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Determining access to financial services among the young and poor in American communities

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Title of Manuscript:

Determining access to financial services among the young and poor in American communities

Abstract

This paper investigates access to financial services in American communities. It analyzes the access gap that the young and poor face relative to more economically advantaged and older groups in society. The paper uses data from the World Bank's Global Financial Inclusion survey to create a multi-dimensional index of financial access and estimates a menu of quantitative models to gauge financial inclusion. Results show that young and poor people face substantial gaps in access to financial services when compared with older people, higher income individuals, more educated people, and individuals who are less vulnerable to future economic shocks. These findings expand understanding of the challenges that young and poor people face in U.S. financial markets and provide insights that can inform financial and social policies for greater financial inclusion and more sustainable communities.

Keywords: access to finance, American communities, young and poor

INTRODUCTION

Access to financial services, such as bank accounts and debit cards, is essential for citizens to be integrated into the economic and social development of communities. When granted access to financial services, research finds that citizens reduce their transaction costs in a structured financial environment, broaden their investment opportunities, accumulate assets, and smooth their incomes over the long-term (Claessens, 2006). However, many citizens lack access to basic financial services due to poverty, as financial service providers tend to prefer wealthy individuals and large enterprises (Claessens, 2006; Beck, Demirguc-Kunt & Peria, 2007).

Among young people especially, poverty remains a lingering challenge that limits access to financial services, constrains economic and social well-being, and hinders youths' transition to a healthy and resilient future in sustainable communities.¹ A significant number of young people in the United States are poor and lack access to essential financial services. Between 2001 and 2009, an average of 16.9 percent of U.S. youth were below the poverty line (National Center for Education Statistics, 2011) and between 2001 and 2014 the youth unemployment rate averaged 17.9 percent (World Bank, 2016). Also, indicators of access to financial services show that 12.4 percent of young people do not have an account at a financial institution, 28.5 percent do not have a debit card in their own name, 46.1 percent do not save at a financial institution, and 80 percent do not save for their old age (World Bank, 2016). These national statistics highlight the need for governments to exert more effort in pursuing financial and

¹ The United Nations classifies individuals 10 to 19 years as adolescents, 10 to 24 years as young, and 15 to 24 years as youth (United Nations Population Fund 2001). We use the terms 'young people' and 'youth' interchangeably to represent individuals between the ages of 15 and 24 years.

social programs, policies, and strategies that promote effective financial inclusion of young and poor people and foster sustainable communities.

Research has focused extensively on access to financial services for the poor (e.g., Koku, 2015; Demirguc-Kunt, Klapper and Peria 2016) but not much is known about access to financial services for the young and poor. Also, many researchers investigate access to financial services at a macro-level using aggregate measures to analyze how access affects economic growth and inequality (e.g., Beck, Demirguc-Kunt, and Peria, 2007) but these studies give little attention to micro-level dynamics, in particular the roles of specific groups (e.g., the young and poor) in economic systems and the constraints they face in contributing their full economic potential.

This article examines access to financial services in American communities. It analyzes the access gap that the young and poor face relative to more advantaged groups in society and explores ways in which government programs, policies, and strategies may minimize these gaps and include the young and poor more fully in sustainable communities. Specifically, the paper seeks to address the following research question: what gaps in access to financial services do the young and poor face relative to other groups in American communities, and how should government social and financial policies interact to reduce these gaps and achieve more sustainable communities?

The article uses data from the World Bank's Global Financial Inclusion survey conducted in 2014. The U.S. component of the global survey consists of 1,021 randomly selected and nationally representative individuals age 15 years and above. The national data gives information on multiple dimensions of a person's access to financial services. Respondents give information on whether they have an account at a financial institution, own a debit card, have a

credit card, have saved in the previous year in an account at a financial institution, or borrowed money in the past year. The survey also records respondents' age, gender, educational attainment, income level, and capacity to come up with emergency funds.

We created a multi-dimensional index of financial access that combines several indicators of access to financial services. The index is an outcome variable in a menu of quantitative models to gauge financial inclusion. We estimate the models using suitable regressions, including logit, ordered logit, and generalized ordered logit. Results show that young and poor people face significant gaps in access to financial services compared to individuals who are older, have more income, are more educated, and are less vulnerable to future economic shocks. The findings shed light on the challenges that young and poor people face in U.S. financial markets and can inform collaborative efforts between social policymakers and public financial managers on the types of multi-level interventions needed to promote greater financial inclusion. The rest of the paper is organized as follows: Section 2 gives a brief review of the academic literature and outlines the study hypotheses; Section 3 describes the data and variables; Section 4 explains the methodology; Section 5 presents empirical results; and Section 6 concludes and discusses policy implications.

LITERATURE REVIEW

Defining access to financial services

The academic literature considers different dimensions of access to financial services. One dimension is reliability, which gauges whether services are available when citizens need them. Another dimension is convenience, analyzing whether it is easy to obtain services. A third

dimension is continuity, a measure of whether citizens can obtain services repeatedly. The fourth dimension is flexibility, which examines the extent to which services are customized to the needs of different groups of citizens (see Morduch, 1999). The literature also extends the definition of *access* to encompass use of financial services because some citizens might not utilize their access to services due to cultural, religious, and other reasons (Beck, Demirguc-Kunt, and Honohan 2009). In sum, access to financial services is viewed in the literature as a multi-dimensional concept having a broad-based meaning.

A theory of access to financial services

Access to financial services may be explained theoretically using insights from efficient markets theory together with conceptual perspectives on the nexus between financial markets and economic development. Much consensus exists among economic theorists on the relationship between financial markets and economic development. According to Levine (2005), financial markets play an important role in generating ex ante information about potential investments, mobilizing and pooling savings to facilitate investment, monitoring investments and managing risk, and reducing transaction costs – together, these functions influence the savings and investment decisions of individuals and businesses and promote economic development. Within these contexts, access to financial services provides a critical link between financial markets and economic development, because economic agents need access to markets to make savings and investment decisions as well as borrow and accumulate funds over time in secure market environments to promote economic development.

Access to financial services is constrained when markets are imperfect and inefficiency persists. As the efficient markets theory states, markets are efficient when asset prices fully reflect all available information such that firms make production-investment decisions and individuals choose among investment alternatives in market environments with zero transaction costs and costless information acquisition and processing (Fama, 1970). Well-functioning and efficient markets channel resources to their most productive uses and allocate risks among economic agents in an equitable manner and improve economic opportunities and income distribution in a pareto-optimizing way. (Demirgüç-Kunt, Beck, and Honohan 2008). However, financial markets are prone to imperfections, including information asymmetry, quality uncertainty, and transaction costs (Akerlof 1970), therefore market inefficiency may result in some groups in society having limited access to financial services compared to other groups, and marginalized groups might face the risk of exclusion from the economic development process. In this context, access to financial services has both demand and supply dimensions.

The supply side dimension is related to information asymmetry and transaction costs. Due to lack of adequate information on all potential clients, and problems with adverse selection and moral hazard, financial service providers may perceive some potential clients as more risky for business than others, and as a rational market response, financial service providers may adjust not only the prices and fees they charge but also ration the quantity of access they extend to potential clients they consider to be more risky (Classens, 2006). Banks may also perceive that the small-size transactions some groups of potential clients typically demand involve high fixed transaction costs for the bank, therefore from the bank's standpoint

it would be imprudent to expand financial service access to these groups (Demirgüç-Kunt et al., 2008). On the demand side, individuals may desire access to financial services, but they will consider the nature and type of services financial service firms provide, as well as the conditions under which firms provide these services, and accordingly choose the combination of price and quantity of financial service access that maximizes their utility, given the range of possible alternatives available (Awunyo-Vitor, 2018). It is likely from a demand-side perspective that some groups in society may find the available supply of financial services unsuitable to their personal needs and may demand less of available services than other groups.

When we consider the supply side dimension, financial service providers may perceive young people, poor individuals, less educated persons, women, and individuals vulnerable to economic shocks as more risky, and these groups may obtain less access to financial services than others perceived to be less risky. Financial service providers may view offering services to young people as unattractive for business because the value of their transactions and balances are typically low, and the cost of marketing and maintaining youth accounts is higher, compared to older people (Deshpande and Zimmerman, 2010). Providers may alternatively find young ones, especially young working-age urban residents, as an attractive group for business because providers can cross-sell additional products to families and friends of these young people and leverage new technology to reduce transaction costs. As regards low income and poor people, financial service providers might be less inclined to extend services to them because they tend to hold smaller deposits, have higher default probability and, as a result, would require greater monitoring of accounts than higher-income individuals (Rao and Malapit, 2015).

Also, more educated persons tend to have more access to financial services because financial service providers consider them to be a lucrative and less risky group for business, as they are more likely to meet the requirements and procedures for opening and maintaining accounts for a wide range of products, compared to less educated individuals (Johnson and Nino-Zarazua, 2011; Shem, Misati and Njoroge, 2012). As regards gender, access to financial services may be explained from the standpoint that the social construction of women portrays them as less likely than men to make independent financial decisions (due to having a man as head of the household) or less likely to work and earn more (due to caring for children), therefore financial service providers may internalize these social constructions in their financial access decision-making and extend less services to women compared to men (Rao and Malapit, 2015; Allen, Demirguc-Kunt, Klapper and Peria, 2016). Finally, individuals who are vulnerable to economic shocks portray to financial service providers that as potential clients they have a more risky profile and higher probability of defaulting on financial obligations, therefore they would be less likely to obtain access to financial services than people who are less vulnerable to economic shocks (Rao and Malapit, 2015).

Empirical studies on financial access gaps in society

Empirical work shows that access to financial services tends to be skewed in favor of specific groups at the expense of others in society. Dymski (2005) analyzed US financial institutions since 1980 and noted that they tend to focus on attracting desirable upscale clients by offering them low or no fees for service but extend costly and limited services to clients perceived to be risky. Lusardi (2011) discussed how individuals perceived to be more risky, including those with

low incomes and limited education, have limited access to financial services, face high transaction costs associated with the use of money orders and check-cashing services, and encounter steep borrowing terms with payday loans, tax refund advances, and pawn shops. Moreover, Rhine, Greene and Toussaint-Comeau (2006) noted that on a longer-term basis, the limited access gaps that young people, low income individuals, and less educated persons face relative to more advantaged groups constrains their asset building and wealth creation, and reduces their ability to maintain a smooth level of consumption throughout their retirement years, therefore they are not able to respond adequately to economic shocks over time (see also Haveman and Wolff, 2005).

Allen, Demirguc-Kunt, Klapper and Peria (2016) present a rare empirically tested measure of individuals' access to financial services and analyzed the gaps in access between specific groups of individuals. The authors analyzed individual characteristics such as income, gender, age, education, marital status, employment, and location using the World Bank's 2011 global survey covering 124,000 individuals in 123 countries. They measured access to financial services using three different indicators, namely likelihood of owning a bank account, likelihood of using an account, and likelihood of using an account frequently. Across all three measures, the authors found that access to financial services was higher among richer people, older individuals, more educated people, males, married persons, urban residents, and people who are employed. The authors also showed that the gaps in access are quite significant. For example, the probability of owning an account is about 16 percentage points lower for a person with a lower level of income (compared to a higher income individual), the probability for a person with a lower level of education is about 12 percentage points lower (compared to

someone with a higher level of education), and the probability for rural residents is about 3 percentage points lower (compared to urban residents). Also, the probability of using an account to save is about 17.5 percentage points lower for people with a lower level of income (compared to higher income individuals), and about 14 percentage points lower for an unemployed person (compared to someone who is employed).

Contribution of the present study and Research hypotheses

The present study contributes to the existing literature by focusing on the young and poor and the gaps in financial access that this group faces relative to other groups in society. The article's focus on the young and poor is important for several reasons. Today's youth are critical assets for the economic, social, and political life of their communities, therefore the extent to which they are integrated into local financial systems would impact the present and future resilience of communities (International Center for Research on Women, 2001). Additionally, young people are recognized as active change agents in their communities (Percy-Smith and Burns, 2013), therefore the extent of their inclusion in financial systems would determine economic growth and development of communities. Furthermore, poverty is known to hinder sustainable development of communities and disrupt livelihoods (Atinmo, Mirmiran, Oyewole, and Belahsen, 2009; Cobbinah, Erdiaw-Kwasie and Amoateng, 2015), therefore young people who are also poor are a social group that would face severe constraints in local financial systems. Additionally, we extend the boundaries of existing research by considering social and financial policy interventions that can minimize the gaps in access that young and poor people face relative to other more advantaged groups in society.

Based on insights from efficient markets theory, conceptual perspectives on the relationship between financial markets and economic development, and prior empirical studies on access to financial services (particularly, Allen et al., 2016 and Beck et al., 2007), we present research hypotheses about the impacts of age, poverty, education, gender, and vulnerability to economic shocks on access to financial services. First, we hypothesize that young people tend to have lower access to financial services than older people. We also expect that access to financial services would change as age exceeds a certain threshold, reflecting non-linear patterns. Second, we hypothesize that poor people, or individuals with lower income levels, tend to have less access to financial services compared to wealthier individuals. Third, we hypothesize that when a young person is also poor, they tend to face markedly lower access to financial services compared to other individuals in society. Further, we hypothesize that access to financial services tends to be lower for less educated individuals, compared to more educated persons, and lower for females, compared to males (see Allen et al. 2016).

DATA AND VARIABLES

We use data from the World Bank's Global Financial Inclusion database for our analysis. The database consists of surveys Gallop Incorporated conducted in 2014 as part of its Gallop World Poll. This global survey gathered data on approximately 1,000 people in each of more than 143 countries using randomly selected and nationally representative samples (World Bank, 2015). The target population for the survey is the entire civilian, noninstitutionalized population age 15 years and older.

The U.S. component of the global survey consists of telephone interviews conducted from May 14 to June 8, 2014 covering 1,021 randomly selected individuals age 15 years and

older (World Bank, 2015). The survey respondents were selected from a nationally representative list of landline telephone numbers along with a nationwide list of cellular phone numbers. Interviewers used the Kish Grid method – a table of numbers created from details about each household member – to randomly select an interviewee from each household. In order to maximize response rate, interviewers made at least three attempts to reach the randomly selected respondent in each household and these attempts were spread over different days and various times during the day. Additionally, the survey data was adjusted using weights to correct for sampling and non-response errors, including unequal probability of selection based on household size. The survey margin of error was 4.0 percent at the 95 percent level of confidence, and the response rate was 50 percent, indicating that the sample responses represented to a reasonable degree the true responses of the entire population of individuals 15 years and older in the United States.

Data from the national survey provide information about multiple dimensions of an individual's access to financial services in the United States. The survey asks respondents whether they have an account at a financial institution, own a debit card, possess a credit card, saved in the past year in an account at a financial institution, or borrowed in the past year. The data also give information about respondents' age, gender, education, income, and ability to come up with emergency funds. However, one limitation is the survey data only provide information on individual-level variables, therefore it is not possible in our analysis to control for jurisdictional-level variables such as population size, population density, urban versus rural dwelling, unemployment rate, median household income, and median home value. Due to this limitation, it is likely that estimates from our analysis might have omitted variable bias, even as

the analysis provides useful insights on the individual-level determinants of access to financial services.

Measuring access to financial services

We created two separate measures of access to financial services. The first measure of access is FINDEX. It is an ordinal variable created from responses to five survey questions that ask whether a person has: (1) an account at a financial institution, (2) a debit card, (3) a credit card; (4) saved in the past 12 months in an account at a financial institution, and (5) borrowed in the past 12 months from a financial institution. Together, these five indicators provide a gauge of access to financial services that starts from 0 to 5, with 0 denoting least access and 5 indicating highest access. Notably, FINDEX includes two dimensions (Questions 4 and 5) that portray more active access to financial services than the remaining dimensions (Questions 1, 2, and 3), therefore the variable represents an expansive measure of access that also includes more active access; operationalizing access to financial services in this way seems to be consistent with an emerging literature that considers *active access* to information in financial markets (e.g., Cai and Lu 2019).

LOWACCESS is a second measure of access to financial services. It is a dichotomous variable created from the ordinal variable FINDEX. The variable LOWACCESS distinguishes between persons who have less active access and those having more active access to financial services. The threshold of less or more active access is important to distinguish between individuals that may be more included in the financial system based on their level of access, and those that may not be as included in the financial system based on their relatively limited

access to financial services. Respondents with FINDEX scores ranging from 0 to 3 are coded as having lower access and those who receive a score of 4 or 5 are denoted as having higher access to financial services. Hence, LOWACCESS takes the value 1 if a person has lower access (FINDEX=0, 1, 2, or 3) and 0 if the individual has higher access (FINDEX=4 or 5) to financial services.

We use FINDEX and LOWACCESS as dependent variables in separate models of access to financial services. Each of the two measures of access provides a unique way to understand the determinants of access to financial services among the young and poor in American communities. FINDEX operationalizes access in its expansive form that also includes more active access whereas LOWACCESS distinguishes in relative terms between lower and higher access to financial services.

Variables measuring socio-economic characteristics of an individual

The analysis uses information about respondents' age, gender, education, income, and ability to come up with emergency funds. We measure gender using a dichotomous variable FEMALE that is coded 1 if the respondent is female and 0 if male. AGE is an interval level variable that measures an individual's age in years. It consists of ages 15 years and above, given that the survey focused on respondents of that age upwards. We also created the variable YOUNG to distinguish between the youth and older individuals. YOUNG is a dichotomous variable that takes the value 1 for individuals who are between 15 and 24 years of age and takes the value 0 for people who are more than 24 years of age. The choice of 15 to 24 years to represent the

youth is consistent with the definition of 'youth' used by supranational organizations like the United Nations and World Bank.

INCOME refers to a respondent's household income. The World Bank data classifies household income into quintiles in the U.S. economy. Accordingly, each respondent's household income belongs to one of five categories: (1) poorest 20 percent, (2) second 20 percent, (3) middle 20 percent, (4) fourth 20 percent, and (5) richest 20 percent. We maintained that ordering and used a five-tier scale to measure respondents' income, starting from 1 (poorest 20 percent) to 5 (richest 20 percent). We also generated a dichotomous variable named POOR to take the value 1 for lower levels of income (levels 1, 2, and 3) and 0 for higher levels of income (levels 4 and 5).

EDUCATION is an ordinal level variable. It measures a person's educational attainment in three categories: completed primary education or less (coded 1), completed secondary school (coded 2), and completed tertiary education or more (coded 3). We also measured a person's VULNERABILITY to future economic shocks. This variable is obtained from the survey question that asks about the possibility of coming up with emergency funds. The response to that question is in four categories: very possible (coded 1), somewhat possible (coded 2), not very possible (coded 3), and not at all possible (coded 4). Thus, VULNEARBILITY is an ordinal level variable and increases in the variable from 1 to 4 show higher levels of vulnerability.

As noted earlier, the data covers 1,021 randomly selected individuals. However, the data has a considerable number of missing information and 'don't know' responses, therefore we cleaned the data to achieve a consistent dataset for empirical analysis of individual

responses. In all, we deleted 45 observations to achieve a consistent sample of 976 observations. Table 1 shows descriptive statistics of the variables.

[Table 1 here]

METHODS

We use a menu of quantitative models to gauge gaps in access to financial services among the young and poor relative to other individuals in society. The empirical strategy starts with an ordinary least squares (OLS) model of FINDEX, one of the dependent variables in our analysis. The OLS model assumes independent and identically distributed standard errors, but it is likely that this assumption of homoscedasticity may be refuted in the model, therefore we conduct tests for heteroscedasticity using the Breusch and Pagan (1979) and White (1980) tests, and based on the tests explore estimating the model using robust standard errors to correct for heteroscedasticity. Additionally, we examine different dimensions of the impact of age in separate regressions of access to financial services; one of the regressions uses the categorical variable measuring youth (YOUNG) to analyze access among the young relative to older individuals in society, and another regression includes both age and its square term as explanatory variables to explore non-linear patterns in the impact of age on access.

However, estimating a model using OLS with FINDEX as the dependent variable may be problematic because FINDEX is an ordinal variable and the estimation would violate the assumption of a normally distributed error term, which can limit the extent of reliability of the confidence intervals of estimated coefficients (Frost, 2019). Accordingly, we consider alternative estimators as complements to the OLS estimator.

First, we specify an ordered logit model to analyze the determinants of FINDEX.

Equation 1 shows the ordered logit model (see Fu, 1998). The model shows the probability of observing the dependent variable FINDEX (y) as a linear function of a set of explanatory variables (x), a random error (u), and a set of cut points (c). The dependent variable (y) is defined at each ordered category ($i = 1, 2, 3, 4, 5$ and 6) across five cut points (c_1, c_2, c_3, c_4 , and c_5) for an observation (j). The explanatory variables in the model range from x_1, x_2, \dots, x_k and $\beta_1, \beta_2, \dots, \beta_k$ are the respective coefficients of the explanatory variables. Consequently, in the ordered logit model of FINDEX, we estimate the coefficients $\beta_1, \beta_2, \dots, \beta_k$ together with cut points c_1, c_2, c_3, c_4 , and c_5 .

$$p_{ij} = Pr[y_j = i] = Pr[c_{i-1} < \beta_1 x_{1j} + \beta_2 x_{2j} + \dots + \beta_k x_{kj} + u_j \leq c_i] \quad (1)$$

An important principle of the ordered logit model is the proportionality of odds assumption. The ordered logit regression satisfies the proportionality of odds assumption if the odds of the outcome occurring is similar across different categories or cut points of the ordinal dependent variable, and in this way the only effect of combining adjoining categories in an ordered categorical regression should be the loss of efficiency in estimation (McCullagh, 1980). We use the standard Brant (1990) test to assess whether the ordered logit regressions meet the proportionality of odds assumption.

Second, if an ordered logit regression does not fully meet the proportionality of odds assumption, we can specify a generalized ordered logit model that constraints the coefficients of all explanatory variables in the model, across all categories of the ordered dependent variable, to meet the proportionality of odds assumption, and in this special case the generalized ordered logit model would be similar in interpretation to the ordered logit model

(Williams, 2016). Equation 2 shows the generalized ordered logit model constrained to meet the parallel odds assumption such that the coefficients (β) of explanatory variables (X) are the same across all categories (i) of the dependent variable (Y) for each observation, j (see Williams, 2006).

$$P(Y_j > i) = g(X\beta) = \left[\frac{\exp(\alpha_i + X_j\beta)}{1 + \{\exp(\alpha_i + X_j\beta)\}} \right], \quad i = 1, 2, \dots, M - 1 \quad (2)$$

Third, we use a dichotomous logistic regression model to analyze access to financial services. The model uses LOWACCESS as the dependent variable and investigates the influence of age, gender, income, education, and vulnerability. Equation 3 outlines the dichotomous logistic model and Equations 3a and 3b give additional details. Y^* is a binary response outcome variable measuring low access to financial services. It is a logarithmic transformation, defined in Equation 3a, and the probability of the binary outcome is presented in Equation 3b. Also, X is a vector of explanatory variables [$x_i = \{x_{1,i}, x_{2,i}, \dots, x_{k,i}\}$] measuring individual and household characteristics of respondents, including age, gender, income, education, and vulnerability. i stands for the list of individuals ($i = 1, \dots, n$). Also, β is a vector of coefficients ($\beta = \{\beta_1, \beta_2, \dots, \beta_k\}$) associated with the explanatory variables, and ε is the error term, which has a standard normal distribution with mean 0 and variance 1.

$$Y^* = X\beta + \varepsilon \quad (3)$$

$$Y^* = \ln \left[\frac{\hat{p}}{1 - \hat{p}} \right] \quad (3a)$$

$$\hat{p} = \frac{e^{X\beta}}{1 + e^{X\beta}} \quad (3b)$$

In analyzing the logit model in Equation 3, we also convert estimates of the regression coefficients into probability changes to assess average partial effects. Additionally, we analyze

probability change scenarios involving hypothetical individuals, using selected characteristics of an individual. These additional analyses are useful to obtain insights about access to financial services that may not be achieved from regression coefficients alone. While regression coefficients show the independent impact of each explanatory variable, the analysis of hypothetical individuals explores how all variables interact together under unique assumptions to give more insights about access to financial services.

EMPIRICAL RESULTS

Ordinary Least Squares Regressions

Tables 2 presents estimates from two ordinary least squares model specifications. The first specification includes YOUNG as a dichotomous explanatory variable to determine the impact of youth as a dimension of age in the model of access to financial services. In the second model specification, age is represented in its non-linear form, using AGE and AGE-SQUARE, along with other explanatory variables in the model of access to financial services. The two model specifications were estimated using robust standard errors to correct for heteroscedasticity, because diagnostic tests showed the presence of heteroscedasticity when each of the specified models was estimated without robust standard errors. Breusch and Pagan [$\chi^2 = 44.34, p < .01$; $\chi^2 = 53.49, p < .01$] and White [$\chi^2 = 72.89, p < .01$ $\chi^2 = 98.37, p < .01$] tests refuted the assumption of homoscedasticity when each model specification was estimated without robust standard errors.

[Table 2 here]

Estimates of both model specifications using robust standard errors show statistically significant impacts of age, youth, income, education, and vulnerability, on access to financial services. However, results do not show evidence of gender having a significant impact on access to financial services in any of the model specifications. Specifically, the first model specification in Table 2 describes youths' access to financial services and shows that young people have significantly lower access to financial services than older people. Estimates of this model specification also show that as household income rises, access to financial services rises significantly. Further, as a person's vulnerability to future economic shocks rises, the person's access to financial services tends to decline. Also, a person's access to financial services increases as this person's level of education rises. Among all these explanatory factors, educational attainment tends to have the largest impact (0.53) on access to financial services, followed by vulnerability (-.30), youth (-.26) and income (.13). Overall, the coefficients of YOUNG and INCOME describe the significantly lower access to financial services that young people and lower income individuals have relative to others in society.

In the second model specification in Table 2, we introduce AGE and AGE-SQUARE in the OLS model along with variables measuring gender, income, education, and vulnerability to future economic shocks. All the explanatory variables show impacts similar to their effects in the first model specification, and age reveals significant non-linear effects. The results show that an increase in age increases access to financial services by .05 units (which is a fraction of a one-level increase in FINDEX), however each additional year increase in age raises access less than the one before it, and access reaches a peak, then decreases at an increasing rate. The critical value in the age-access relationship is obtained from the coefficients of the variables

measuring age ($b_1 = 0.0545396$) and its square-term ($b_2 = -0.0005908$) using the following standard formula: $-b_1 / 2b_2$. Based on the formula, age reaches a peak at 46.15 years. This result is a surprising and worrying outcome. If the non-linear effects of age hold in practice, and when considered in the context of results from the first model specification with YOUNG as an explanatory variable, it would mean that over the life cycle, a young person (15 to 24 years) would have lower access to financial services relative to older people, however beyond their youthful years this person would face a cap in access sooner in the middle age years.

Ordered Logit Estimations

As mentioned earlier, estimating an OLS model with FINDEX as dependent variable may be problematic because FINDEX is an ordinal categorical variable and estimation would violate the assumption of a normally distributed error term, limiting the reliability of the confidence intervals of regression coefficients. Consequently, the ordered logit model is a more suitable estimation framework for a model with an ordinal dependent variable. As with the OLS models, we estimated ordered logit regressions using two alternate model specifications of access to financial services; the first specification includes the variable YOUNG as an explanatory variable, and the second specification includes AGE and AGE-SQUARE as explanatory variables.

The summary statistics from the ordered logit regressions showed that each model specification was statistically significant, however the model estimations in each case only weakly satisfied the proportionality of odds assumption. As noted previously, an ordered logit regression satisfies the proportionality of odds assumption if the likelihood of the outcome occurring is the same across different categories of the ordinal dependent variable; the Brant

test provides a standard way to test this assumption for an ordered logit model as a whole, and for each explanatory variable in the model – an insignificant test result means the proportionality of odds assumption is satisfied. In our analysis, Brant tests of the two ordered logit model specifications showed that the regressions only weakly satisfied the proportionality of odds assumption: in the first specification, the variable INCOME ($X^2=16.09$, $p < .01$) does not meet the assumption, and in the second specification, the variables AGE-SQUARE ($X^2=11.92$, $p < .01$) and INCOME ($X^2=12.10$, $p < .01$) violated the assumption, whereas all other explanatory variables in each model specification met the assumption at the 5 percent level at least. We therefore conducted our analysis of the determinants of access to financial services within the generalized ordered logit framework to achieve more statistically meaningful insights.

Generalized Ordered Logit Estimations

As Williams (2016) noted, if an ordered logit estimation does not fully satisfy the proportionality of odds assumption, we can use a generalized ordered logit regression that limits the coefficients of all explanatory variables, across all tiers of the ordered outcome variable, to satisfy the proportionality of odds assumption. In this special case, we can interpret the generalized ordered logit regression similarly as the ordered logit regression. We analyze two different model specifications of the generalized ordered logit model; the first specification shown in Table 3 includes YOUNG as an explanatory variable, and the second specification shown in Table 4 includes the variables AGE and AGE-SQUARE (Table 4). Both model specifications are statistically significant (LR $X^2 = 278.26$, $p < .01$; LR $X^2 = 334.77$, $p < .01$) and,

except for gender, explanatory variables in each model specification show statistically significant coefficients and impacts that are generally consistent with our research hypotheses.

[Table 3 here]

[Table 4 here]

Specifically, a younger person has a lower likelihood of being in a higher category of access to financial services than an older person. The log odds of a younger person being in a higher category of access is 0.36 less than the log odds for an older person, given the other explanatory variables in the model (Table 3). Age also shows significant non-linear patterns (Table 4) similar to results from OLS estimations. As for income, the results show that a one-level increase in a person's income (e.g., from the poorest 20 percent to the second 20 percent in society) would increase the log odds of the person being in a higher access category by 0.20 (Table 3) or 0.23 (Table 4). Similarly, an increase in a person's level of education (e.g., from primary school completion to secondary education completion) would raise the log odds of the person being in a higher category of access by 0.94 (Table 3) or 0.79 (Table 4). Also, when a person's vulnerability to future economic shocks increases (e.g., from *very* possible to come up with emergency funds to *somewhat* possible to come up with emergency funds), the log odds of the person being in a higher category of access decreases by 0.53 (Table 3) or 0.58 (Table 4). Overall, education level appears to have the largest impact on access to financial services in the generalized ordered logit regressions, followed by vulnerability, youth, and income, respectively.

Logit model estimates

Table 5 shows logit estimates of access to financial services across two model specifications. Like the OLS and generalized ordered logit regressions, the first model specification includes YOUNG as an explanatory variable, whereas the second specification includes AGE and AGE-SQUARE as explanatory variables. The dependent variable in both specifications is LOWACCESS, which is a dichotomous variable gauging low and high access to financial services. Logit model results in Table 5 are consistent with the generalized ordered logit results in Tables 3 and 4. The variables measuring age, youth, income, education, and vulnerability are all significant in the logit regressions. The first model specification in Table 5 shows that young people are more likely to have low access to financial services than older people. It also shows that people with higher levels of income are less likely to have low access to financial services, compared with others with lower levels of income. Further, individuals having higher levels of education are less likely to have low access to financial services when compared with people having lower educational attainment. Also, people who are more vulnerable to future economic shocks are more likely to have low access to financial services, compared with people who show more resilience. Altogether, the variable measuring educational attainment shows the largest impact (-1.01) on financial access, followed by vulnerability (0.57), youth (0.43) and income (-0.18). In the second model specification, age shows significant non-linear effects on the likelihood of having low access to financial services, similar to OLS results, but in the logit estimation, age peaks even earlier in the life cycle at 44.07 years.

Analysis of average partial effects and hypothetical individuals

Finally, we assess average partial effects and explore scenarios involving hypothetical individuals to gain more insights on financial inclusion. Table 6 presents probability changes and average partial effects of the statistically significant explanatory variables. Holding the other explanatory variables constant at their means, young people are 9.85 percentage points more likely than older people to have low access to financial services. Also, the probability of having low access to financial services is 11.04 percentage points higher for low income individuals compared to people who have a higher level of income. Additionally, people with higher levels of education are 25.95 percentage points less likely to have low access to financial services than those who have a lower level of education. Finally, individuals who have a higher level of vulnerability to future economic shocks are 14.80 percentage points more likely to have low access to financial services than people who have a lower level of vulnerability. The analysis of average partial effects corroborates findings in the ordinary least squares and logistic regressions and highlights the substantial gaps in financial access that young and poor people face relative others in the community.

[Tables 6 here]

[Table 7 here]

Next, we compare hypothetical individuals using characteristics from the data and logit regressions. The goal is to set a hypothetical individual as a reference point and compare this person with other individuals who have different socio-economic characteristics. This helps to gauge potential gaps in financial access among individuals who have different identifiers. Table 7 displays details about the hypothetical individual. We define the hypothetical individual as an older person ($YOUNG=0$), who is not from a low-income household ($POOR=0$), has the highest

level of educational attainment (EDUCATION=3) and is among the group of people who are least vulnerable to future economic shocks (VULNERABILITY=1). Based on these characteristics, the hypothetical reference person has only a 26.04 percent probability of having low access to financial services. Against this reference point, a person who is young (YOUNG=1) and poor (POOR=1), has a low level of educational attainment (EDUCATION=1) and is among the most vulnerable to future economic shocks (VULNERABILITY=4) would be 97.54 percentage points more likely to have low access to financial services. This analysis of hypothetical individuals, when considered along with findings from the OLS and logistic regression estimates, emphasizes the substantial negative gap that young and poor people face in access to financial services when compared with others in the society.

SUMMARY AND POLICY CONSIDERATIONS

This article analyzed the gaps that exist in access to financial services for the young and poor relative to other groups in American communities. It finds that young people are more likely to have lower access to financial services than older people. It also finds that poor people, or people with lower income, are more likely to have lower access to financial services than wealthier persons. Moreover, when we consider youth and poverty together, as seen in the results from the analysis of the hypothetical individual, the young and poor face a markedly higher likelihood of having lower access to financial services, compared to others in society.

These findings altogether give unique insights on access to financial services. First, our analysis of the hypothetical individual makes it possible to understand how all explanatory variables interact together under unique assumptions of the individual – besides the

independent impact of each explanatory variable – to explain gaps in financial service access among specific groups in society. The analysis also provides a framework that can be expanded to analyze more scenarios about hypothetical individuals' access to financial services. Second, the generalized ordered logistic models in our analysis provide a unique estimation strategy to help identify different tiers of access to financial services and understand how individual level variables affect access across different tiers of the outcome variable. However, the novelty of our analysis is limited in the sense that it does not include jurisdictional level variables, such as population size, urban or rural location, unemployment rate, and median home value, which would have provided more unique insights.

Another limitation is the likely existence of endogeneity in the models measuring access to financial services. Endogeneity arises in an empirical model when the explanatory variable is related to the error term (Kennedy 2003). As the error term accounts for variables that might explain the outcome variable but are not represented in the model as explanatory variables, endogeneity may be such that the explanatory variable influences the outcome variable, and at the same time the outcome variable also influences the explanatory variable. It may also be such that a variable other than those represented in the model is related to both the outcome variable and the explanatory variable. At any rate, endogeneity can lead to biased estimates and weaken statistical inference. In our models of access to financial services, endogeneity is a concern in that people with higher levels of poverty (lower levels of income) may have less access than richer individuals, but low access to financial products and services may also raise the level of poverty. It is also likely that lower income people may reside in neighborhoods

where there are fewer banking and finance facilities and as a result would have less access to financial services compared to people with higher levels of income.

Despite its limitations, the article contributes to the extant literature on financial inclusion by drawing attention to a peculiar group in society – the young and poor – whose equitable inclusion in local financial systems is critical to enhance present and future resilience of American communities. The findings from this study highlight the need for effective public management and social strategies to reduce the gaps in access that young and poor people face in financial systems. Local public managers may consider offering tax incentives and other economic benefits to encourage local financial service providers to expand access to the young and poor through customized products and services and targeted deposit and savings campaigns. Local governments may also offer incentives to financial service providers that locate branches and self-service kiosks in specific zones where low-income individuals reside. As for more vulnerable individuals who may have limited access to financial services because they are susceptible to severe economic shocks, state and federal public policy has an important role to play, not merely providing welfare assistance to the more vulnerable, but rather growing the economy in a more inclusive way that creates many income-generating opportunities for vulnerable individuals to accumulate assets, smooth their incomes over the long-term, and become more integrated into the economic and social development of municipalities.

However, a critical question remains: how should social and financial policy strategies interact to reduce the gaps young and poor people face and achieve more sustainable communities? We argue that the strategies for inclusion and redress must stem from micro, meso, and macro levels. At the micro-level, commitment accounts or devices can be useful in

encouraging savings behavior among young people. A commitment account restricts a person's access to their own funds until a future date of their choosing (Brune, Giné, Goldberg, and Yang, 2011). It could serve as a means for young people to maintain their presence in financial systems and benefit from specific financial products for the youth. Matched savings schemes are more generous and can be valuable among young and poor people (Sherraden and Gilbert, 2016). These saving schemes match a person's savings using funds from charitable organizations or local and national government agencies. Individuals typically would receive about \$2 or \$3 for each \$1 a person saves, given that the person will spend the funds on prescribed items such as college education (Sherraden and Gilbert, 2016).

At the meso-level, parents and guardians are important stakeholders. When families, guardians, and community partners are involved in youth financial literacy education and outreach, outcomes improve for all involved (Reinsch, 2012). Reinsch found that "educating and involving parents and guardians led to the understanding and support needed for youth to avail of the [financial] services, and even improved financial practices among the adults themselves," (p. 146). We recommend, whenever possible, the inclusion of family and community partners in increasing financial access for the young and poor in hopes that communities at large will benefit.

Finally, macro-level strategies such as the requirement and inclusion of broad-based financial literacy programs in schools for young people show promise in the United States and globally (Hopkins et al., 2012; Reinsch, 2012). This is because beneficial use of financial services requires not only formal education, but also an adequate understanding of technical matters associated with financial service provision (Shem et al., 2012). These curriculum innovations,

coupled with micro-financing and entrepreneurship options for youth, should be heavily emphasized to promote access to financial services in American communities.

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TABLE 1

Descriptive

Statistics

VARIABLES	N	Mean	SD	Min	Max
<i>Dependent variables</i>					
FINDEX	988	3.243	1.204	0	5
LOWACCESS	988	0.531	0.499	0	1
<i>Explanatory variables</i>					
Female	988	0.469	0.499	0	1
Age	988	53.02	19.17	15	95
Age squared	988	3,178	1,984	225	9,025
Young	988	0.111	0.315	0	1
Education	977	2.463	0.533	1	3
Income	988	3.306	1.382	1	5
Poor	988	0.300	0.458	0	1
Vulnerability	976	1.818	1.126	1	4

TABLE 2

OLS Estimates of FINDEX

VARIABLES	(1)	(2)
Young	-0.26** (0.12)	
Age		0.055*** (0.0099)
Age-square		-0.00059*** (0.000095)
FEMALE	0.021 (0.066)	0.082 (0.065)
INCOME	0.13*** (0.028)	0.14*** (0.028)
education	0.53*** (0.068)	0.45*** (0.069)
vulnerability	-0.30*** (0.035)	-0.32*** (0.035)
Constant	2.09*** (0.22)	1.20*** (0.30)
Observations	965	965
F-statistic	64.76 (5, 959)	61.74 (6, 958)
Prob>F	0.000	0.000
R-squared	0.269	0.305

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 3

Generalized Ordered Logit Estimates of FINDEX

VARIABLES	(1)	(2)	(3)	(4)	(5)
Young	-0.36* (0.19)	-0.36* (0.19)	-0.36* (0.19)	-0.36* (0.19)	-0.36* (0.19)
Female	-0.019 (0.12)	-0.019 (0.12)	-0.019 (0.12)	-0.019 (0.12)	-0.019 (0.12)
Income	0.20*** (0.048)	0.20*** (0.048)	0.20*** (0.048)	0.20*** (0.048)	0.20*** (0.048)
Education	0.94*** (0.12)	0.94*** (0.12)	0.94*** (0.12)	0.94*** (0.12)	0.94*** (0.12)
Vulnerability	-0.53*** (0.061)	-0.53*** (0.061)	-0.53*** (0.061)	-0.53*** (0.061)	-0.53*** (0.061)
Constant	1.78*** (0.40)	0.97** (0.39)	-0.54 (0.38)	-2.20*** (0.38)	-4.31*** (0.40)
Observations	965	965	965	965	965
LR chi-square (5)	278.26	278.26	278.26	278.26	278.26
Prob > chi-square	0.000	0.000	0.000	0.000	0.000
Pseudo R-square	0.095	0.095	0.095	0.095	0.095

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 4

Generalized Ordered Logit Estimates of FINDEX (with non-linear age effects)

VARIABLES	(1)	(2)	(3)	(4)	(5)
Age	0.098*** (0.017)	0.098*** (0.017)	0.098*** (0.017)	0.098*** (0.017)	0.098*** (0.017)
Age square	-0.0011*** (0.00016)	-0.0011*** (0.00016)	-0.0011*** (0.00016)	-0.0011*** (0.00016)	-0.0011*** (0.00016)
Female	0.094 (0.12)	0.094 (0.12)	0.094 (0.12)	0.094 (0.12)	0.094 (0.12)
Income	0.23*** (0.048)	0.23*** (0.048)	0.23*** (0.048)	0.23*** (0.048)	0.23*** (0.048)
Education	0.79*** (0.13)	0.79*** (0.13)	0.79*** (0.13)	0.79*** (0.13)	0.79*** (0.13)
Vulnerability	-0.58*** (0.062)	-0.58*** (0.062)	-0.58*** (0.062)	-0.58*** (0.062)	-0.58*** (0.062)
Constant	0.45 (0.51)	-0.35 (0.50)	-1.91*** (0.49)	-3.65*** (0.50)	-5.83*** (0.52)
Observations	965	965	965	965	965
LR chi-square (6)	334.77	334.77	334.77	334.77	334.77
Prob > chi-square	0.000	0.000	0.000	0.000	0.000
Pseudo R-square	0.114	0.114	0.114	0.114	0.114

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5

Logit Estimates of LOWACCESS

VARIABLES	(1)	(2)
Young	0.43* (0.25)	
Age		-0.13*** (0.023)
Age-square		0.0015*** (0.00023)
Female	0.14 (0.15)	-0.015 (0.15)
Income	-0.18*** (0.057)	-0.23*** (0.059)
Education	-1.01*** (0.15)	-0.88*** (0.15)
Vulnerability	0.57*** (0.077)	0.65*** (0.081)
Constant	2.11*** (0.45)	4.24*** (0.64)
Observations	965	965
LR chi-square (df)	222.40 (5)	289.71 (6)
Prob > chi-square	0.000	0.000
Pseudo R-squared	0.167	0.217

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6

Analyses of Average Partial Effects

Panel A: Base scenario and changes to the base:

VARIABLES	LOWACCESS
Young	0.40 (0.25)
Poor	0.45*** (0.17)
Education	-1.05*** (0.14)
Vulnerability	0.60*** (0.076)
Constant	1.50*** (0.41)
Observations	965
LR chi-square (4)	218.30
Prob > chi-square	0.000
Pseudo R-square	0.164
Standard errors in parentheses	*** p<0.01, ** p<0.05, * p<0.1

Panel B: *prchange* results

logit: Changes in Predicted Probabilities for LOWACCESS

	min->max	0->1	+1/2	+sd/2	MargEfct
YOUNG	0.0963	0.0963	0.0982	0.0313	0.0985
POOR	0.1088	0.1088	0.1100	0.0501	0.1104
education	-0.4415	-0.0936	-0.2539	-0.1375	-0.2595
vulnerabil~y	0.3912	0.1355	0.1469	0.1644	0.1480
Pr (y x)	0 0.4559	1 0.5441			
x=	YOUNG .11399	POOR .290155	education 2.46321	vulnerabil~y 1.81244	
sd (x)=	.317963	.454069	.53308	1.12084	

TABLE 7

Analyses of a Hypothetical Individual

Panel A: . prvalue, x(YOUNG=0 POOR=0 education=3 vulnerability=1) save

logit: Predictions for LOWACCESS

Confidence intervals by delta method

		95% Conf. Interval		
Pr (y=1 x) :	0.2604	[0.2182,	0.3027]	
Pr (y=0 x) :	0.7396	[0.6973,	0.7818]	
x=	YOUNG	POOR	education	vulnerabil~y
	0	0	3	1

Panel B: . prvalue, x(YOUNG=1 POOR=1 education=1 vulnerability=4) diff

logit: Change in Predictions for LOWACCESS

Confidence intervals by delta method

	Current	Saved	Change	95% CI for Change	
Pr (y=1 x) :	0.9754	0.2604	0.7150	[0.6632,	0.7668]
Pr (y=0 x) :	0.0246	0.7396	-0.7150	[-0.7668,	-0.6632]
Current=	YOUNG	POOR	education	vulnerabil~y	
	1	1	1	4	
Saved=	0	0	3	1	
Diff=	1	1	-2	3	