population is working poor households in the Tulsa metropolitan area. Eligibility of CAPTC's IDA program was limited to employed people with household income at or below 150 percent of the federal poverty line. Approved use of IDA savings included home purchase, postsecondary education, small business investment, home repair, and retirement. CAPTC offered a match rate of 2:1 for withdrawals used for home purchase, and a match rate of 1:1 for all other approved uses. CAPTC required participants to complete 12 hours of general financial education, of which 4 hours had to be completed prior to opening an IDA account.

Theory and Evidence

Institutional Saving Theory

Institutional saving theory suggests that institutional features affect human behaviors related to asset accumulation. According to institutional saving theory, the poor can save with institutional supports (Sherraden, 1991). Institutional features include access, information, incentives, facilitation, expectations, restrictions, and security (Beverly & Sherraden, 1999; Sherraden & Barr, 2005; Schreiner & Sherraden, 2007). Since the sample of this study is participants in only one IDA program, institutional features that have variations should be analyzed; this study focuses on three institutional constructs: information, incentives, and facilitation.

People with knowledge and information of asset accumulation behave differently from those without such knowledge and information. It appears that people with knowledge of saving are aware of their financial choices and of the consequences of those choices, and tend to consider this information when making decisions (Schreiner & Sherraden, 2007). Financial education has been found to be positively associated with saving in a retirement account, for example (Bayer, Bernheim, & Scholz, 1996; Bernheim & Garrett, 2003; Duflo & Saez, 2003). Another institutional construct that may influence performance in saving programs is the existence of incentives like matched deposits, tax-free earnings, and rebates (Clancy et al., 2006). Munnell, Sunden, & Taylor (2001/2002) found that the existence of an employer's match for pension plans positively influences participation rates and contribution levels. Also, it was found that matching grants are positively associated with saving amount and deposit frequency in 529 college savings plans (Clancy et al., 2006). A third institutional construct, facilitation, provides support for saving, may also increase saving performance. The introduction of automatic enrollment plans, for example, increased participation and contribution levels in retirement pension plans (Choi, et al., 2004).

Empirical Evidence in IDAs

More specifically, studies have tested effects of institutional features on saving performance in IDAs. Generally, financial education (Clancy, Grinstein-Weiss, & Schreiner, 2001; Han, 2007; Han & Sherraden, 2007; Zhan & Schreiner, 2004) are significantly associated with average monthly net deposits (AMND), which is defined as net deposits per month and is calculated by dividing net deposits by the number of participation months. Previous research has also analyzed deposit

frequency, measured by dividing the number of deposit months by participation months (Curley, 2004; Han, 2007; Han & Sherraden, 2007). Curley (2004) found that participants in ADD, on average, made deposits in approximately 6 months of every year (a deposit frequency of .47). Deposit frequency is significantly associated with financial education, match rate, and availability of direct deposit. Specifically, deposit frequency has been found to be positively associated with hours of financial education (Han, 2007; Han & Sherraden, 2007). In another study, a significantly higher deposit frequency was found for participants with a 3:1 match rate than those with a 1:1 match rate; interestingly, significant differences in deposit frequency compared with 1:1 were not found for other match rates (Curley, 2004). Finally, a higher deposit frequency has been found for participants using direct deposit than those who did not (Han, 2007; Han & Sherraden, 2007).

Individual characteristics are also significantly associated with saving performance. Age is positively associated with deposit frequency (Curley, 2004), and participants with college education is associated with saving more frequently than those with a high school education (Curley, 2004; Han, 2007; Han & Sherraden, 2007; Ssewamala & Sherraden, 2004). Third, several income measures, such as high income-to-poverty ratio (Curley, 2004; Ssewamala & Sherraden, 2004), regular income (Sherraden et al., 2003), and intermittent or irregular income (Sherraden et al., 2003) are positively related to AMND and saving rates. Asset ownership, in particular, home ownership and passbook ownership are likely to increase saving outcomes (Grinstein-Weiss & Wagner, 2006; Ssewamala & Sherraden, 2004). Last, married participants save more than non-married participants in terms of AMND (Grinstein-Weiss & Wagner, 2006; Grinstein-Weiss et al., 2004).

Methods

Data and Sample

Compared to the other IDA programs in ADD, the Tulsa IDA program employed an experimental and longitudinal design where a total sample of 1,103 eligible participants were assigned to treatment ($n=537$) and control ($n=566$) groups. While those in the treatment group participated in the IDA program, control group participants were not allowed to open IDA accounts during the four-year demonstration period (1999-2003). The baseline interview was conducted just before the assignment, followed by follow-up surveys at 18 and 48 months. The survey captured information about individual characteristics including demographics, income, assets, and saving behaviors. This study also draws on data from the Management Information System for Individual Development Accounts (MIS IDA), a data system developed by the Center for Social Development to manage and monitor information on IDA accounts and programs. MIS IDA data provide account information and institutional features of the Tulsa IDA sample. This study merges the survey and MIS IDA data for LGCM analyses.

Attrition and Non-participation

This study used only the sample ($N=537$) in the treatment group. However, this study suffered a large reduction in the sample because of attrition, non-participation in the experiment, and duration of participation. The sample had an attrition rate of about 23 percent ($n=125$). The sample ($N=537$) in the treatment group at the baseline were reduced to 412 respondents at wave 3. In addition, of 537 participants at the baseline, it was found that about 12 percent ($n=66$) of the sample did not open IDA accounts over the course of the demonstration period (Han, Schreiner, & Sherraden,

2007). In particular, 43 of 412 respondents at wave 3 had not opened IDA accounts, reducing the sample to 369. Finally, only participants who had been in the IDA program for at least 36 months could be included in the LGCM analysis of this study. The cut-off point of 36 month is based on the 18-month interval between waves 1 and 2, and waves 2 and 3. It was found that about 26 percent ($n=95$) of 369 participants did not meet the guideline of the duration. This process resulted in 274 cases or approximately 52 percent of the eligible participants at the baseline. A total of 263 cases were eliminated.

Given that there was a large reduction in the sample from the original sample of 537 to 274, this study compared the socioeconomic demographic characteristics at the baseline of the 274 respondents in the sample with those of the 263 respondents that were eliminated. There were no significant differences in age, gender, race or ethnicity, marital status, and household size between the two groups. They were also similar in income and poverty experience throughout the 3 waves. The two groups, however, differed significantly in terms of education attainment status and assets. Thirty-two percent of the respondents had college graduation or higher education degree, compared with 20% of the non-respondents ($\chi^2 = 12.24; p=.002$). In addition, the respondents owned more total assets than the non-respondents (\$17,426 vs. \$10,321; $t=-3.48; p<.001$).

Measures

Cumulative net deposits in the Tulsa IDA program are dependent variables. To analyze longitudinal growth modeling, this study used initial deposits and cumulative values of savings in the IDA accounts at wave 2 and wave 3. Three institutional features are used in this study. A match rate of 1:1 is used as a reference group, although CAPTC offered match rates of 1:1 and 2:1. Hours of financial education (a continuous variable) is also used to test how information influences trajectories of savings in IDAs. Last, direct deposit is a dichotomous variable measuring the effects of facilitation on savings. Non-users of direct deposit are used as a reference group.

Socioeconomic characteristics included in this study are age, race, marital status, education, and income. Race or ethnicity is dichotomized into African Americans and “others,” a category that includes Caucasians, Hispanics, Asian Americans, and other races and ethnicities. Only two categories were used for race/ethnicity because previous research using the same data from the Tulsa program found that African Americans saved much less than Caucasians but found no significant difference in saving outcomes between Caucasians and other racial groups (Han, 2007; Han & Sherraden, 2007). Marital status was collapsed into married and non-married households. The non-married include single never married, divorced, separated, and widowed. Education was categorized into three groups: high school graduation or less, some college, and college graduation or higher degree. In this study, income was divided into two types, regular and irregular income. According to the permanent income hypothesis, consumption and long-term saving depend on changes in permanent income but in the short-term, individuals are likely to save transitory income (Meghir, 2001). Recurrent or regular income is the sum of wages, government benefits, pensions, and investment income; intermittent or irregular income is the sum of self-employment, child support, gifts, and other sources (Sherraden et al., 2003). All variables discussed above were measured at the baseline. Another economic status measure is “no poverty though 3 waves,” which is coded as 1 if a participant never fell below the poverty line throughout the 3 waves. This variable was created to examine how economic security during the period is associated with saving in an IDA.

Analysis Strategy

Previous research on saving in IDAs was based on cross-sectional methods and analysis design (Curley, 2004; Grinstein-Weiss, Wagner, & Ssewamala, 2005; Schreiner et al., 2002; Ssewamala & Sherraden, 2004). Spilerman (2000:507) suggests that “analysis profiles from cross-sectional data in most economic studies should be interpreted descriptively and not used to infer asset accumulation behavior.” Considering that longitudinal research has advantages in assessing behavior patterns and in establishing direction and magnitude of causality (Menard, 2002), longitudinal data analysis can help to explain dynamic mechanisms of asset accumulation.

Traditional longitudinal data analyses such as auto-regressive and cross-lagged multiple regression heavily rely on tenuous assumptions (for example, same variances in repeated measures). Therefore, they provide little insight into changes over time at the individual level (Muthen & Curran, 1996). To overcome limitations of traditional longitudinal analysis, “latent growth curve modeling (LGCM)” was developed in structural equation modeling (SEM). LGCM can describe individuals’ behaviors in terms of initial levels and developmental trajectories from those levels. In addition, the method can determine variability across individuals in both initial levels and trajectories as well as provide a means for testing the contribution of other variables or factors in explaining initial levels and trajectories. In doing so, LGCM simultaneously focuses on correlations over time, changes in variance, and shifts in mean values (Lawrence & Hancock, 1998).

There are several advantages of LGCM in repeated measures designs. First, LGCM allows a more complete study of a wide range of parameters of change including linear and nonlinear effects along with their variances and covariances. Second, LGCM can estimate measurement errors and provide estimation separately from measurement error. Last, flexibility of the variances and covariances is another advantage of LGCM. In LGCM, error variances and covariances can be estimated freely or specified to conform to a predetermined pattern (Bollen & Curran, 2006).

Latent growth curve modeling was carried out using LISREL. First, an unconditional LGCM without predictors is tested to examine whether individuals have different levels and growth rates of savings in IDAs. Next, a conditional model includes exploratory variables of the individual characteristics and the institutional features. The conditional LGCM provides information of how the predictors explain the levels and rates of savings in IDA. This study used maximum likelihood (ML) as an estimation method.

Table 1. Descriptive Statistics (N = 274)

Variables	Frequency (%)	Mean (SD)
Balance in IDA account		
Wave 1 (\$)		59.66 (122.94)
Wave 2 (\$)		497.68 (546.33)
Wave 3 (\$)		768.67 (880.48)
<u>Individual characteristics</u>		
Race		
African American	112 (40.87)	
Others* (reference)	162 (59.12)	
Age		40.88 (10.59)
Marital status		
Married	64 (23.36)	
Non-married** (reference)	210 (76.64)	
Education		
H.S. graduation or less (reference)	78 (28.74)	
Some college	108 (39.42)	
College graduation or higher	88 (32.11)	
Regular income (\$)		1,197.16 (741.51)
Irregular income (\$)		283.84 (499.36)
Total assets (\$)		17,425.71 (26,474.67)
No poverty through 3 waves	105 (38.32)	
<u>Institutional features</u>		
Match rates		
1:1 (reference)	146 (53.28)	
2:1	128 (46.72)	
Direct deposit	31 (11.31)	
Hours of financial education		11.43 (3.08)

*Others includes Caucasians, Hispanics, Asians, and other race or ethnicity.

**Non-married includes single, widowed, separated, and divorced households.

Results

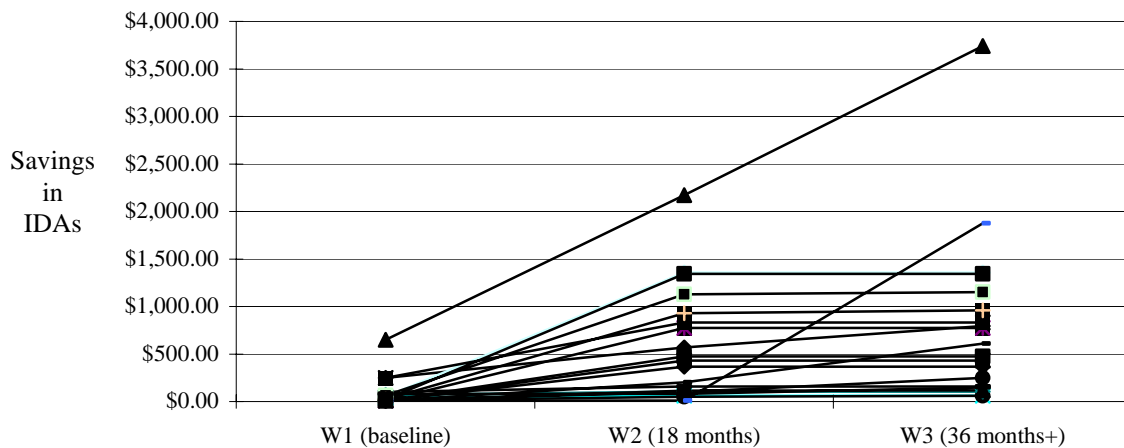
Descriptive Statistics

Descriptive statistics of the sample are shown in Table 1. Average age of participants is 41. The majority of the sample is not married (77%) and, since CAPTC is targeting the employed poor, the majority is also well-educated (71%), with some college or higher education. African Americans make up about 41% of the sample. About 38% of the sample has income above the poverty line throughout the 3 waves. While average regular monthly income is \$1,197, average irregular income is \$284. Average total assets of the sample is about \$17,426. Regarding institutional features, 47% of

the sample has a 2:1 match rate, indicating that they were saving to buy a home. Only 11% of the sample elected to use direct deposit. The amount of financial education averaged about 11 hours.

On average, participants made initial deposits of about \$60; cumulative amounts in IDA accounts at wave 2 and 3 increased to \$498 and \$769, respectively. According to the average savings growth trend, it appears that there is a linear growth of savings through the 3 waves. Latent growth curve modeling tests whether there is a really linear growth of savings in the sample. To get a hint of changes in the savings, individual growth curves of the first 20 participants are presented in Figure 1. Although we cannot generalize saving patterns from the growth curves of the sub-sample (n=20), a few features are noteworthy. First, individuals had different initial levels and slopes of savings. LGCM examines whether there are significant variations in the levels and slopes of savings. Second, variations of savings increased with time. These results are also supported by the increases in the standard deviation at wave 2 and wave 3, compared with that of wave 1 (see Table 1). While the standard deviation of savings at wave 1 is \$123, the standard deviations at wave 2 and 3 increased to \$546 and \$880, respectively. Third, as a pronounced saving pattern, slopes of savings appeared not to increase after 18 months, which suggests that there were few additional deposits after 18 months. This finding is contrary to the apparently linear growth of the average savings.

Figure 1: Individual Growth Curves of Savings in IDAs (n=20)

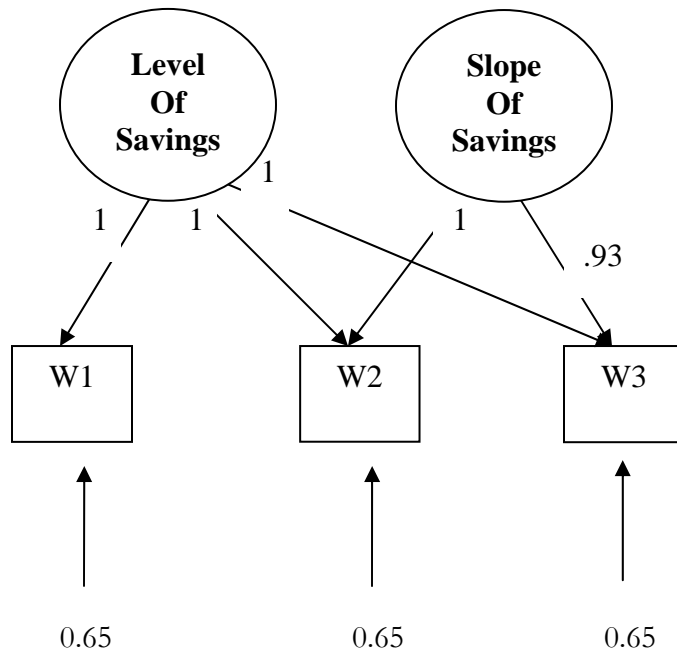


Do Participants in IDAs Have Different Trajectories of Savings?

For an unconditional model of savings in IDAs, this study estimates a two-factor and three-indicator model. The first factor (level) is constructed by fixing all three of the loadings from waves 1, 2, and 3 savings measures to 1.0, which represents the initial level or intercept of the growth curve. The second factor (slope) fixes the first loading to 0, thus not allowing the wave 1 measure to load in this factor; the second loading is fixed at 1.0; and the third factor loading is freed. If a linear growth of saving in IDAs is hypothesized, then the model can fix the last factor loading of slope at 2. Since this study is the first examination of savings trajectories in IDAs, however, this study freed the factor loading of slope at wave 3. Error terms of each measure of cumulative deposits were set to be equal to control error variance (Chassin et al., 1996).

The unconditional LGCM of savings in IDA have good model fits. Chi-square is not significant ($\chi^2 = 1.55, df = 1, p = .21$). Root Mean Square Error of Approximation (RMSEA = .04) is smaller than .05. In addition, 90 percent confidence interval (.00; .07) for RMSEA is smaller than the upper bound of .08 (Schumacker & Lomax, 2004). Other indices also suggest good model fits (Adjusted Goodness of Fit Index = .98; Comparative Fit Index = .99; and Incremental Fit Index = .99). The findings indicate that the unconditional LGCM is well fit with the data.

Figure 2: Unconditional LGM of Savings in IDA



Note: Fit indices ($\chi^2 = 1.55, df = 1, p = .21$; RMSEA = .04, 90 percent confidence interval of RMSEA: .00-.07; AFGI = .98; CFI = .99; IFI = .99).

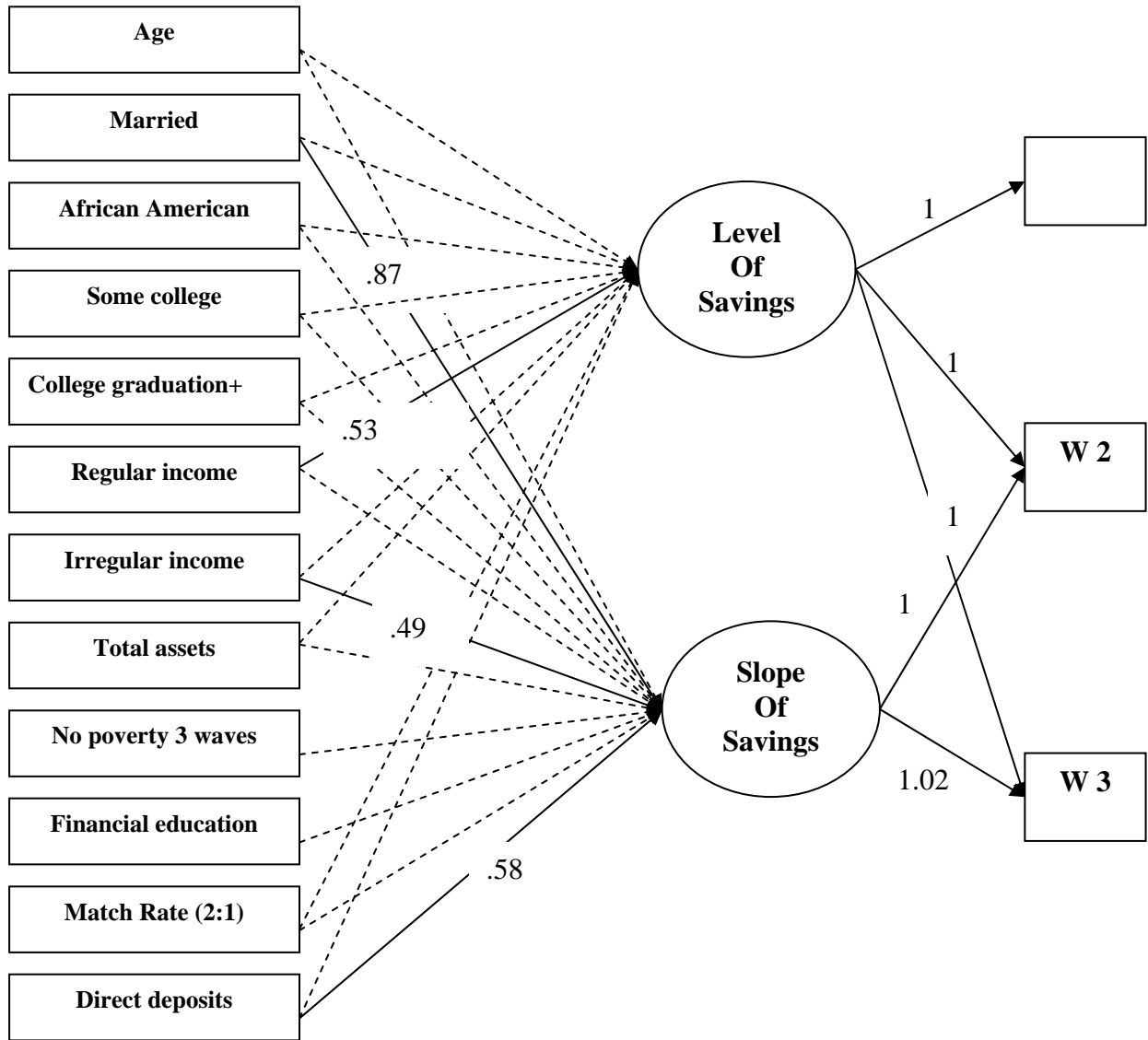
The factors of level and slope explained about 35% of the variance in savings at wave 1. Respectively, about 37% and 33% of the variance in savings at time 2 and time 3 were explained by the two factors. A covariance matrix indicates that the level ($t = 3.48, p < .05$) and the slope ($t = 5.02, p < .05$) of savings are significantly different across IDA participants. In other words, individual participants have significantly different levels and slopes of savings in IDA. Furthermore, level is negatively and significantly associated with slope ($t = -4.19, p < .05$), which means that participants with low initial levels are likely to make significant additional deposits and that participants with high initial levels are likely to make small additional deposits. The factor loading of the slope at wave 3 is .93, which is too small to indicate a linear growth of savings. It suggests that savings in the IDA program trailed off after 18 months of participation.

To What Degree are Individual and Institutional Characteristics Associated with the Trajectories of Savings in IDAs?

In the conditional model with individual and institutional predictors, all variables except race are hypothesized to have positive relations with level and slope. Based on previous research, African

Americans are expected to make smaller initial deposits and have lower growths in savings than other races or ethnicities. It is hypothesized that participants with the high match rate (2:1) and those using direct deposit will have a higher level and slope of savings. Hours of financial education and no poverty through 3 waves are hypothesized to have a positive association with only the slope of savings; hours of financial education and no poverty through 3 waves were measured throughout the three waves.

Figure 3: Latent Growth Curve Modeling of Savings in IDA



Note: While the solid lines represent significant associations, the broken lines (dashes) represent non-significant associations; Estimates in the line represent *Gamma* values. Fit indices ($\chi^2=20.30$, $df=15$, $p=.16$; RMSEA= .03, 90 % confidence interval of RMSEA: .00-.06; AGFI=.93; CFI=.99; IFI=.99).

The conditional LGCM also has good model fits ($\chi^2=20.30$, $df=15$, $p=.16$; RMSEA= .03, 90 % confidence interval: .00, .06; AGFI=.93; CFI=.99; IFI=.99). The predictors have more explanatory power of the slope than that of the level. The model explains about 28% and 20% of the variance in slope and level, respectively. While only regular income is significantly associated with the level of savings in IDA, marital status, irregular income, and direct deposit are significantly related to slope of savings in IDA. Participants with higher regular income were found to make significantly more initial deposits in their IDA accounts ($\hat{\gamma} = .53$, $t = 2.22$, $p<.05$), but not to have significant growths in additional deposits. Interestingly, the married participants have no differences in initial deposits, but have a positive slope of savings ($\hat{\gamma} = .87$, $t = 4.27$, $p<.05$), compared to the non-married. Irregular income was positively associated with the growths of savings ($\hat{\gamma} = .49$, $t = 2.01$, $p<.05$). As expected, participants using direct deposit were found to make significant additional contributions ($\hat{\gamma} = .58$, $t = 2.94$, $p<.05$). Similar to the finding of the unconditional LGCM, a factor loading of the slope at wave 3 in the conditional LGCM is 1.02, which indicates no linear growth of savings.

Summary and Discussion

Using latent growth curve modeling, the study first examined saving trajectories in IDAs. LGCM can increase our understanding of saving patterns and longitudinal trajectories of savings in IDAs. Several findings are noteworthy. First, as expected, participants have significant variations in the initial levels and slopes of savings. This finding suggests that participants have different saving patterns. In particular, the variation in slopes increased with time.

Second, contrary to a linear growth pattern in terms of average savings, it was found that there was no linear growth of actual savings. This result is explained by the non-significance of additional deposits made after wave 2 (18 month). With the same data, the average deposit frequency was .60, which indicates that participants made deposits in approximately 21 of 36 months (Han, 2007; Han & Sherraden, 2007). This deposit frequency suggests that participants made most deposits during the first half of the demonstration. Although this study cannot explain the reason behind saving trajectories, it is suggested that saving might be difficult for low-income households to sustain, or that interest in the IDA program might decrease during the second half of the demonstration period.

Third, total income (Han, 2007; Han & Sherraden, 2007) or income to poverty ratio (Curley, 2004) was not significantly associated with deposit frequency. However, this study found that income was related to saving patterns in interesting ways. While regular income was positively associated with initial deposits, irregular income was positively related to saving growth slope. In other words, participants with more regular income were found to save more at the baseline but growth in savings were associated with irregular income rather than regular income. These findings partially support permanent income theory where saving is a function of irregular and intermittent income (Meghir, 2001). These findings suggest that future studies should analyze the effects of different types of income on saving rather than total income (Sherraden et al., 2003).

Fourth, while married participants had no significant differences in initial deposits, they were more likely to have positive growths in savings. While the non-married are likely to have more barriers to manage their saving, the married may have more resources to make additional deposits (Grinstein-

Weiss & Wagner, 2006). This finding suggests that marriage facilitates saving (Schmidt & Sevak, 2006; Waite & Gallagher, 2000).

Fifth, it is also noteworthy that age, race, education, no poverty through 3 waves, and total assets were not significantly associated with the level and slope of savings in IDAs. In particular, while African Americans saved much less in terms of average monthly net deposits and deposit frequency than Caucasians and other racial minorities (Han, 2007; Han & Sherraden, 2007), this study found no significant association between race and saving trajectories. Further, contrary to research where education status was positively associated with deposit frequency (Han, 2007; Han & Sherraden, 2007), this study found that education had no differences in the levels and slopes of savings.

Last, turning to institutional features, consistent with previous research where direct deposit is positively associated with deposit frequency (Han, 2007; Han & Sherraden, 2007), direct deposit users had significantly positive slopes of savings in IDAs. Since direct deposit facilitates savings, users of direct deposit made more frequent deposits and have steeper slopes of savings than the non-users of direct deposit service. Contrary to the findings of previous research (Curley, 2004; Han, 2007; Han & Sherraden, 2007), however, match rate and financial education were not significantly associated with saving trajectories. Although it is possible that a different methodology and a large reduction in the sample size contributed to this discrepancy, these findings suggest the institutional features of the Tulsa IDA program are not helping participants to save regularly or accumulate assets.

Limitations

Several limitations of this study should be highlighted for future research. First, the findings of this study may be affected by the large sample attrition, which limits generalization of this study. The results of the comparison between the participation and the non-participation suggest that the “stayers” with higher education status (e.g., college graduation) and more total assets than the “leavers” are likely to have strong propensity for saving. Therefore, care should be exercised in interpreting the results of this study. Second, this study used only time-invariant predictors. Since socio-economic factors such as income and marital status may frequently change during the demonstration period, future studies should explore more complicated models with time-varying predictors of key socioeconomic factors. Last, although the TULSA IDA program is a typical example of IDA programs in ADD, one IDA program may be not enough to generalize the findings of the study. A future study should replicate the LGM by using a larger sample with more IDA programs.

Implications and Conclusion

This study builds upon an emerging body of research where individual and institutional features have been found to affect saving in IDAs of low-income households. Compared to previous research where saving outcomes are analyzed as aggregate measures (e.g., AMND and deposit frequency), this study is the first examination of saving patterns in IDAs using latent growth modeling.

Several policy and practice implications are suggested by this study. First, similar to previous research on IDA programs, the empirical results of this study suggest that low-income households

can save with the institutional supports provided by IDA programs. Therefore, inclusion should be a priority of asset-based policy. Although the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 gave states the option to use block grant funds for matched saving accounts for the poor, a significant portion of low-income households are untouched by these programs and asset accumulation remain beyond their reach. More emphasis should be put on expansion of savings plans and campaigns to increase public awareness of the program availability.

Second, it is important to understand saving patterns of IDA participants. By identifying institutional features influencing saving patterns, policy makers and practitioners can design IDA programs to encourage more savings among low-income households. In particular, according to the finding of this study, those with direct deposit service were likely to save more frequently and have steeper growths in savings. However, according to the ADD data of 14 IDA programs, only 6% of participants used direct deposit (Schreiner et al., 2002) and 11% of participants in the Tulsa IDA program used direct deposit. Although direct deposit users may contribute small monthly amounts, it should be a primary goal of IDA programs to encourage low-income households to save regularly and continuously.

Last, this study also has implications for social workers. Philippe Van Parijs (1992) claims that inequalities in wealth weaken social justice. Given that enhancing social justice is one of goals of the social work profession, social workers should be actively involved in fighting against asset poverty. As staff members or practitioners of IDA programs, social workers need to understand saving behaviors of low-income households and pay more attention to how to organize IDA programs to encourage participants to save continuously.

References

- Bayer, P. J., Bernheim, B. D., & Scholz, J. K. (1996). *The effects of financial education in the workplace: Evidence from a survey of employers* (NBER Working Paper No. 5655). Cambridge, MA: National Bureau of Economic Research.
- Bernheim, B. D., & Garrett, D. M. (2003). The effects of financial education in the workplace: Evidence from a survey of households. *Journals of Public Economics*, 87(7), 1487-1519.
- Beverly, S.G. & Sherraden, M. (1999). Institutional Determinants of Saving: Implications for Low-income Households and Public Policy. *Journal of Socio-Economics*, 28, 457-473.
- Bollen, K. A., & Curran, P. J. (2006). *Latent Curve Models: A Structural Equation Perspective*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Cagetti, Marco & De Nardi, M. (2004). Wealth Inequality: Data and models. Retrieved August 14, 2007 from <http://www.econ.umn.edu/~nardi/research/Wealthsurvey.pdf>
- Chassin, L., Curran, P. J., Hussong, A. M., & Colder, C. R. (1996). The relation of parent alcoholism to adolescent substance use: A longitudinal follow-up study. *Journal of Abnormal Psychology*, 105 (1), 70-80.
- Choi, J., Laibson, D., Madrian, B., & Metrick, A., (2004). For better or for worse: Default effects and 401(k) savings behavior. In D. Wise (Ed.), *Perspectives in the Economics of Aging*, pp. 81-126. Chicago: University of Chicago Press.
- Clancy, M., Grinstein-Weiss, M., & Schreiner, M. (2001). *Financial education and savings outcome in Individual Development Accounts*. (CSD Working Paper No 01-2). St. Louis, MO: Washington University, Center for Social Development.

- Clancy, M., Han, C., Mason, L. R., & Sherraden, M. (2006). *Inclusion in college savings plans: Participation and saving in Maine's matching grant program* (CSD Research Report 06-03). St. Louis, MO: Washington University, Center for Social Development.
- Curley, J. C. (2004). *The role of institutions in the saving participation and performance of low-income households in Individual Development Accounts*. Unpublished doctoral dissertation, Washington University, St. Louis, MO.
- Duflo, E., & Saez, E. (2003). The role of information and social interactions in retirement plan decisions: Evidence from a randomized experiment. *Quarterly Journal of Economics*, 118(3), 815-842.
- Grinstein-Weiss, M. (2004). *IDAs for housing policy: Analysis of saving outcomes and racial differences*. Unpublished doctoral dissertation. Washington University, St. Louis.
- Grinstein-Weiss, M., Wagner, K., & Ssewamala, F. M. (2005). *Saving and asset accumulation among low-income families with children in IDAs* (CSD Working Paper No. 05-09). St. Louis, MO: Washington University, Center for Social Development.
- Grinstein-Weiss, M., & Kristen, W. (2006). *Using Individual Development Accounts to saving for a home: Are there differences by race?* (Working Paper No. 06-06). St. Louis, MO: Washington University, Center for Social Development.
- Han, C. (2007). *Unemployment, financial affordability, and saving in IDA*. (Unpublished Working Paper). St. Louis, MO: Washington University, Center for Social Development.
- Han, C., Schreiner, M., & Sherraden, M. (2007). *Second thoughts: Who almost participates in IDAs?* (Unpublished Working Paper). St. Louis, MO: Washington University, Center for Social Development.

- Han, C., & Sherraden, M. (2007). *Do institutions really matter for saving among low-income households? A comparative approach*. (Unpublished Working Paper). St. Louis, MO: Washington University, Center for Social Development.
- Lawrence, F. R., & Hancock, G. R. (1998). Assessing change over time using latent growth modeling. *Measurement and Evaluation in Counseling and Development*, 30, 211-224.
- Meghir, Costas (2001). *A retrospective on Friedman's theory of permanent income*. (Working Paper No. 04/01). The Institute for Fiscal Studies.
- Menard, S. (2002). *Longitudinal research* (2nd ed.). Newbury Park, CA: Sage Publication.
- Munnell, A. H., Sunden, A., & Taylor, C. (2001/2002). What determines 401(k) participation and contributions? *Social Security Bulletin*, 64(3), 64-76.
- Muthen, B. O., & Curran, P. (1996, April). General growth modeling in experimental designs: A latent framework for analysis and power estimation. Paper presented at the meeting of the American Educational Research Association, New York.
- Schmidt, L., & Sevak, P. (2004). *Gender, marriage, and asset accumulation in the United States*. *Feminist Economics*, 12 (1 & 2), 139-166.
- Schreiner, M., Clancy, M., & Sherraden, M. (2002). *Saving performance in the American Dream Demonstration: A national demonstration of Individual Development Account (CSD Report)*. St. Louis, MO: Washington University, Center for Social Development.
- Schreiner, M., & Sherraden, M. (2007). *Can the poor save? Savings and asset building in Individual Development Accounts*. New York: Aldine de Gruyter.
- Schumaker, R. E. & Lomax, R. G (2004). *A Beginner's Guide to Structural Equation Modeling*.: New Jersey: Lawrence Erlbaum Associates.

- Sherraden, M. (2005, January). Inclusion in asset-based policy: Scientific development. Presentation at the Chinese Academy of Social Science. Beijing, China.
- Sherraden, M. & Barr, M. S. (2005). Institutions and inclusion in saving policy. In N. Retsinas & E. Belsky (Eds.), *Building assets, building credit: Creating wealth in low-income communities*. Washington, DC: Brookings Institution Press.
- Sherraden, M., Schreiner, M., & Beverly, S. (2003). Income, institutions, and saving performance in Individual Development Accounts. *Economic Development Quarterly*, 17, 95-115.
- Sherraden, M. (1991). *Assets and the poor: A new American welfare policy*. Armonk, NY: M. E. Sharpe, Inc.
- Spilerman, S (2000). Wealth and stratification process. *Annual Review of Sociology*, 26, 497-524.
- Ssewamala, F. M. & Sherraden, M. (2004). Integrating saving into microenterprise programs for the poor: Do institutions matter? *Social Service Review*, 78 (3), 404-428.
- Van Parijs, P. (1992). *Arguing for basic income*. London: Verso.
- Waite, Linda, & Gallagher, M. (2000). *The case for marriage: Why married people are happier, healthier, and better off financially*. New York: Doubleday.
- Weber, R. N. & Smith, J. L. (2003). Assets and neighborhoods: The role of individual assets in neighborhood revitalization. *Housing Policy Debate*, 14 (1 & 2), 169-202.
- Zhan, M., & Schreiner, M. (2004). *Saving for post-secondary education in Individual Development Accounts* (CSD Working Paper No. 04-11). St. Louis, MO: Washington University, Center for Social Development.