

Financial Inclusion in Papua New Guinea

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Research Question

- What individual level characteristics determine financial inclusion in Papua New Guinea?
 - ▶ Gender
 - ▶ Education
 - ▶ Distance to bank
 - ▶ English
- What is the influence of gender on financial inclusion in Papua New Guinea?
 - ▶ Spillover benefits from husbands to wives, but not from wives to husbands.
- Approach
 - ▶ Theoretical model
 - ▶ Empirical estimation of descriptive results
 - ▶ Novel dataset consisting of both the male and female heads of household, which allows us to examine intra-household bargaining.

Overview

- 1 Financial Inclusion: What is it?
- 2 Relevant literature
- 3 Theoretical model and conclusions
- 4 Data
- 5 Empirical specification
- 6 Results
- 7 Policy discussion
- 8 Conclusion

Financial Inclusion: What is it?

Supply-side definitions

- “Access to appropriate financial services so that people can manage their money effectively, securely and confidently on a day-to-day basis; plan for the future and cope with financial distress to protect against short term variations in income and expenditure and take advantage of longer term opportunities and deal effectively with financial distress.” (HM Treasury)
- “Individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way.” (World Bank)

Our paper focuses on observed financial inclusion (demand and supply) as measured by bank account ownership

Financial Inclusion: Why is it so important?

- Allows households to smooth consumption
- Investment in education and health
 - ▶ Drivers of long term economic growth and development
 - ▶ Higher growth and lower inequality
- Exploit business opportunities (SMEs)
 - ▶ Leads to job creation
- Financial services act as a bridge between economic opportunity and outcome
- **Policy relevance:** understand of the restrictions/bottlenecks that prevent access to financial services by poorer households. Helps to build policy changes that will enable and empower households to use financial services.

Financial Inclusion in PNG

- 2021: ~40% of adults in low- and middle-income Asia-Pacific economies do not have a bank account, and less than 10 percent have borrowed from formal financial institutions.
- Papua New Guinea has the lowest financial inclusion index of all Asia-Pacific countries, according to the IMF. (2018)

Relevant Applied Literature

From the development literature:

- Women tend to make more future-oriented choices than men, especially when there are children in the household. This is evidenced by differential spending on things like children's education expenses and healthcare.
 - ▶ Duflo, 2012
- Women and people with higher education tend to have lower discount rates.
 - ▶ Bauer and Chytilova, 2010 2014
- Road quality and remoteness contribute to poverty in PNG. Not only due to differences in human capital – infrastructure directly influences access to other resources.
 - ▶ Gibson and Rozelle, 2003

Relevant Theoretical Literature

- Becker (1965), Gronau (1977): theory of the household
- Becker and Mulligan (1997) → develop a model of an individual's endogenously determined discount rate. Their analysis shows how wealth, mortality, addictions, uncertainty, and other variables affect the degree of time preference.

Theoretical Framework

- Model the household's decision as to whether or not to expend the resources required to become financially included.
 - ▶ first attempt (to our knowledge) at a theory of household financial inclusion
 - ▶ Sen (1987): members of HH face two types of problems simultaneously:
 - ★ cooperation: adding to total availability
 - ★ conflict: dividing total availability among household members
 - ★ decisions as to who does what, who consumes what, and who makes which decisions
- incorporates the benefits that a household will receive by becoming financial included
 - ▶ increased intertemporal trade: borrow/save
 - ▶ increased intratemporal trade (increased efficiency in the allocation of household resources)

Theoretical Framework

- In maximizing household utility household's make two decisions:
 - ① efficient allocation of household resources within a time period (comparative advantage)
 - ★ produce goods self (autarky) or trade with economy (sell services of fop and buy goods)
 - ② optimal allocation of expenditure across time
 - ▶ involves a bargain within HH
- NFI household: no intertemporal trade.
- HH's problem
 - ▶ i. intratemporal: allocate resources across range of productive activities (within and outside HH)
 - ★ choose between home production of some goods, trading for others by selling services of home factors of production
 - ▶ ii. intertemporal: allocate consumption across time
 - ★ borrow / lend

Intratemporal Trade: allocation of HH resources

- Household i (drop subscript)
 - ▶ resource (Hicksian composite of physical and human capital, labor, land): L
 - ▶ continuum of goods on $j \in [0, 1]$
 - ▶ technology: unit labor requirement: $a(j)$ for goods (differs across HHs)
 - ▶ utility (C-D): $\ln U = \int_0^1 \ln c(j)$
- Choice: home production or sell labor services and buy goods
- Assumption 1: household's productivity is declining in j

Intratemoral Trade: allocation of HH resources

- firms produce goods under perfect competition
- identical unit labor requirements $a^e(j)$ (superscript e refers to economy)
- $a^e(j) < a^i(j)$ (households less productive in all goods) but distance means HHs produce some goods.
- wage rate fixed at w so price of good j : $p(j) = wa^e(j)$
- set $p(j) = 1 \Rightarrow a^e(j) = a^e = \frac{1}{w}$ by choosing appropriately sized units for all goods
- Given HH technology, rate at which the household can convert labor into good j is given by $1/a^i(j)$.

Intratemporal Trade: allocation of HH resources

- Work outside home, earn a wage w , then the household can convert labor into good j at the rate $w/p(j) = 1/a^e$ given that $p(j) = 1$ for all j .
 - ▶ goods j where $1/a^i(j) > 1/a^e(j)$ produced at home
 - ▶ goods j where $1/a^i(j) < 1/a^e(j)$ self labor services for the good outside the home.
 - ▶ Simple case: cut-off good, j^* is defined by

$$\frac{1}{a^i(j)} = \frac{1}{a^e} = w$$

Intratemporal Trade: allocation of HH resources: distance

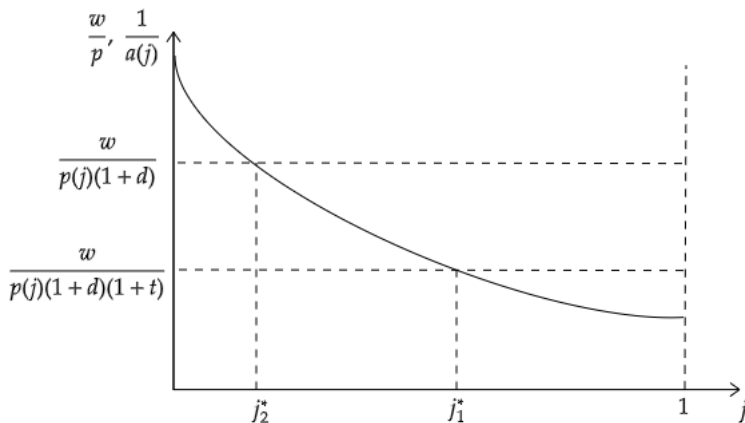
- household lives a distance d away from markets
- add ad valorem transport costs to goods, $(1 + d) p(j)$
 - ▶ incurs this cost itself, or pays a higher price for delivered good
- not being FI means HH's wages are diminished due to transaction frictions/costs $t(d)$: wage received $w / (1 + t(d))$
 - ▶ $t(0) = 0, t'(d) > 0$.
 - ▶ justification: costs of delivering cash (middlemen, stealing)
- Hence, while labor can be converted into goods by firm j at rate $w/p(j) = 1/a^e(j)$,
- Non-FI HHs located distance d from market, rate at which labor can be converted into goods is given by

$$\frac{w}{p(j)(1+d)(1+t(d))} = \frac{1}{a^e(1+d)(1+t(d))}$$

- cut-off good, j_1^* , determined by

$$a(j_1^*) = a^e(1+d)(1+t(d)) = \frac{(1+d)(1+t(d))}{w}$$

Diagram 1



HH Utility

- Cobb-Douglas Utility: $c(j) = Y/p(j)$ for all goods j
- home-produced goods: $c(j) = L/a(j)$
- traded good: $c(j) = wL/p(j) = L/(a^e(1+d)(1+t))$.
- Non-FI HH (indirect) utility

$$\begin{aligned}\ln U^{NF} &= \int_0^{j_1^*} \ln \frac{L}{a(j)} dj + \int_{j_1^*}^1 \ln \frac{L}{a^e(1+d)(1+t)} dj \\ &= \ln L - \int_0^{j_1^*} \ln a(j) dj - (1 - j_1^*) \ln a^e(1+d)(1+t)\end{aligned}$$

- If HH becomes FI, $t(d)$ fall to zero, cut-off good given by $a(j_2^*) = a^e(1+d)$
- FI HH (direct) utility

$$\begin{aligned}\ln U^{FI} &= \int_0^{j_2^*} \ln \frac{L^i}{a^i(j)} dj + \int_{j_2^*}^1 \ln \frac{L^i}{a^e(1+d)} dj \\ &= \ln L^i - \int_0^{j_2^*} \ln a^i(j) dj - (1 - j_2^*) \ln a^e(1+d)\end{aligned}$$

Proposition 1

- For a household that is not FI, the gain to becoming FI (moving from *NFI* to *FI*) in any time period is given by

$$\Delta U = \ln U^{FI} - \ln U^{NFI} = \int_{j_2^*}^{j_1^*} \ln \frac{a(j)}{a^e (1+d)} dj + (1 - j_1^*) \ln (1+t) > 0$$

- Intuition: when a household becomes financially included, t falls to zero, and HH's terms of trade improve
 - ▶ additional trade with the rest of the economy (first term above)
 - ▶ traded inframarginal units of labor are also earning more, allowing higher consumption (second term above).

Lemma

The intratemporal gains from financial inclusion are decreasing in d , that is $\frac{\partial}{\partial d} (\Delta U) = -\frac{1}{1+d} (j_1^ - j_2^*) < 0$*

Intertemporal Trade: optimal allocation of consumption over time

- If HH is FI, can borrow / save
- HH trades-off resource costs of becoming FI (incurred in the current period) against the benefits of a reduction in transaction costs now and in the future and the ability to trade intertemporally.
- Two period model: HH intertemporal utility:

$$U(E_1, E_2) = \ln V_1(p, E_1) + \beta \ln V_2(p, E_2)$$

- $\beta = 1 / (1 + \rho)$ is the discount rate: ρ the discount factor
 - ▶ lower ρ (or higher β) \implies more patient HH
 - ▶ E_1 and E_2 represent the household's expenditure in periods 1 and 2
- Indirect utility function in any time period:
 $\ln V(p, Y) = \ln Y - \int_0^1 \ln p(j) dj$.
- If HH is NFI then in both periods: $E_i = wL$ and HH utility is

$$U^{NF}(E_1, E_2) = (1 + \beta) \ln L - (1 + \beta) \int_0^{j_1^*} \ln a(j) dj - (1 + \beta)(1 - j_1^*) \ln a^e(1 + d)(1 + t)$$

Intertemporal Trade: optimal allocation of consumption over time

- To become FI, HH must incur resource cost the first period, $f(d)$ (iceberg cost - fraction of each unit of labor melts away)
 - ▶ income in the first period is reduced to $Y_1 = wL / (1 + f(d))$ (income in the second period remains at $Y_2 = wL$)
 - ▶ $f(0) = 0, f'(d) > 0$
 - ▶ more remotely HHs have to incur higher costs to become FI
- FI HH can optimally allocate expenditure across time.
- PV of wealth for FI HH, \bar{W} , is

$$\bar{W} = \frac{wL}{1+f} + \frac{wL}{1+r} = wL \left(\frac{2+r+f}{(1+f)(1+r)} \right)$$

where r is the economy-wide interest rate.

Intertemporal Trade: optimal allocation of consumption over time

- HH optimization problem

$$\text{Max}_{E_1, E_2} \ln V_1^{FI}(\rho, E_1) + \beta \ln V_2^{FI}(\rho, E_2) \text{ subject to } \bar{W} = E_1 + \frac{E_2}{1+r}$$

- Solution: Euler equation: $E_2 = \beta(1+r)E_1$
- $\beta(1+r) > 1 \Rightarrow$ HH savings in period 1 $\Rightarrow E_1 < E_2$
- HH reduces consumption on all goods, reallocates labor from home-produced goods to production outside of HH, and saves more.

$$\begin{aligned} U^{FI}(E_1, E_2) &= (1+\beta) \ln L - \ln(1+f) + \ln\left(\frac{2+r+f}{2+\rho}\right) \left(\frac{1+\rho}{1+r}\right) \\ &+ \beta \ln \frac{2+r+f}{(1+f)(2+\rho)} - (1+\beta) \int_0^{j_2^*} \ln a(j) dj \\ &- (1+\beta)(1-j_2^*) \ln a^e(1+d) \end{aligned}$$

Proposition 2

The gain to financial inclusion is given by

$$\begin{aligned}\Delta U &= U^{FI}(E_1, E_2) - U^{NF}(Y_1^{NF}, Y_2^{NF}) \\ &= -\ln(1+f) + \ln\left(\frac{2+r+f}{2+\rho}\right) \left(\frac{1+\rho}{1+r}\right) + \beta \ln \frac{2+r+f}{(1+f)(2+\rho)} \\ &\quad + (1+\beta) \int_{j_2^*}^{j_1^*} \ln \frac{a(j)}{a^e(1+d)} dj + (1+\beta)(1-j_1^*) \ln(1+t)\end{aligned}$$

Intuition: 1st term is resource cost of FI $\cong f(d)$; 2nd & 3rd represent the intertemporal gains from trade; 4th & 5th interpreted as in Proposition 1

Lemma

The gains to financial inclusion are decreasing in distance, d . $\frac{\partial}{\partial d}(\Delta U) < 0$

Lemma

The gains to financial inclusion are decreasing in the discount factor.

$$\frac{\partial}{\partial \rho}(\Delta U) < 0$$

Diagram 2

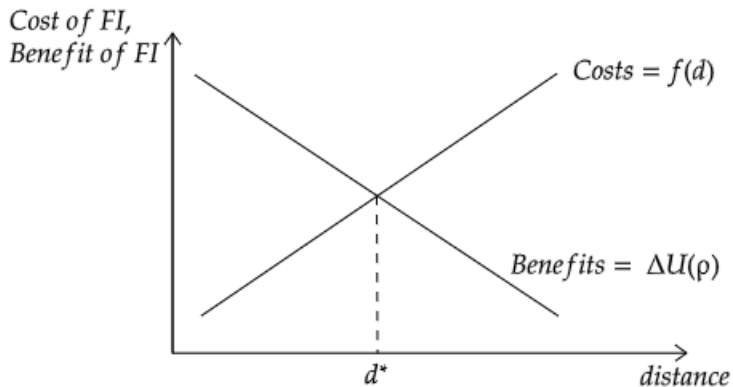
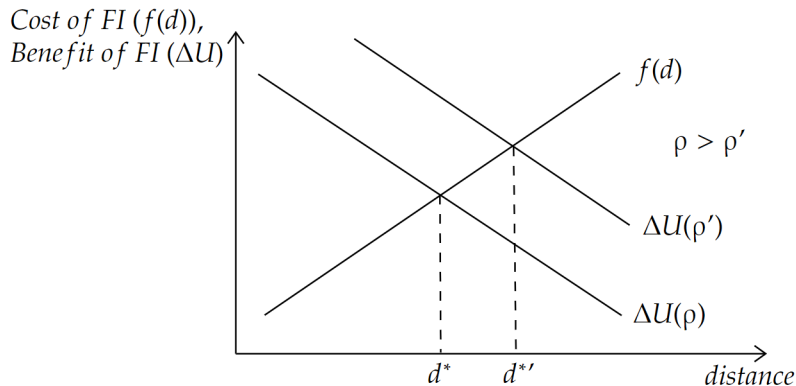


Diagram 3



Predictions of the Model

- Characteristics of individual matter
 - ▶ \uparrow education $\Rightarrow \downarrow \rho$ (more patient)
 - ▶ females are more patient: $\rho_{female} < \rho_{male}$
- More patient households (lower ρ) \Rightarrow more likely to FI
 - ▶ Education
 - ▶ Female HoH
- Intra-HH bargain: HHs in which females have more bargaining power $\Rightarrow \downarrow \rho$
 - ▶ HHs where female is more educated than male
 - ▶ Female HoH
- Distance matters
 - ▶ distance increases the cost, and decreases the benefits of, FI
 - ▶ more distant HHS less likely to FI

Data

- 2014 World Bank-INA survey targeting financial inclusion, financial competency, and poverty
- ~600 individual observations (2 respondents per household)
- Respondents from each household were surveyed separately by same-sex interviewers to ensure more truthful answers.
- Representative of Morobe and Madang provinces
- Stratification of districts by female literacy and predicted poverty to get a representative sample
- Weaknesses:
 - ▶ Lack of funding; sample size smaller than intended.
 - ▶ Lack of responses for financial information.

Descriptive Statistics

| Variable | RURAL | | URBAN | |
|-----------------------------|-------|------------------------|-------|-------------------------|
| | Obs | Mean | Obs | Mean |
| Age | 519 | 38.35 (19 - 83) | 83 | 38.33 (18 - 65) |
| Sex | 531 | 50% | 84 | 48% |
| Primary | 531 | 46% | 84 | 35% |
| Secondary | 531 | 10% | 84 | 30% |
| Tertiary | 531 | 10% | 84 | 31% |
| English | 526 | 34% | 84 | 80% |
| Monthly Income | 513 | 446.02 (5 - 10,000) | 84 | 1114.52 (30 - 7,000) |
| Number of HH Members | 531 | 6.11 (0 - 20) | 84 | 6.55 (2 - 13) |
| Distance to Bank | 460 | 66.20 (0.5 - 350) | 77 | 2.89 (0.5 - 6) |

Descriptive Statistics

| | Bank Account | |
|------------------|---------------------|--------------------|
| | Urban (84) | Rural (531) |
| Male | 36.9% | 14.7% |
| Female | 16.7% | 6.6% |
| Total | 53.6% | 21.3% |
| Primary | 16.7% | 7.0% |
| Secondary | 14.3% | 4.9% |
| Tertiary | 22.6% | 6.8% |
| English | 48.8% | 15.1% |

Descriptive Statistics

| | Obs. | Bank Account |
|-------------------|-------------|---------------------|
| 0-20 km | 316 | 122 |
| 20-40 km | 58 | 22 |
| 40-60 km | 17 | 4 |
| 60-100 km | 48 | 3 |
| 100-200 km | 33 | 0 |
| No Access | 143 | 7 |

Empirical Specification

$$\begin{aligned} Inclusion_i = & \beta_0 + \beta_1 Age_i + \beta_2 Sex_i \\ & + \beta_3 Education_i + \beta_4 Income_i + \beta_5 HHMembers_i \\ & + \beta_6 Distance_i + \beta_7 Urban_i + \beta_8 English_i \end{aligned}$$

where:

- $Inclusion_i$ is a binary variable for being financially included
- Age_i is measured in years
- $Education_i$ is a series of indicator variables for different the highest level of education achieved
- $Income_i$ is monthly income in Kina
- $HHMembers_i$ is the number of people living in the household
- $Distance_i$ represents the distance the respondent's house to the closest bank
- Sex_i , $Urban_i$, and $English_i$ are all indicator variables

| | Full Sample | | | |
|------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | (1) | (2) | (3) | (4) |
| | BankAcct | BankAcct | BankAcct | BankAcct |
| age | 0.00206 (0.00158) | 0.00179 (0.00159) | 0.00146 (0.00156) | 0.00122 (0.00157) |
| sex | 0.139*** (0.0321) | 0.127*** (0.0310) | 0.129*** (0.0316) | 0.118*** (0.0305) |
| primary | 0.0875*** (0.0314) | 0.0762** (0.0309) | 0.0406 (0.0335) | 0.0353 (0.0334) |
| secondary | 0.334*** (0.0663) | 0.296*** (0.0648) | 0.208*** (0.0799) | 0.189** (0.0789) |
| tertiary | 0.506*** (0.0646) | 0.447*** (0.0652) | 0.386*** (0.0752) | 0.346*** (0.0752) |
| monthlyinc | 0.0000704*** (0.0000213) | 0.0000677*** (0.0000183) | 0.0000638*** (0.0000206) | 0.0000623*** (0.0000180) |
| hhmembers | 0.0118* (0.00655) | 0.0122* (0.00670) | 0.0122* (0.00656) | 0.0125* (0.00671) |
| urban | 0.100* (0.0555) | 0.0582 (0.0559) | 0.0833 (0.0559) | 0.0452 (0.0563) |
| DistDummy | | -0.0533*** (0.00803) | | -0.0519*** (0.00801) |
| english | | | 0.153*** (0.0467) | 0.130*** (0.0456) |
| _cons | -0.159** (0.0720) | -0.0487 (0.0743) | -0.139* (0.0722) | -0.0313 (0.0745) |
| N | 584 | 584 | 579 | 579 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Men are 12% more likely to be financially included
- Likelihood of having a bank account increases monotonically with education
- Living farther away from a bank decreases the likelihood that a person has an account
- English-speaking is very important! English is taught in primary school.
- Effect of income:
 - ▶ If monthly income increases by \$100 \Rightarrow likelihood of being financially included increases by 2.5%

Results Separately by Gender

| Female Sample | | | | |
|---------------|---------------------------|----------------------------|--------------------------|----------------------------|
| | (1) | (2) | (3) | (4) |
| | BankAcct | BankAcct | BankAcct | BankAcct |
| age | 0.000663 (0.00156) | 0.000585 (0.00155) | 0.000581 (0.00157) | 0.000499 (0.00156) |
| primary | 0.0841** (0.0336) | 0.0563* (0.0317) | 0.0607* (0.0362) | 0.0384 (0.0347) |
| secondary | 0.276*** (0.0954) | 0.240*** (0.0895) | 0.206* (0.108) | 0.188* (0.103) |
| tertiary | 0.713*** (0.0847) | 0.649*** (0.0865) | 0.648*** (0.101) | 0.601*** (0.101) |
| monthlyinc | 0.0000354* (0.0000207) | 0.0000381** (0.0000183) | 0.0000331 (0.0000203) | 0.0000365** (0.0000181) |
| hhmembers | 0.00119 (0.00677) | 0.00288 (0.00683) | 0.000891 (0.00671) | 0.00253 (0.00678) |
| urban | -0.0413 (0.0724) | -0.0673 (0.0720) | -0.0399 (0.0727) | -0.0659 (0.0722) |
| DistDummy | | -0.0407*** (0.00787) | | -0.0401*** (0.00791) |
| english | | | 0.0721 (0.0608) | 0.0531 (0.0585) |
| _cons | -0.0161 (0.0754) | 0.0624 (0.0761) | -0.0106 (0.0761) | 0.0678 (0.0770) |
| <i>N</i> | 298 | 298 | 297 | 297 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

| Male Sample | | | | |
|-------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | (1) | (2) | (3) | (4) |
| | BankAcct | BankAcct | BankAcct | BankAcct |
| age | 0.00353 (0.00241) | 0.00316 (0.00236) | 0.00252 (0.00236) | 0.00218 (0.00231) |
| primary | 0.0953* (0.0565) | 0.123** (0.0554) | 0.0439 (0.0574) | 0.0762 (0.0570) |
| secondary | 0.355*** (0.0864) | 0.338*** (0.0859) | 0.224** (0.103) | 0.224** (0.103) |
| tertiary | 0.341*** (0.0874) | 0.315*** (0.0855) | 0.220** (0.102) | 0.211** (0.0995) |
| monthlyinc | 0.000150*** (0.0000275) | 0.000131*** (0.0000270) | 0.000138*** (0.0000279) | 0.000121*** (0.0000275) |
| hhmembers | 0.0196** (0.00949) | 0.0183** (0.00925) | 0.0210** (0.00951) | 0.0195** (0.00925) |
| urban | 0.227*** (0.0854) | 0.174** (0.0844) | 0.187** (0.0860) | 0.141* (0.0851) |
| DistDummy | | -0.0611*** (0.0129) | | -0.0602*** (0.0128) |
| english | | | 0.177** (0.0718) | 0.154** (0.0704) |
| _cons | -0.165 (0.108) | -0.0586 (0.111) | -0.148 (0.108) | -0.0425 (0.111) |
| <i>N</i> | 286 | 286 | 282 | 282 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Interpretation

- For women, financial inclusion is increasing in education.
- For men, the effect levels out after secondary education.
- Tertiary education effects for women are 2-3 times larger than the analogous effects for men

Spillovers of Spouse's Education

| | Female Sample | | | |
|---------------|---------------------------|----------------------------|--------------------------|----------------------------|
| | (1) BankAcct | (2) BankAcct | (3) BankAcct | (4) BankAcct |
| age | 0.000695 (0.00155) | 0.000617 (0.00155) | 0.000612 (0.00157) | 0.000530 (0.00156) |
| primary | 0.0967*** (0.0343) | 0.0689** (0.0321) | 0.0747** (0.0379) | 0.0526 (0.0361) |
| secondary | 0.304*** (0.0951) | 0.268*** (0.0890) | 0.240** (0.111) | 0.222** (0.105) |
| tertiary | 0.738*** (0.0812) | 0.674*** (0.0827) | 0.678*** (0.101) | 0.631*** (0.101) |
| SpouseGreater | 0.0681** (0.0336) | 0.0681** (0.0329) | 0.0653* (0.0346) | 0.0667** (0.0339) |
| monthlyinc | 0.0000344* (0.0000202) | 0.0000371** (0.0000177) | 0.0000324 (0.0000198) | 0.0000358** (0.0000175) |
| hhmembers | 0.00125 (0.00682) | 0.00293 (0.00685) | 0.000949 (0.00675) | 0.00260 (0.00680) |
| urban | -0.0504 (0.0711) | -0.0765 (0.0707) | -0.0487 (0.0716) | -0.0751 (0.0710) |
| DistDummy | | -0.0407*** (0.00785) | | -0.0403*** (0.00790) |
| english | | | 0.0654 (0.0626) | 0.0461 (0.0602) |
| _cons | -0.0614 (0.0773) | 0.0170 (0.0768) | -0.0539 (0.0784) | 0.0239 (0.0779) |
| <i>N</i> | 298 | 298 | 297 | 297 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

| | Male Sample | | | |
|---------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | (1) BankAcct | (2) BankAcct | (3) BankAcct | (4) BankAcct |
| age | 0.00379 (0.00240) | 0.00338 (0.00236) | 0.00276 (0.00235) | 0.00237 (0.00231) |
| primary | 0.108* (0.0554) | 0.132** (0.0547) | 0.0573 (0.0568) | 0.0860 (0.0568) |
| secondary | 0.369*** (0.0853) | 0.350*** (0.0852) | 0.243** (0.102) | 0.239** (0.103) |
| tertiary | 0.372*** (0.0863) | 0.341*** (0.0843) | 0.253** (0.101) | 0.237** (0.0986) |
| SpouseGreater | 0.113* (0.0602) | 0.0920 (0.0605) | 0.0905 (0.0594) | 0.0716 (0.0599) |
| monthlyinc | 0.000146*** (0.0000276) | 0.000128*** (0.0000270) | 0.000136*** (0.0000280) | 0.000119*** (0.0000275) |
| hhmembers | 0.0167* (0.00947) | 0.0160* (0.00927) | 0.0184* (0.00949) | 0.0175* (0.00927) |
| urban | 0.226** (0.0872) | 0.175** (0.0861) | 0.189** (0.0876) | 0.143* (0.0866) |
| DistDummy | | -0.0587*** (0.0130) | | -0.0586*** (0.0129) |
| english | | | 0.165** (0.0714) | 0.145** (0.0702) |
| _cons | -0.195* (0.106) | -0.0874 (0.109) | -0.170 (0.106) | -0.0630 (0.110) |
| <i>N</i> | 286 | 286 | 282 | 282 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Interpretation

- Women who have more educated husbands are 7% more likely to be financially included
- The analogous result is not true for men.
- Women are listening to their husbands... but it looks like men aren't listening to their wives.

Heads of Households

| HoH Sample | | | | |
|------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | (1) | (2) | (3) | (4) |
| | HH_has_acct | HH_has_acct | HH_has_acct | HH_has_acct |
| age | 0.00417* (0.00247) | 0.00388 (0.00246) | 0.00315 (0.00240) | 0.00289 (0.00238) |
| HOHgender | -0.199** (0.0936) | -0.255*** (0.0893) | -0.236** (0.0965) | -0.290*** (0.0917) |
| primary | 0.102* (0.0589) | 0.123** (0.0580) | 0.0445 (0.0583) | 0.0672 (0.0581) |
| secondary | 0.396*** (0.0889) | 0.376*** (0.0875) | 0.234** (0.105) | 0.225** (0.104) |
| tertiary | 0.397*** (0.0836) | 0.354*** (0.0818) | 0.252** (0.0978) | 0.218** (0.0961) |
| monthlyinc | 0.000130*** (0.0000289) | 0.000120*** (0.0000255) | 0.000111*** (0.0000301) | 0.000102*** (0.0000267) |
| hhmembers | 0.0149 (0.0106) | 0.0146 (0.0105) | 0.0163 (0.0103) | 0.0159 (0.0103) |
| urban | 0.245*** (0.0836) | 0.188** (0.0836) | 0.202** (0.0843) | 0.149* (0.0843) |
| DistDummy | | -0.0590*** (0.0135) | | -0.0586*** (0.0134) |
| english | | | 0.216*** (0.0730) | 0.202*** (0.0716) |
| _cons | 0.0435 (0.141) | 0.196 (0.138) | 0.0936 (0.141) | 0.245* (0.138) |
| N | 287 | 287 | 283 | 283 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- PNG has both matrilineal and patrilineal societies.
- Our 2-obs per HH dataset allows us to analyze the effect of the HoH's gender on financial inclusion of the household.
- Households headed by a male are btwn 20% and 30% less likely to be financially included

Policy Relevance and Conclusions

- Gender and bargaining power within the household matters
- Education is important
 - ▶ Policy Implication: free primary education is good
 - ▶ Primary education is teaching students (enough) English to facilitate financial inclusion
- Distance is important
 - ▶ Better roads
 - ▶ Encourage financial institutions to locate in more remote locations
 - ▶ Mobile banking as an option