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The impact of digital finance channels on saving and investment decisions in South Africa

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*The views expressed here are those of the authors and not necessarily those of the Bank for International Settlements (BIS) or South African Reserve Bank (SARB).



Context: lack of retail investment participation and savings is a problem

Households:

- Fewer opportunities to build wealth
 - Non-participation in risky markets leads to lower retirement wealth and lifetime consumption (Gomes and Michaelides, 2005)
- Limited ability to buffer shocks
 - Lack of access to formal savings → lower income growth and higher income volatility (World Bank, 2014)
- Ongoing concentration of wealth and inequality (IMF, 2021)

Financial markets:

- Lower market depth (BIS, 2019)
- Foreign capital dependence
 - Higher volatility in bond yields and larger capital outflows during shocks (BIS, 2014)
- Overreliance on public finance for pension
 - Higher long-term fiscal burden (OECD, 2020)
- Financial stability
 - Ability to absorb shocks (Federal Reserve, 2024)

Why could digital finance channels help?

- *Participation costs are too high*

- Improved and lower cost access:
 - Lower fees → higher participation (Omri, Kogan, and So, 2020)
 - Reduced travel costs in rural areas (World Bank, 2015)
 - Ability to safely store money digitally → higher savings (Dupas and Robinson, 2012)

- *Investing is too complicated*

- Behavioural nudges and simplification:
 - Auto-saving and goal-based savings → increase savings rates
 - (Gargano and Rossi, 2024)
 - Real-time balance → enhance trust
 - (Bachas et al., 2019)
 - Robo-advising → mitigate behavioral biases
 - (D'Acunto, Prabhala, and Rossi, 2019; Chak et al., 2022)

Contribution

- Evidence on population level
 - Previous studies focus on existing app users or small focus groups.
D'Acunto, Prabhala, and Rossi, 2019; Chak et al., 2022, Omri, Kogan, and So, 2020
- Include a wider range of financial decisions
 - Previous studies analyze a single financial aspect (e.g., credit access, saving rates, or app adoption).
Agarwal et al., 2020; Berg et al., 2020, Gargano and Rossi, 2024
 - Include a wider range of financial decisions, including debt's role in savings.
 - Examine savings allocation and quality(e.g., formal savings, long-term goals, diversification).

Research question: How do digital finance channels affect saving and investing behaviour in South Africa?

South Africa as a highly relevant jurisdiction to study digital finance

Developed financial sector

- Financial sector that is among the most developed in Africa: 23.5% to GDP in 2021, and the banking sector had total assets worth R6.8 trillion (USD 374.8 billion)
- Well-established capital market: Johannesburg Stock Exchange (JSE) ranking among the top 20 largest globally
- 97% adult South Africans accessed some form of formal financial product or service in 2021

High mobile phone penetration

- Mobile phone ownership : 96.1% of households owned at least one mobile phone in 2023
- Internet access: 78.6% of households had internet access, but data costs remain high
- Fintech regulatory sandbox launched in 2020

Important structural challenges

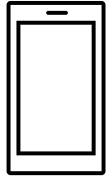
- High unemployment (32.1%), highest Gini coefficient globally (World Bank), low savings rate (CEIC), the five largest banks hold 90% of total assets (National Treasury, 2023)

Finmark Trust data

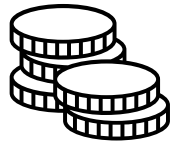
- Independent non-profit focused on financial inclusion in South Africa
 - Widely used by South African Reserve Bank (SARB), Financial Sector Conduct Authority (FSCA) and other regulators
- Annual waves from 2019, 2021–23
 - Extension: Includes data from 2013–18
 - Representative of the South African population
 - ~5,500 individuals annually, 21,839 total observations
- Extensive demographic and socio-economic information



Finmark Trust data

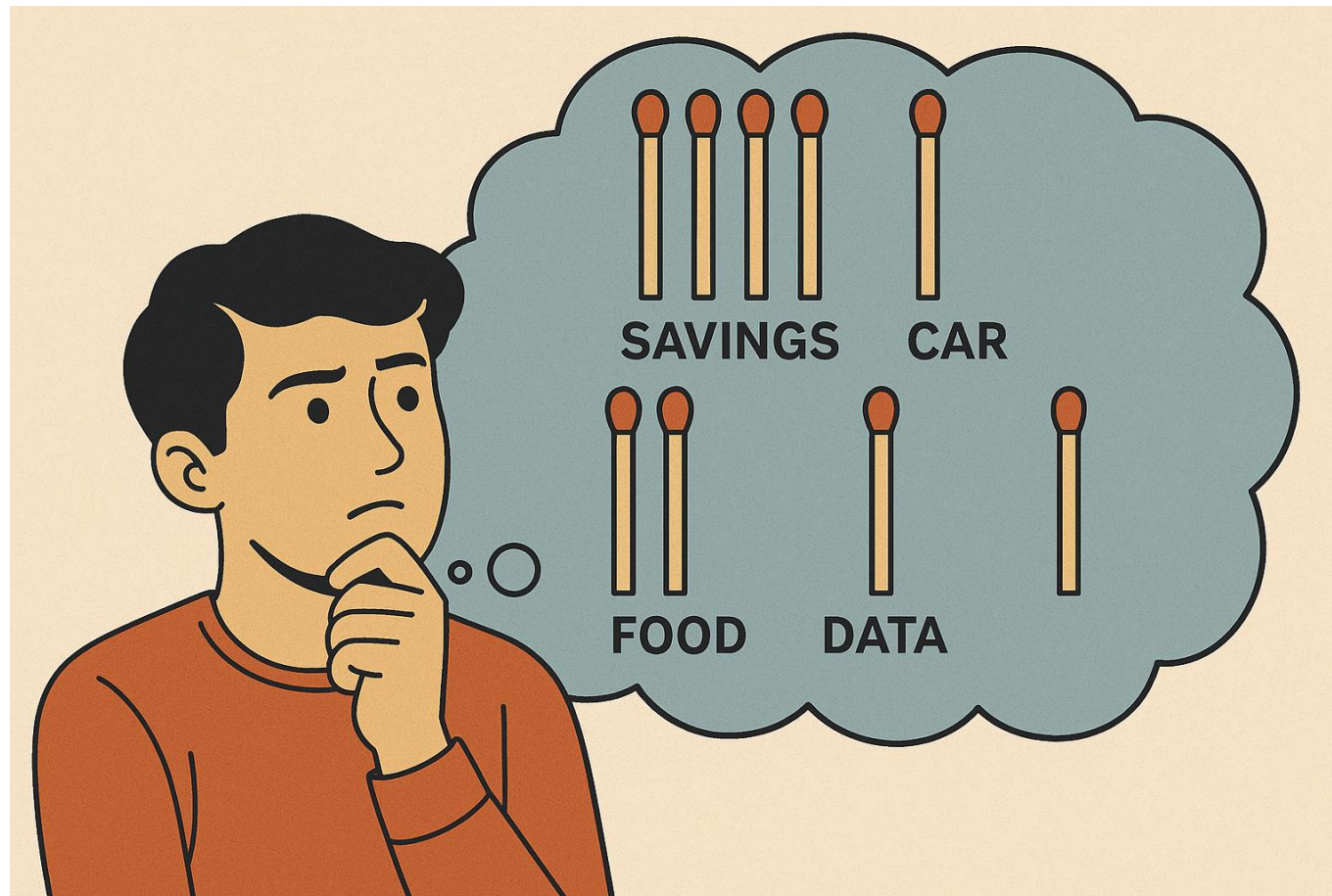


- Digital finance variables:
 - Digital Finance behavior
 - Mobile banking, send/receive via mobile
 - Bank Choice
 - Fintech-only users, fintech and traditional users



- Saving outcomes:
 - Saves, allocation to savings, number of saving methods, proportion using formal methods, portion receiving advice, proportion saving for long-term goals, rainy day fund

Spending Allocation

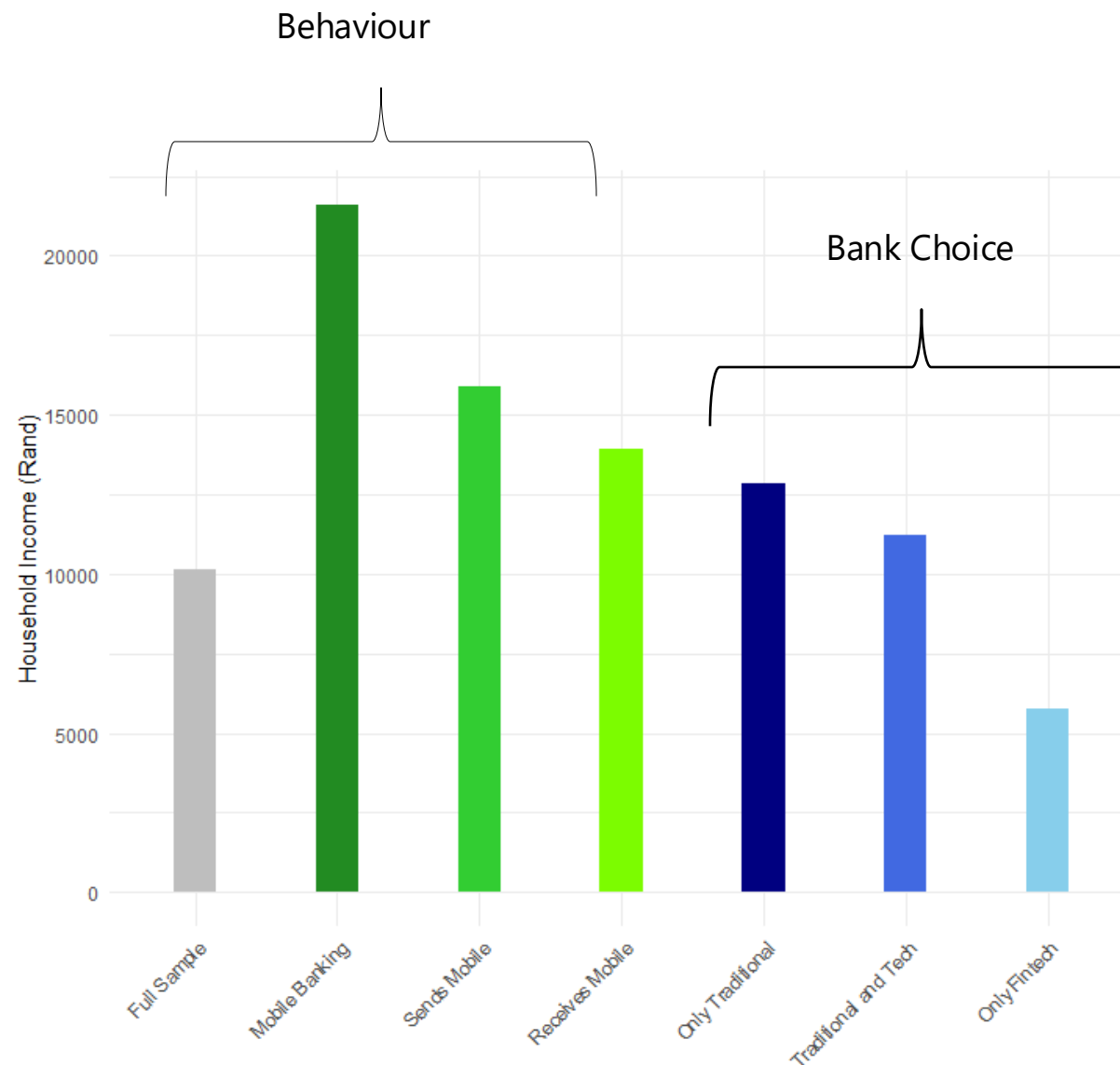


Descriptives

Variable	Obs	Mean	Std. dev.
Age (Years)	21,836	39.17	14.59
Male	21,836	0.43	0.50
Education (1-6)	21,736	2.85	1.34
Household Income adj. (Rand)	20,689	10,128	11,631
Urban	21,837	0.47	0.50
Black	21,841	0.47	0.50
White	21,841	0.13	0.33
Mobile Banking	18,654	0.14	0.35
Sending Mobile	7,054	0.40	0.49
Receiving Mobile	7,277	0.40	0.49
Only Traditional	21,839	0.65	0.48
Only Fintech	21,839	0.01	0.12
Both Traditional and Fintech	21,839	0.01	0.11
Saves	21,839	0.38	0.49
Number of saving methods	21,839	0.82	1.87
Proportion formal (%)	8,397	0.48	0.45
Proportion of long term goals (%)	11,035	0.31	0.43
Proportion of saving methods with advice (%)	4,771	0.25	0.47
Has rainy day fund	21,835	0.31	0.46

Who adopts?

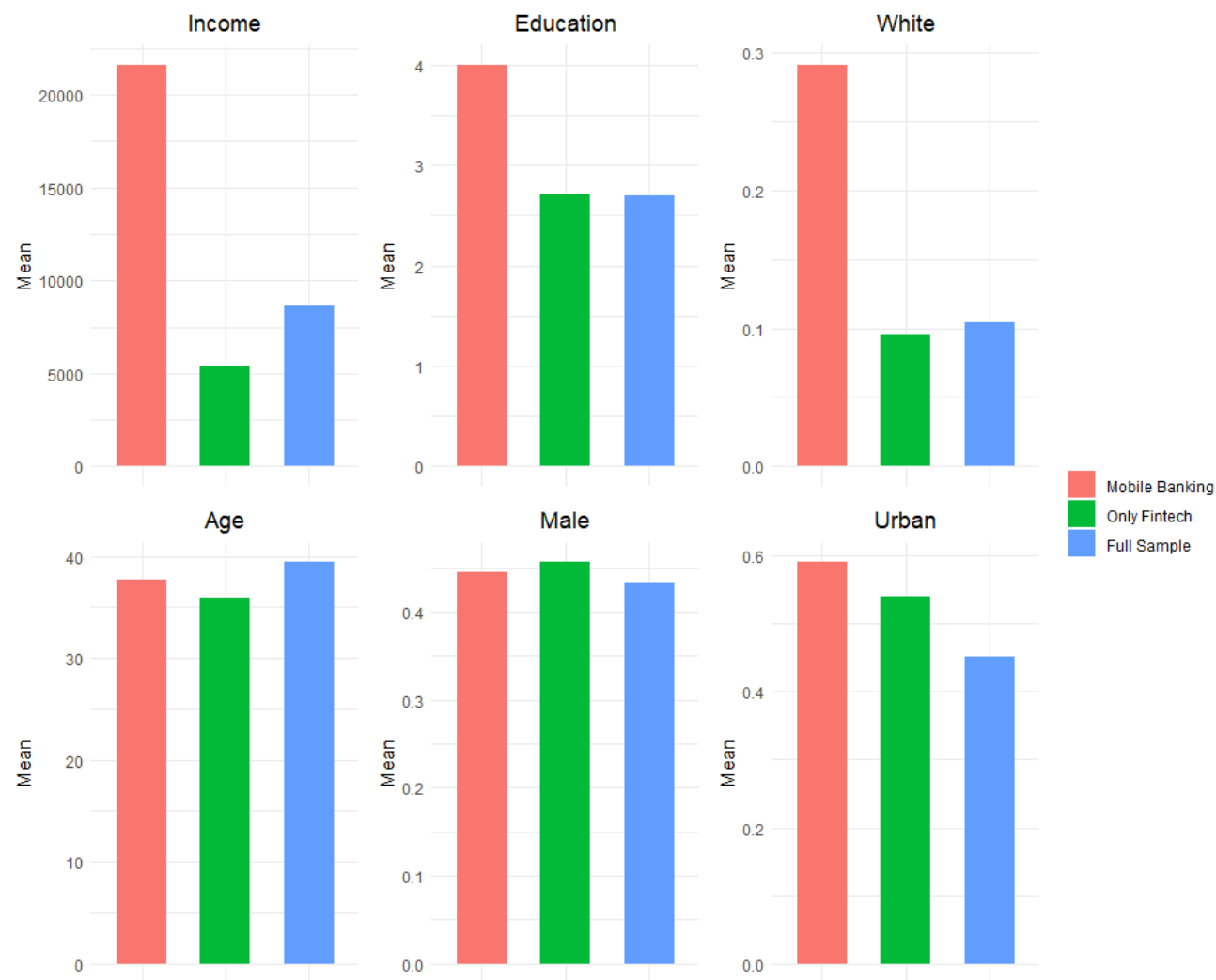
- Digital behaviours (eg mobile banking and payments) and fintech bank adoption (traditional and fintech) involve different groups.
- Digital behaviour users tend to have higher incomes.
- Users with only fintech have lower incomes.



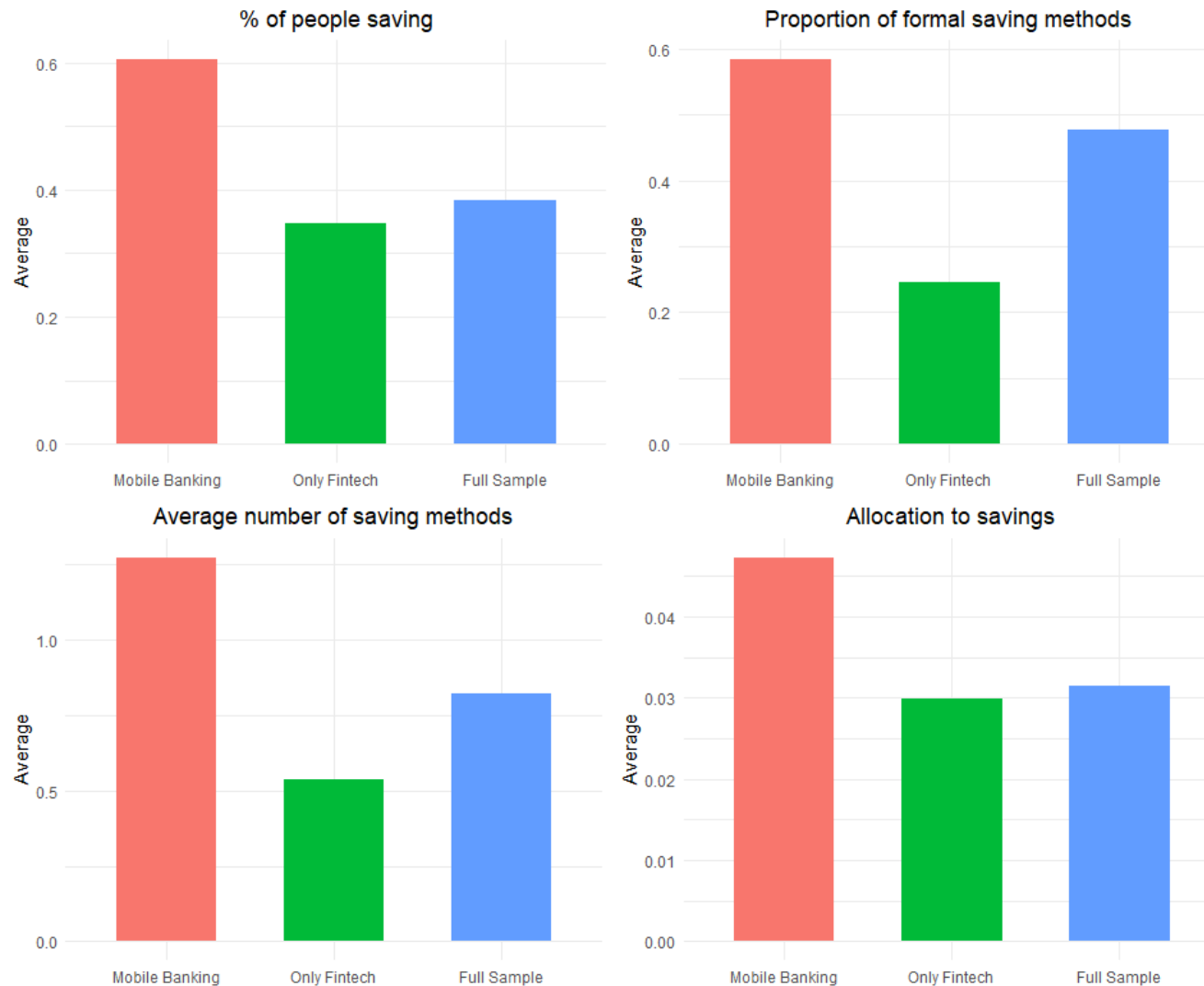
Mean income by digital adoption measure

Demographic Differences among adopters

- Digital channel adopters are higher-income, more educated, and predominantly white.
- Fintech-only users are lower-income, less educated, and predominantly black.
- Both groups are younger than average, more urban, and slightly more male.



Savings, digital behaviour and banking choice



Users of mobile banking and payments are more likely to save

- Probit regression with controls for income, age, gender, education, urbanization, race, and year and province fixed effects.
- Income and education strongly predict outcomes in all specifications.

Probit	Saves (Saving methods >0)					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.152*** (10.36)					
Sending mobile		0.086*** (4.99)				
Receiving mobile			0.081*** (5.00)			
Only fintech				-0.008 (-0.18)		
Only traditional					0.157*** (16.17)	
Both traditional and fintech						0.076* (1.81)
Pseudo R-Squared	0.058	0.051	0.059	0.051	0.060	0.051
N	11,623	3,873	3,941	11,623	11,623	11,623

These users are also more likely to save formally, and through more methods

OLS	Proportion formal					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.033** (2.51)					
Sending mobile		0.005 (0.28)				
Receiving mobile			0.036** (2.11)			
Only fintech				-0.077 (-1.51)		
Only traditional					0.023* (1.74)	
Both traditional and fintech						0.090** (2.13)
R-squared	0.381	0.379	0.375	0.381	0.381	0.381
N	5,131	2,159	1,922	5,131	5,131	5,131

OLS	Number of saving methods					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.344*** (5.62)					
Sending mobile		0.251*** (3.10)				
Receiving mobile			0.190** (2.49)			
Only fintech				-0.349* (-1.83)		
Only traditional					0.452*** (9.54)	
Both traditional and fintech						0.158 (0.83)
R-squared	0.046	0.061	0.053	0.044	0.051	0.043
N	11,623	3,873	3,941	11,623	11,623	11,623

... as well as to have a rainy-day fund and allocate more to savings

Probit							OLS						
Has rainy day fund							Allocation savings						
	(1)	(2)	(3)	(4)	(5)	(6)		(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.058*** (4.37)						Mobile banking	0.006*** (4.06)					
Sending mobile		0.029* (1.70)					Sending mobile		0.007*** (3.64)				
Receiving mobile			0.023 (1.51)				Receiving mobile			0.003* (1.74)			
Only fintech				0.032 (0.85)			Only fintech				0.003 (0.61)		
Only traditional					0.088** * (9.67)		Only traditional					0.010*** (10.40)	
Both traditional and fintech						0.049 (1.32)	Both traditional and fintech						-0.002 (-0.42)
Pseudo R-Squared	0.081	0.056	0.068	0.080	0.084	0.080	R-squared	0.066	0.066	0.061	0.063	0.069	0.063
N	11,623	3,873	3,941	11,623	11,623	11,623	N	11,622	4,497	4,732	14,641	14,641	14,641

Qualitative Evidence - Discussions with regulators and practitioners

- **Structural barriers:** low income, no savings capacity, high banking costs, high minimum deposits
- **Cash-based economy:** cash-only transport and merchants, high ATM fees, preference to hold cash
- **Informal economy:** strong trust in stokvels, culturally ingrained practices
- **Infrastructure:** expensive, unreliable internet and electricity

Future extensions

- **Identification:**

- Are observed effects due to digital channels or individuals with better financial habits being more likely to adopt?
- Can use the cost of internet as an instrument for adoption
 - Data costs from providers are generally uniform across the country, regardless of location → but number of providers/competition varies
- Access to fiber internet varies significantly across regions
 - Not always correlated with economic activity → townships next to wealthy areas

- **Model:**

- Identify the barriers to adoption, quantify their costs and evaluate their impact on the likelihood of adopting digital finance channels
- Which factors have the most significant influence on adoption ("what moves the needle")?

Future extensions



Conclusion

- Adoption by underserved groups is rising but doesn't appear to have led to substantial changes in savings or investment behaviour.
- Benefits are largest for already well-served individuals.
- Identification is needed to see if adoption drives behaviour or reflects existing financial habits.
- Insights will show if technology improves decisions or amplifies pre-existing tendencies.

Appendix



Case studies

Case studies:

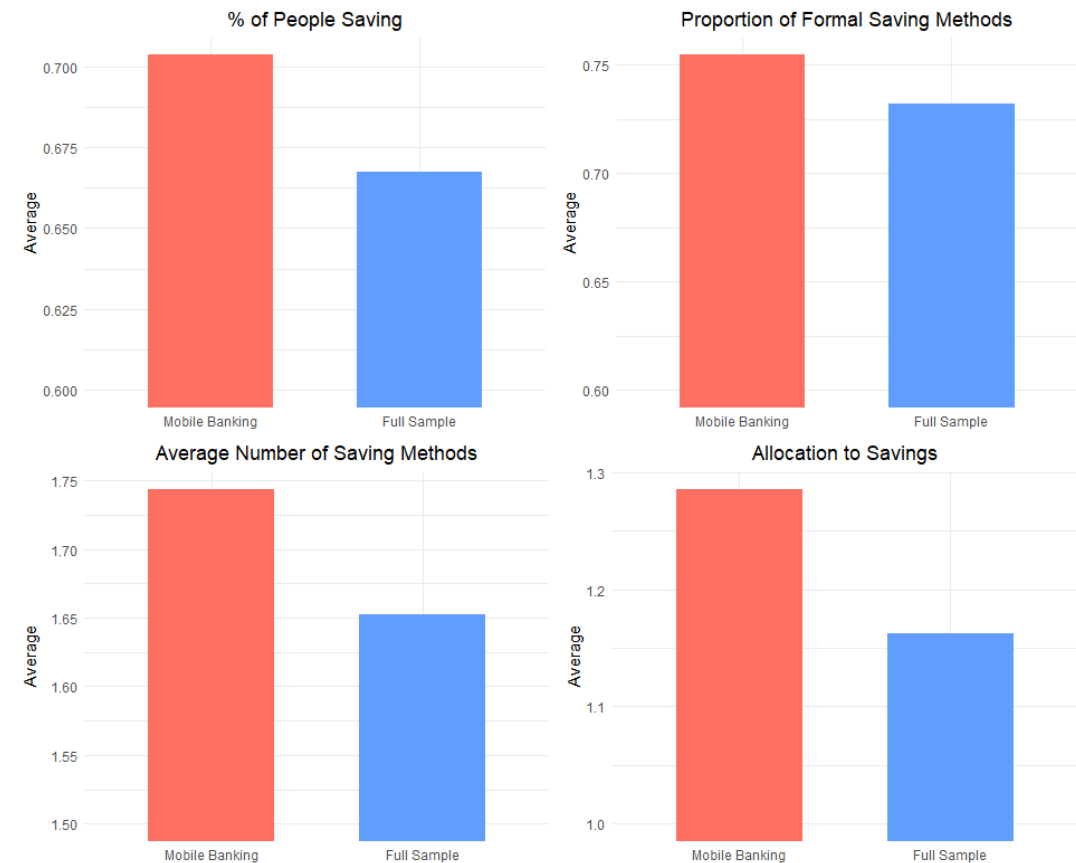
- **M-Pawa:**
Goal-setting features led to 3 times higher savings compared to a control group.
- **Juntos Finanzas & Bancolombia:**
Savings reminders and nudges increased account balances by 50%.
- **Caixinhas (Nubank):**
Achieved 1.7 million active customers post-release and tripled user base from December 2022 to December 2023.

Who adopts? Regression results

	<u>Mobile banking</u>	<u>Sending mobile</u>	<u>Receiving mobile</u>	<u>Only fintech</u>	<u>Only traditional</u>	<u>Both traditional and fintech</u>
	(1)	(2)	(3)	(4)	(5)	(6)
Log household income (adj)	0.333*** (17.20)	0.188*** (7.77)	0.145*** (6.89)	-0.101*** (-3.03)	0.286*** (19.07)	0.073** (2.09)
Age group 18 - 34	0.169 (1.10)	-0.005 (-0.02)	0.292* (1.65)	-0.120 (-0.52)	0.542*** (4.93)	0.379 (1.03)
Age group 35 - 54	0.001 (0.01)	-0.188 (-0.75)	0.165 (0.93)	-0.158 (-0.69)	0.521*** (4.77)	0.245 (0.67)
Age group > 55	-0.244 (-1.52)	-0.411 (-1.58)	-0.067 (-0.36)	-0.640** (-2.51)	-0.021 (-0.19)	-0.219 (-0.56)
Male	0.011 (0.31)	-0.008 (-0.19)	0.034 (0.77)	0.092 (1.29)	0.423*** (13.67)	0.210*** (2.96)
Education	0.163*** (11.71)	0.246*** (13.25)	0.194*** (10.43)	-0.086** (-2.56)	0.235*** (15.83)	0.029 (0.96)
Urban	0.125*** (2.78)	0.178*** (2.78)	0.206*** (3.48)	0.196* (1.96)	0.036 (0.92)	0.088 (0.84)
Coloured	0.061 (1.09)	0.102 (1.29)	0.129* (1.88)	-0.357** (-2.47)	-0.093** (-2.15)	0.058 (0.50)
Asian	0.113 (1.59)	0.200 (1.56)	0.106 (0.96)	0.181 (1.23)	-0.081 (-1.11)	-0.301 (-1.42)
White	0.332*** (7.48)	0.462*** (6.65)	0.335*** (5.23)	0.085 (0.83)	0.187*** (3.71)	-0.149 (-1.42)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.184	0.145	0.098	0.112	0.185	0.121
N	9,751	3,711	4,008	12,054	12,054	12,054

How much of that can be explained by income and education?

- Only the people in the highest income quintile and highest education category
- Small differences still persist



Additional results - Saving

OLS	Allocation debt repayment					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.002* (1.82)					
Sending mobile		0.004*** (2.58)				
Receiving mobile			0.000 (0.11)			
Only fintech				0.000 (0.02)		
Only traditional					0.004*** (5.05)	
Both traditional and fintech						-0.002 (-0.59)
R-squared	0.067	0.100	0.069	0.063	0.064	0.063
N	11622	4497	4732	14641	14641	14641

OLS	Proportion saving vs. debt repayment					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.020 (0.54)					
Sending mobile		0.054 (1.13)				
Receiving mobile			0.017 (0.32)			
Only fintech				-0.050 (-0.36)		
Only traditional					0.051 (1.41)	
Both traditional and fintech						-0.168 (-1.23)
R-squared	0.027	0.050	0.046	0.029	0.029	0.029
N	2684	1138	994	3043	3043	3043

Additional results - Saving

OLS	Proportion advice					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.020 (1.37)					
Sending mobile		0.005 (0.25)				
Receiving mobile			0.006 (0.30)			
Only fintech				0.102 (1.34)		
Only traditional					0.019 (1.07)	
Both traditional and fintech						0.152*** (3.16)
R-squared	0.336	0.334	0.314	0.336	0.335	0.337
N	3280	1489	1247	3280	3280	3280

OLS	Allocation other debt					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.152*** (4.11)					
Sending mobile		0.148*** (3.37)				
Receiving mobile			0.087** (2.10)			
Only fintech				-0.004 (-0.03)		
Only traditional					0.301*** (11.98)	
Both traditional and fintech						-0.047 (-0.43)
R-squared	0.059	0.066	0.062	0.049	0.057	0.049
N	11622	4497	4732	14641	14641	14641

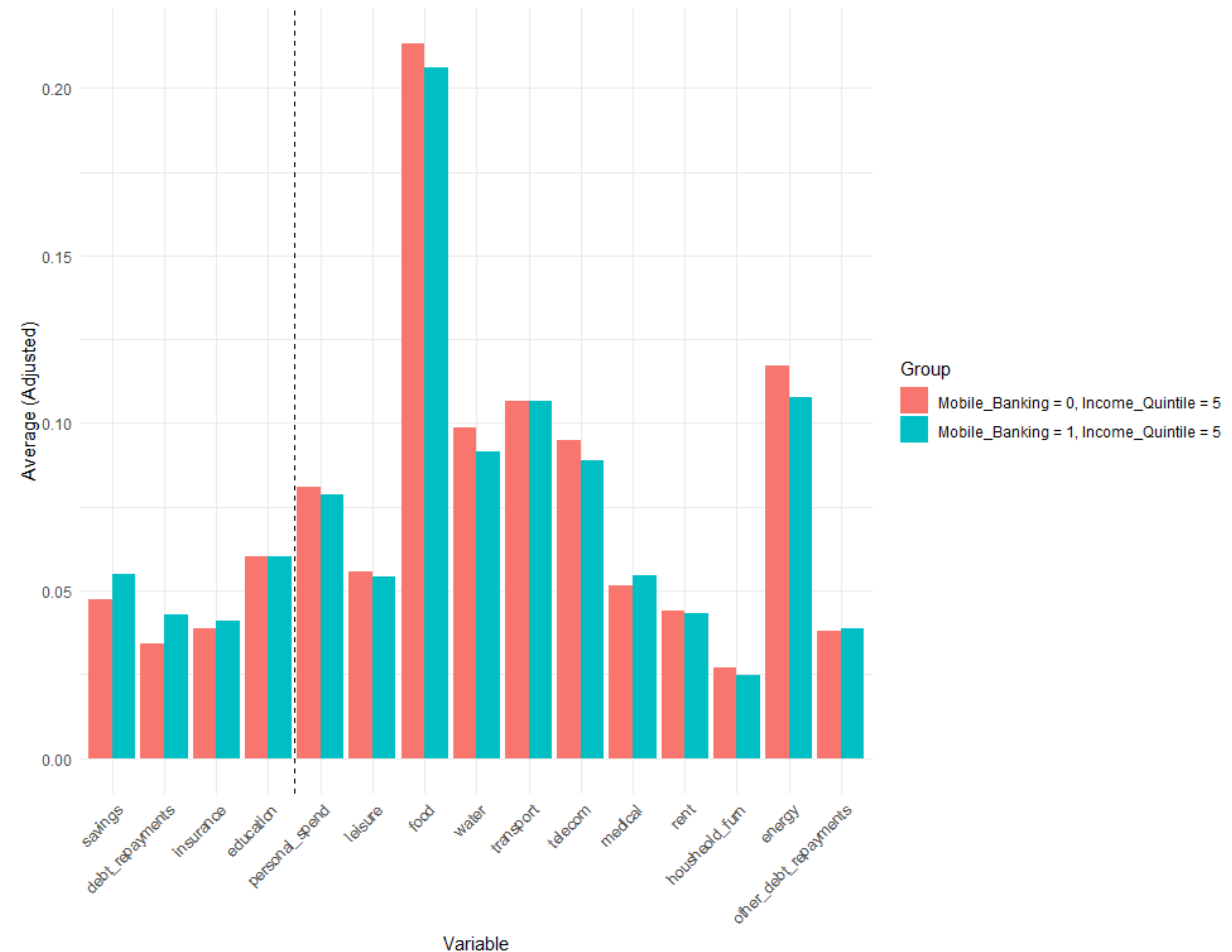
Additional results - Saving

Probit	Has budget					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.292*** (7.38)					
Sending mobile		0.010 (0.21)				
Receiving mobile			0.110** (2.40)			
Only fintech				0.087 (0.73)		
Only traditional					0.241*** (8.16)	
Both traditional and fintech						0.424*** (3.17)
R-squared	0.113	0.084	0.112	0.109	0.114	0.110
N	11623	3873	3941	11623	11623	11623

Probit	Currently saving					
	(1)	(2)	(3)	(4)	(5)	(6)
Mobile banking	0.215*** (5.43)					
Sending mobile		0.089* (1.91)				
Receiving mobile			0.091** (2.16)			
Only fintech				0.271** (2.37)		
Only traditional					0.413*** (16.90)	
Both traditional and fintech						0.066 (0.58)
Pseudo R-squared	0.043	0.047	0.060	0.054	0.068	0.054
N	11623	4498	4732	14642	14642	14642

Spending allocation – highest-income quintile

- Mobile banking group allocates more to financial categories (eg savings and debt)



Spending Allocation – Lowest Income Quintile

- Large disparity on food
- Gap on telecom is larger than gap on savings

