Financial Inclusion, Human Capital, and Wealth Accumulation: Evidence from the Freedman's Savings Bank

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Motivation: Understand effects of a large increase in financial inclusion





- Significant portions of the U.S. population are unbanked/underbanked
 - Investment hard if costs lumpy and income streams vary
 - Persistent differences across groups in utilization of financial services
 - May partly explain racial gaps in education and labor market outcomes
- Literature on effects of financial inclusion largely focused on marginal changes (including experimental interventions) or work in developing countries; harder to assess larger-scale improvements in access
- Shock we study provided bank access to a large share of local populations that previously had none
 - Estimated effects capture externalities across affected individuals
 - First paper to look at human capital and entrepreneurship outcomes

Modern trust in financial institutions

Dependent var. "Lack of trust in financial institutions" is the reason household is unbanked (in 2017 FDIC National Survey of Unbanked and Underbanked Households)

Independent var. Presence of an FSB branch in a county (ever)

	(1) Blacks	(2) Whites
Branch in County	.074* (.041)	.021 (.11)
Observations	635	1,267

African Americans in counties that once had a branch more likely to list mistrust of financial institutions as a reason for being unbanked (association is not present for Whites)

Freedman's Savings Bank: Institutional overview

- Private corporation chartered by the U.S. Government to receive deposits "by or in behalf of persons heretofore held in slavery in the United States, or their descendants"
 - Low minimum deposits; interest payments
 - Real estate loans
 - Basic "thrift education"
- 34 Bank branches opened 1865–1870
 - Primarily in the South, though also several large Northern cities (NY, Philadelphia, St. Louis)
 - 14 additional planned but never opened due to Panic of 1873
 - Bank ultimately collapsed; eventual (partial) government bailout
- Surviving records from 27 branches include
 - $\sim 107 \text{K}$ account holders
 - ${\sim}483$ K family members (${\sim}12\%$ of all African Americans)



We find positive effects of a FSB account on schooling, literacy, employment, income, business formation and real estate wealth

Freedman's Savings Bank branch locations



Opened Pre-1870 (26; 19 in sample)

Planned incl. 1870 (22; 17 in sample)

Freedman's Savings Bank branches (opened pre-1870)

Location		Population	Status		Location		Population	Status	
Huntsville	AL	<15,000	Opened	1865	Baltimore	MD	267,354	Opened	1866
Washington	DC	109,119	Opened	1865	New Bern	NC	<15,000	Opened	1866
Natchez	MS	<15,000	Opened	1865	New York †	NY	942,292	Opened	1866
Vicksburg	MS	<15,000	Opened	1865	Beaufort	SC	<15,000	Opened	1866
Memphis	ΤN	40,226	Opened	1865	Charleston	SC	48,956	Opened	1866
Lynchburg	VA	<15,000	Opened	1865	Shreveport	LA	<15,000	Opened	1868
Norfolk	VA	19,229	Opened	1865	Wilmington	NC	30,841	Opened	1868
Richmond	VA	51,038	Opened	1865	$Raleigh^*$	NC	<15,000	Opened	1868
Mobile	AL	32,034	Opened	1866	$Montgomery^*$	AL	<15,000	Opened	
Tallahassee	FL	<15,000	Opened	1866	$Columbia^*$	ΤN	<15,000	Opened	
Savannah	GA	28,235	Opened	1866	$Alexandria^*$	VA	<15,000	Opened	
Augusta	GA	15,389	Opened	1866	$Jacksonville^*$	FL	<15,000	Opened	
New Orleans	LA	191,418	Opened	1866	Macon [*]	GA	<15,000	Opened	

Excluded from main analysis sample: *Missing Freedman's Savings Bank account records †Outside South.

Planned branch list (incl. 1870)

Historical Setting: Reconstruction-era (i.e., post-U.S. Civil War) South

- Majority of Southern Blacks were freed slaves in rural areas, with virtually no assets
- Movement into market economy, including by Black Union Army veterans
- $\bullet ~{\sim}90\%$ of the Black population was illiterate in 1860
 - Few pre-emancipation educational institutions for Blacks
 - State laws banning teaching slaves to read/write

"The sole ambition of the Freedman at the present time appears to be to become the owner of a little piece of land, there to erect a humble home, and to dwell in peace and security at his own free will and pleasure."

-A. Warren Kelsey, Cotton manufacturers' representative

"Access to education for themselves and their children was, for Blacks, central to the meaning of freedom.... [Blacks] raised money to purchase land, build schoolhouses, and pay teachers' salaries." —*Foner (2014)*

Related literature

• Work on financial inclusion and access to banking

(e.g.; Agarwal et al., 2017 WP; Ashraf et al., 2006; De Mel et al., 1999; Karlan and Morduch, 2010; Bruhn and Love, 2013; Dupas and Robinson, 2013ab; Brown, Cookson and Heimer, forthcoming; Appel and Nickerson, 2016 WP; Schaner, 2018; Celerier and Matray, forthcoming)

Work in financial history on nineteenth century U.S. banks and financial system (e.g.; Anderson et al., forthcoming; Anderson and Bluedorn, 2017; Calomiris and Pritchett, 2016; Calomiris and Carlson, 2016, 2017; Frydman et al., 2015; Frydman and Hilt, 2015; Benmelech and Moskowitz, 2010; Koudijs and Salisbury, 2018 WP; Traweek and Wardlaw, 2018 WP)

- Work on racial gaps and intergenerational mobility
- Work on economic history of African Americans

Approach

Roadmap









Data

String- and distance-based matching across

- **1** Freedman's Savings Bank branch information
- **1870 U.S. Decennial Census** (from NAPP/IPUMS)
 - 2% sample of African Americans (1% for others)
 - Identifying information and basic demographics
 - Data on literacy, schooling, real estate wealth, personal estate wealth, employment status, and occupation
 - Geocoded at county-level

③ Freedman's Savings Bank account records

- 27 branches, ~107K account records, ~483K individuals (not necessarily unique)
- Imperfect enumeration, digitization, database extraction

Gives main sample (N = 27, 247):

- African Americans,
- In the South,
- Within 50 miles of a branch or planned branch,
- In a household with a "potentially matchable name"

Match rates (state-level)

Approach Data

Sample 1870 U.S. decennial census record

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Sample Freedman's Savings Bank account records

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Approach Data

Summary statistics

	Mean	Std. Dev.	p 50	<i>p</i> ₂₅	p 75
Has Account (%)	14.4				
Attended school (%)	3.9				
Literate (%)	15.8				
Works (%)	39.4				
Income (\$100 in 1950)	5.3	6.8	0	0	9
Real property (\$)	9.7	307.0	0	0	0
Business owner (stricter, %)	0.1				
Business owner (looser, %)	0.2				
In metro area (%)	12.2				
City population (1000)	19.6	54.5	0	0	0
Male (%)	48.7				
Age	22.3	17.7	18	8	33
Relationship to household head	ł				
Self (head)	19.3				
Spouse	13.9				
Child	41.7				
Roomer, boarder, lodger	13.5				
Other	11.6				
Number in household					
Married couples in HH	0.9	0.5	1	1	1
Own children age i5 in HH	0.3	0.6	0	0	0
Observations	27,247				

Financial Inclusion, Human Capital, and Wealth Accumulation

Approach

Estimation strategy

Estimation strategy

- OLS evidence on outcome difference for account-holders vs. non-holders
 - Challenge: Account holders may differ systematically (e.g., higher income, lower discount rates, ...)
 - Also, attenuation bias (enumeration, digitization, database extraction, matching)
- Evidence exploiting branch proximity (cf. e.g.; Huber, 2018; Giorcelli, 2018)
 - Reduced-form proximity-outcome relationships
 - Instrumental variables estimates in matched Census–Freedman's Bank sample (LATE)
- Placebo tests and robustness checks
 - Whites
 - Proximity to planned (vs. built) branches
 - Alternative estimation specifications, instruments, and sample definitions

$$y_i = \alpha_t + \alpha_c + \beta^{OLS} A_i + \gamma_1 \mathbf{X}_i + \varepsilon_i.$$

$$\begin{aligned} \boldsymbol{A}_{i} &= \tilde{\alpha}_{t} + \tilde{\alpha}_{c} + \zeta_{1}\boldsymbol{B}_{i} + \zeta_{2}\boldsymbol{M}_{i}^{B} + \gamma_{2}\boldsymbol{X}_{i} + \epsilon_{i}, \\ \boldsymbol{y}_{i} &= \alpha_{t} + \alpha_{c} + \beta^{IV}\hat{A}_{i} + \gamma_{3}\boldsymbol{X}_{i} + \eta_{i}. \end{aligned}$$

$$\begin{aligned} y_i &= \alpha_t + \alpha_c + \eta_1 B_i + \eta_2 M_i^B + \gamma_4 \mathbf{X}_i + \varepsilon_i, \\ y_i &= \alpha_t + \alpha_c + \eta_1 P_i + \eta_2 M_i^P + \gamma_4 \mathbf{X}_i + \varepsilon_i. \end{aligned}$$

Stein and Yannelis

Financial Inclusion, Human Capital, and Wealth Accumulation

Account holders have better outcomes (OLS estimates)

$$y_i = \alpha_t + \alpha_c + \beta^{OLS} A_i + \gamma_1 \mathbf{X}_i + \varepsilon_i.$$

	(1)	(2)	(3)	(4)	(5)
	Attended School	Literate	Works	Income	Real Property
Has Account	0.0166^{***}	0.0504***	0.0255**	0.0195***	0.000769
	(0.00316)	(0.0106)	(0.0105)	(0.00513)	(0.00140)
Observations	27,247	27,247	27,247	27,247	27,247

Measurement error

Proximity to a branch increases likelihood of holding an account



Will utilize both

- Continuous distance from nearest branch (*B_i*)
- Indicator for presence of branch in county of residence (B_i ≡ 1[M_i^B = 0])

Account status by branch distance (First-stage estimates)

$$A_i = \alpha_t + \alpha_c + \zeta_1 B_i + \zeta_2 M_i^B + \gamma_2 \mathbf{X}_i + \epsilon_i.$$

	(1) Has Account	(2) Has Account	(3) Has Account	(4) Has Account	(5) Has Account	(6) Has Account
Branch Distance	-0.000698*** (0.000132)		-0.000398*** (0.0000810)	-0.000700*** (0.000138)		-0.000405*** (0.0000797)
Branch in County		0.170*** (0.0190)	0.141^{***} (0.0198)		0.171*** (0.0186)	0.142*** (0.0194)
Fixed Effects	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Demographic Ctrls.				\checkmark	\checkmark	\checkmark
Observations	27,247	27,247	27,247	27,247	27,247	27,247

Control variables

Results

Roadmap









Access to finance improved human capital outcomes (IV estimates)

$$y_i = \alpha_t + \alpha_c + \beta^{IV} \hat{A}_i + \gamma_3 \mathbf{X}_i + \eta_i.$$

	(1)	(2)	(3)	(4)
	Attended School	Attended School	Literate	Literate
Has Account	0.143*** (0.0156)	0.139*** (0.0152)	0.194*** (0.0662)	0.134** (0.0628)
Fixed Effects	\checkmark	\checkmark	\checkmark	\checkmark
Demographic Ctrls.		\checkmark		\checkmark
Observations	27,247	27,247	27,247	27,247

Opening a bank account significantly increases education and literacy (LATE)

Distance reduced-form (figures)

Results IV results

Access to finance improved labor market and wealth accumulation (IV)

$$y_i = \alpha_t + \alpha_c + \beta^{IV} \hat{A}_i + \gamma_3 \mathbf{X}_i + \eta_i.$$

	(1) Works	(2) Works	(3) Income	(4) Income	(5) Real Property	(6) Real Property
Has Account	0.0586*** (0.0198)	0.0285* (0.0160)	0.0400*** (0.0100)	0.0385*** (0.00917)	0.0245^{**} (0.0100)	0.0258*** (0.00968)
Fixed Effects	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Demographic Ctrls.		\checkmark		\checkmark		\checkmark
Observations	27,247	27,247	27,247	27,247	27,247	27,247

Opening a bank account increases employment, income, and real estate holdings (LATE)

Distance reduced-form (figures)

Stein and Yannelis

Financial Inclusion, Human Capital, and Wealth Accumulation

Access to finance led to higher business formation

$$y_i = \alpha_t + \alpha_c + \beta^{IV} \hat{A}_i + \gamma_3 \mathbf{X}_i + \eta_i.$$

	(1)	(2)	(3)	(4)	(5)	(6)
		OLS			IV	
	Stricter	Stricter	Looser	Stricter	Stricter	Looser
Has Account	0.00183*** (0.000651)	0.000873* (0.000460)	0.00143** (0.000643)	0.00514*** (0.000811)	0.00515*** (0.000863)	0.00634*** (0.00109)
Fixed Effects	\checkmark	` √ ´	\checkmark	\checkmark	` √ ´	Ì √
Demographic Ctrls.		\checkmark	\checkmark		\checkmark	\checkmark
Observations	27,247	27,247	27,247	27,247	27,247	27,247

Opening a bank account increases occupations associated with business ownership

Mechanisms

- Lumpy Investment: Access to formal savings accounts might encourage investment in businesses and human capital (Dupas and Robinson, 2013a)
- **Timing of Cashflows**: Income may vary over time, and access to a deposit account may allow savers to make consistent recurring payments
 - Especially true in an agricultural society such as the nineteenth century American South, where streams of income may coincide with harvests, and payment sizes may depend on agricultural output that varies with weather patterns and other factors
- Working Capital: May be difficult to liquidate working capital when shocks occur, and individuals may need to save in the form of liquid assets outside of their business to insure against adverse events
- **Commitment**: Increasing the costs of accessing funds by requiring individuals to withdraw deposits may reduce impulsive behavior and act as a commitment device (O'Donoghue and Rabin, 1999)

Placebo tests and alternative/robustness specifications

• If distance from branch captures differences in e.g., local amenities, Whites might have differential outcomes across distance from branch

$$y_i = \alpha_t + \alpha_c + \eta_1 B_i + \eta_2 M_i^B + \gamma_4 \mathbf{X}_i + \varepsilon_i$$

- If distance from *potential* branch captures differences in e.g., local amenities, ...
 - May be differential outcomes across distance from planned branch

$$y_i = \alpha_t + \alpha_c + \eta_1 P_i + \eta_2 M_i^P + \gamma_4 \mathbf{X}_i + \varepsilon_i$$

• May be different differential outcomes across distance from planned vs. built branch

$$y_i = \alpha_t + \alpha_c + \zeta_1 BP_i + \zeta_2 NB_i + \zeta_3 M_i^{BP} + \zeta_4 NB_i \times M_i^{BP} + \gamma_4 \mathbf{X}_i + \nu_i$$

Alternative weightings, controls, instruments, and sample definitions

Results Placebo tests

Placebos: Whites

$$y_i = \alpha_t + \alpha_c + \eta_1 B_i + \eta_2 M_i^B + \gamma_4 \mathbf{X}_i + \varepsilon_i.$$

	(1) Attended School	(2) Literate	(3) Works	(4) Income	(5) Real Property
Branch Distance	0.0000218 (0.0000446)	0.0000789 (0.0000630)	0.00000186 (0.0000120)	0.00000245 (0.00000649)	0.000170*** (0.0000538)
Branch in County	0.00331 (0.00747)	0.00645 (0.0110)	0.00139 (0.00164)	-0.000318 (0.00119)	0.0298*** (0.00899)
Controls	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Observations	26,389	26,389	26,389	26,389	26,389

Human capital outcome averages by distance



Labor market and wealth accumulation outcome averages by distance



Placebos: Proximity to **planned** branches

$$y_i = \alpha_t + \alpha_c + \eta_1 P_i + \eta_2 M_i^P + \gamma_4 \mathbf{X}_i + \varepsilon_i.$$

	(1)	(2)	(3)	(4)	(5)
	Attended School	Literate	Works	Income	Real Property
Planned	0.000115**	0.0000282	-0.0000239	-0.00000895	0.0000191 (0.0000222)
Branch Distance	(0.0000447)	(0.000108)	(0.0000261)	(0.0000141)	
Planned	0.0228***	-0.0185	0.00487	-0.00179	0.000675
Branch in County	(0.00576)	(0.0159)	(0.00396)	(0.00215)	(0.00182)
Controls	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Observations	27,247	27,247	27,247	27,247	27,247

Placebos using proximity to branches OR planned branches

Other alternative/robustness specifications

Roadmap



2 Approach





Conclusion

Conclusions

- Financial inclusion—even access to savings products—can encourage investments including in human capital
 - Investment may be lumpy
 - Income may vary over time
 - Challenging to liquidate working capital, so demand for other savings
 - Cash savings may be dangerous (incl. for behavioral reasons)
- Access to the Freedman Saving's Bank significantly increased schooling, literacy, employment, income, and real estate wealth
- Variation in access to formal finance (and experience of financial losses) may have long-term effects [work in progress]



Thank You!

Planned Freedman's Savings Bank branches (including 1870)

Location		Population	Status		Location		Population	Status
Little Rock	AR	<15,000	Opened	1870	Albany	GA	<15,000	Planned
Atlanta	GA	21,789	Opened	1870	New Madrid †	MO	<15,000	Planned
Lexington	KΥ	<15,000	Opened	1870	Jackson	MS	<15,000	Planned
Louisville	KΥ	100,753	Opened	1870	Charlotte	NC	< 15,000	Planned
Saint Louis [†]	MO	310,864	Opened	1870	Salisbury	NC	<15,000	Planned
Columbus	MS	31,274	Opened	1870	Cincinnati [†]	ОН	216,239	Planned
Philadelphia *†	PA	674,022	Opened	1870	$Harrisburg^\dagger$	PA	23,104	Planned
Nashville	ΤN	25,865	Opened	1870	Galveston	ТΧ	<15,000	Planned
Selma	AL	<15,000	Planned		Sherman	ТΧ	<15,000	Planned
Andersonville	GA	<15,000	Planned		Lexington	VA	<15,000	Planned
Columbus	GA	<15,000	Planned		Charlottesville	VA	<15,000	Planned

Excluded from main analysis sample: *Missing Freedman's Savings Bank account records †Outside South.

In Branch list

Match-implied account holding (state-level)



Backup slides

Control variables

- Metropolitan area
- City population
- Sex
- Age
- Number of own children under age five in household
- Opening date of the nearest branch (FE)
- Relationship with household head (FE)
- Number of married couples in the household (FE)
- Occupation (FE)

Regressions weighted using IPUMS sample weights

Development literature on access to formal savings mechanisms

RCTs find large short-run effects from *savings accounts*:

- Schaner (2018) finds long run effects on income and assets from savings accounts using a randomized control trial. Study participants who received the highest interest rate on their individual account were 28 percent more likely to be entrepreneurs and had substantially more business profit and capital at end of the experiment.
- Dupas and Robinson (2013a) find that a simple safe place to save is enough to increase preventative health investment by at least 66 percent.
- Dupas and Robinson (2013b) find that after six months, daily private expenditures were about 37 percent higher for market women in the treatment group.

Distance reduced form graphs

Distance reduced forms: Human capital outcomes



School Attendance

Literate

IV estimates

Stein and Yannelis

Financial Inclusion, Human Capital, and Wealth Accumulation

Distance reduced form graphs

Distance reduced forms: Labor market and wealth accumulation outcomes



Real estate wealth

Works

Income

Placebos: Proximity to branches **or** planned branches (1/2)

$$y_i = \alpha_t + \alpha_c + \zeta_1 BP_i + \zeta_2 NB_i + \zeta_3 M_i^{BP} + \zeta_4 NB_i \times M_i^{BP} + \gamma_4 \mathbf{X}_i + \nu_i.$$

Human Capital Outcomes

	(1)	(2)	(3)	(4)
	Attended School	Attended School	Literate	Literate
Branch or Planned in County	0.0422***	0.0224***	0.00720	-0.0182
	(0.00883)	(0.00737)	(0.0637)	(0.0466)
Near Branch	0.00644***	0.0107***	0.0851***	0.0413**
	(0.00145)	(0.00241)	(0.00871)	(0.0166)
Branch or Planned Distance	<mark>0.000277</mark>	-0.0000219	<mark>0.000148</mark>	<mark>0.000245</mark>
	(0.000232)	(0.000208)	(0.00157)	(0.00115)
Near Branch $\times B$ ranch or Planned Distance	-0.000295**	-0.0000687	-0.00305***	-0.00166***
	(0.000127)	(0.000105)	(0.000527)	(0.000522)
Controls		\checkmark		\checkmark
Observations	27,247	27,247	27,247	27,247

Placebos using proximity to planned branches

Placebos: Proximity to branches **or** planned branches (2/2)

$$y_i = \alpha_t + \alpha_c + \zeta_1 BP_i + \zeta_2 NB_i + \zeta_3 M_i^{BP} + \zeta_4 NB_i \times M_i^{BP} + \gamma_4 \mathbf{X}_i + \nu_i.$$

Labor Market and Wealth Accumulation Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Works	Works	Income	Income	Real Property	Real Property
Branch or Planned in County	0.00109	0.0127	0.0109	0.00102	-0.00296	-0.00178
	(0.0368)	(0.0116)	(0.0300)	(0.00966)	(0.00561)	(0.00476)
Near Branch	0.0412***	-0.000491	0.0478***	0.0101***	0.00407***	0.00568***
	(0.00560)	(0.00491)	(0.00465)	(0.00232)	(0.000751)	(0.00153)
Branch or Planned Distance	- <mark>0.000721</mark>	<mark>0.000118</mark>	- <mark>0.000364</mark>	<mark>0.0000136</mark>	- <mark>0.000106</mark>	- <mark>0.0000248</mark>
	(0.000987)	(0.000297)	(0.000756)	(0.000247)	(0.000140)	(0.000123)
Near Branch $\times Branch$ or Planned Distance	-0.000698	-0.0000396	-0.000546*	-0.000152*	-0.000183***	-0.000170***
	(0.000470)	(0.000152)	(0.000307)	(0.0000842)	(0.0000529)	(0.0000578)
Controls		\checkmark		\checkmark		\checkmark
Observations	27,247	27,247	27,247	27,247	27,247	27,247

Placebos using proximity to planned branches

Alternative/robustness IV specifications (1/4)

	(1)	(2)	(3)	(4)	(5)
	Attended School	Literate	Works	Income	Real Property
Baseline IV	0.139***	0.134**	0.0285*	0.0385***	0.0258***
n = 27,247	(0.0152)	(0.0628)	(0.0160)	(0.00917)	(0.00968)
Unweighted $n = 27,247$	0.142***	0.125**	0.0281*	0.0361***	0.0244**
	(0.0163)	(0.0622)	(0.0166)	(0.00900)	(0.00956)
Alternative Excluded Instruments Branch Distance only n = 27,247	0.119*** (0.0314)	0.0856 (0.119)	-0.0255 (0.0278)	0.0443*** (0.0162)	0.00695 (0.0232)
Branch in County only $n = 27,247$	0.147***	0.154**	0.0504**	0.0362***	0.0335***
	(0.0177)	(0.0686)	(0.0232)	(0.0123)	(0.00949)
Alternative Maximum Distance from Branch/Plau 40 Miles n = 20,553	nned Branch 0.158*** (0.0201)	0.155** (0.0767)	0.0262 (0.0228)	0.0481*** (0.0107)	0.0401*** (0.0129)
60 Miles	0.141***	0.123**	0.0185	0.0414 ^{***}	0.0294**
n = 32,821	(0.0188)	(0.0584)	(0.0142)	(0.00788)	(0.0125)
Alternate Geographic Samples Exclude 1870 Planned Branches n = 21,030	0.220*** (0.0425)	0.245** (0.114)	0.0828*** (0.0311)	0.0417* (0.0214)	0.0413** (0.0171)
Exclude Border States $n = 23,913$	0.113***	0.180***	0.000382	0.0522***	0.0297***
	(0.0128)	(0.0659)	(0.0164)	(0.00834)	(0.00739)
Exclude branches w/o Freedmen's Bureau FO $n = 24,456$	0.142***	0.206***	0.0261	0.0495***	0.0209**
	(0.0152)	(0.0625)	(0.0168)	(0.00933)	(0.00988)

Alternative test descriptions

Alternative/robustness (2/4): Minimizing effects of veterans

	(1) Attended School	(2) Literate	(3) Works	(4) Income	(5) Real Property
Has Account	0.146*** (0.0234)	0.198** (0.0777)	0.0197 (0.0218)	0.0247*** (0.00957)	0.0288** (0.0132)
Fixed Effects	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Demographic Ctrls.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Observations	16081	16081	16081	16081	16081

Exclude HH with age 23–35 male

	(1) Attended School	(2) Literate	(3) Works	(4) Income	(5) Real Property
Has Account	0.109*** (0.0142)	0.0822 (0.0703)	0.0285* (0.0164)	0.0157** (0.00730)	0.0259*** (0.00892)
Fixed Effects	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Demographic Ctrls.	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Observations	19098	19098	19098	19098	19098

Alternative test descriptions

Alternative/robustness (3/4): Controlling for distance to nearest city

	(1)	(2)	(3)	(4)	(5)
	Attended Schoo	Literate	Works	Income	Real Proper
las Account	0.166*** (0.0175)	0.213*** (0.0677)	0.0337* (0.0203)	0.0503*** (0.00989)	0.0273** (0.0107)
istance to closest metro area central/principal city	-0.0000430*** (0.0000138)	-0.000123** (0.0000491)	-0.00000792 (0.0000127)	-0.0000184* (0.00000891	-0.0000022
ixed Effects	√	~	~	√	√
emographic Ctrls.	~	~	~	√	√
bservations	27247	27247	27247	27247	27247
	(1) Attended School	(2) Literate	(3) Works	(4) Income	(5) Real Property
Has Account	0.144*** (0.0208)	0.135 (0.0854)	0.0507** (0.0219)	0.0529*** (0.0139)	0.0350*** (0.0121)
Distance to closest city with population ${\geq}25\text{K}$	0.0000110 (0.0000200)	-0.00000345 (0.0000813)	0.0000469** (0.0000207)	0.0000355** (0.0000139)	0.0000200** (0.00000908)
Fixed Effects	✓	✓	√	√	√
Demographic Ctrls.	✓	\checkmark	✓	✓	√
Observations	27247	27247	27247	27247	27247
	(1) Attended School	(2) Literate	(3) Works	(4) Income	(5) Real Property
Has Account	0.145*** (0.0233)	0.179* (0.0945)	0.0544** (0.0261)	0.0507*** (0.0162)	0.0331*** (0.0126)
Distance to closest city with population ${\geq}10 \text{K}$	0.0000150 (0.0000455)	0.000129 (0.000172)	0.0000665* (0.0000359)	0.0000408 (0.0000261)	0.0000176 (0.0000138)
Fixed Effects	1	✓	~	~	√
Demographic Ctrls.	~	✓	~	√	√
Observations	27247	27247	27247	27247	27247

Alternative test descriptions

Alternative/robustness (4/4): Controlling for branch distances

-			(1) Attended Sc	hool Att	(2) ended School	(3) Literate	(4) Literate	
-	Has Accour	nt	0.0577** (0.0269)		0.0446* (0.0244)	0.102 (0.0664)	0.0518 (0.0704)	
	Fixed Effect	ts	\checkmark		\checkmark	\checkmark	\checkmark	
	Demographic Ctrls.				\checkmark	\checkmark		
-	Observations		76,229 76,229		76,229	76,229	76,229	
		(1) Works	(2) Works	(3) Income	(4) Income	(5) Real Prop	erty Real	(6) Property
Has Acco	unt	0.0729*** (0.0231)	0.0304* (0.0184)	0.0367*** (0.0115)	0.0470*** (0.0138)	0.0215* (0.0106	·* 0 6) (0	.0148 .0113)
Fixed Effe	ects	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
Demogra	phic Ctrls.		\checkmark		\checkmark			\checkmark
Observati	ons	76,229	76,229	76,229	76,229	76,229) 7	6,229

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Illiterate subsample (IV)

	(1) Works	(2) Works	(3) Income	(4) Income	(5) Real Property	(6) Real Property
Has Account	0.0642*** (0.0225)	0.0439** (0.0188)	0.0448*** (0.00997)	0.0442*** (0.00933)	0.0211** (0.00877)	0.0227*** (0.00878)
Fixed Effects	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Demographic Ctrls.		\checkmark		\checkmark		\checkmark
Observations	22,939	22,939	22,939	22,939	22,939	22,939

Measurement error

- Can measurement error explain the downward OLS bias?
- Measurement error in a dummy variable is a special case of non-classical measurement error.

plim
$$\hat{eta}=etarac{\pi(q_1-\hat{\pi})}{\hat{\pi}(1-\hat{\pi})}$$

where β is the true value, q_1 is the probability of correctly classifying true account holders, π is the true fraction of accountholders, and $\hat{\pi}$ is our estimate of account-holding.

- If we assume $q_1 = .5$, $\pi = .12$, and $\hat{\pi} = .15$, the OLS estimates should be $\sim 1/3$ the size of the true IV estimates.
- Roughly in line with our gaps in estimates.

OLS estimates

OLS estimates with 1880 Census match interaction

	(1)	(2)	(3)	(4)	(5)
	Attended School	Literate	Works	Income	Real Property
Has Account	0.0231***	0.0520***	0.0264**	0.0205***	0.00244
	(0.00390)	(0.0101)	(0.0112)	(0.00671)	(0.00170)
No 1880 match	0.00507*	0.00693	0.00171	0.00948**	0.0000764
	(0.00293)	(0.00471)	(0.00629)	(0.00430)	(0.00116)
Has Account $ imes$ No 1880 match	-0.0150***	-0.000930	-0.00150	0.00212	-0.00446*
	(0.00376)	(0.0141)	(0.0112)	(0.00784)	(0.00250)
Observations	27,247	27,247	27,247	27,247	27,247

OLS estimates