
Enabling Micro-Savings Through Point of Service (POS) Terminal Deposit Collection in Sri Lanka

ASSA meetings, Chicago Ill, January 2012

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Savings on the Supply Side:

Lenders worldwide were hit by sudden lack of access to lending capital during financial crisis, focus on currency mismatches in banking sector.

Recent CGAP paper on microfinance & the Financial Crisis says:

- “deposit-taking MFIs are well-insulated from refinancing risks”
- “MFIs accelerating the move to become licensed to mobilize deposits”
- “most deposit-taking MFIs mobilize larger deposits from nonpoor customers, and these may be more sensitive to the economic downturn”

However, many MF lenders not able under law to intermediate savings.

Therefore savings banks such as Sri Lanka’s National Savings Bank are well placed to play a leading role in showing how to use savings-led intermediation to deepen the financial sector in developing countries.

Savings on the Demand Side:

Behavioral finance has recently uncovered a number of decisionmaking quirks that prevent people from meeting their *own* savings trajectories:

- ‘time inconsistency’: I fundamentally value consumption today differently than consumption tomorrow (Laibson, 2009)
- Intrahousehold conflict: husbands and wives have different preferences, women cannot control money inside the household (Ashraf et al., 2010).
- ‘temptation goods’: there are certain goods (luxuries, alcohol) that I value today but do not value today whether I consume tomorrow (Banerjee & Mullainathan, 2009).

Any of these can lead to people being unable to stick to their own intended savings path.

- In the developed world, many tools exist to overcome these problems (periodic paychecks, automatic deposit, retirement plans, life insurance, etc).
- Micro-entrepreneurs may lack instruments that help them to save.
- Most recent studies on savings among micro-entrepreneurs show very large effects on income, consumption (Dupas & Robinson 2010, Brune et al. 2011).

Questions: Where do these income increases come from? What would have happened with the money if it had not gone into the bank?

Research questions for our study:

1. What are the 'headwaters' of formal savings? When money is deposited in a bank, what is the source of these funds and what is not done as a result?
2. Which of the various explanations for difficulty in saving appears predominant in this context?
 1. Intrahousehold
 2. Behavioral
 3. 'temptation' goods.
3. What is the effect on informal savings mechanisms such as seetus when there is an expansion in the formal options for saving?

Motivation for the POS terminal:

- Deposit collection has been shown to be an effective way of driving deposits in many contexts (Susu collectors in West Africa).
- Technological issue: how can a bank credibly take deposits in the field, in that savers must be confident that money given to bank agents will really be deposited.
- **Solution: Wireless Point of Service terminal.**
 - POS device allows bank staff to issue receipts on the spot, providing full credibility for savers that their cash arrives in their accounts.
 - Technology is easily transportable, had been being used by NSB to take deposits from merchants in outlying areas.
 - Our intervention pushed this technology all the way to the household level, providing a powerful impetus to save.

The POS terminal in use:



Selecting the sample for the study:

- The sample was selected to reflect a group that were not currently using formal financial services in the following manner:
 - First, we listed households within intermediate distances (5-10 km) from two major NSB branches, Bandarawela and Mahiyangana.
 - We divided the study areas into 'zones' (roads) that became the basis for treatment assignment.
 - From this population, we selected households that were:
 - Self Employed (more irregular income streams generate more need for savings).
 - 'Unbanked' in that the household was not regularly using a formal bank account.
 - Accessible by motorcycle so that the POS terminal could reach their house.
 - We oversampled households that had:
 - Female survey respondents who fit the above categories, and
 - Members who participated in Seetus made up of members only of the local community.
- This yielded 829 households in 156 zones that were drawn into the study.

Survey waves:

- We conducted full household surveys for four months to reduce noise in pre-treatment estimates.
- 2/3ds of sample gets surveys every month, 1/3d only quarterly.

<u>Round</u>	<u>Month</u>	<u>Survey Waves</u>	<u>Treatment</u>
1	August, 2010	Baseline Survey	
2	September, 2010	Full Wave	
3	October, 2010	Full Wave	
4	November, 2010	Full Wave	
5	December, 2010	Monthly Only	
6	January, 2011	Monthly Only	Weekly Home Visit POS Treatment Begins
7	February, 2011	Full Wave	
8	March, 2011	Monthly Only	
9	April, 2011	Monthly Only	
10	May, 2011	Full Wave	
11	June, 2011	Monthly Only	51 zones Switch to Biweekly or Lockbox
12	July, 2011	Monthly Only	
13	August, 2011	Full Wave	
14	September, 2011	Monthly Only	
15	October, 2011	Monthly Only	
16	November, 2011	Full Wave	
17	December, 2011	Monthly Only	
18	January, 2012	Monthly Only	All treated zones Switch to Community Lockbox

Research Design:

- We use a Randomized Controlled Trial (RCT), similar to clinical trials in medicine.
 - Purpose of the technique is to ensure that the group that receives the treatment is exactly equivalent on average (for both observable and unobservable variables!) as the comparison group.
 - Given 156 zones in the study, we assign 78 to treatment and 78 to control, blocking the randomization on the following zone-average covariates:
 - Whether the zone has a local seetu as of baseline, and
 - Quartiles of baseline savings balances.
 - Study households in treatment zones are then visited weekly by NSB officers with the POS terminal.
 - Households in control villages (as well as non-study households) are not prevented from using NSB but are not visited at home.
-

Tests of balance:

	Treatment- control differential	SE of difference	Mean in control	Observati ons
Number of transactions with a formal financial institution during previous month	0.046	(0.08)	0.684	2851
Total quantity of informal loans given out in previous month	-26.44	(171.71)	640.42	2851
Total quantity of informal gifts given out in previous month	-93.146	(67.30)	656.08	2851
Total quantity of informal loans received in previous month	-202.198	(502.06)	1802.536	2851
Total quantity of informal gifts received in previous month	-168.535	(87.922)*	239.18	2851
Total number of seetus in which respondent participated in previous month	-0.07	(0.11)	1.24	2851
Total payouts from seetus in previous month	-108.04	(347.88)	1,257.43	2851
Respondent reports being self-employed in non-ag enterprise during previous mont	0.021	(0.04)	0.495	2851
Number of transactions with a formal financial institution during previous month	0.046	(0.08)	0.68	2851
Total cash flow withdrawn from informal savings assets during previous month	-168.233	(439.31)	3051.774	2851
Total cash flow invested in informal savings assets during previous month	-502.173	(466.93)	3,506.44	2851
Total change in household cash balances over previous month	-777.68	(711.61)	2188.75	2851
Total loans received from all sources (formal + inforaml) in previous month	-55.331	(939.35)	4082.117	2851
Total debt owed to vendors & storekeepers	333.891	(639.01)	2,267.84	2851
Total income received by household from all sources in previous month	-1235.036	(1105.64)	25,141.41	2851
Total household expenses over previous month	130.57	(501.74)	19,289.67	2851
Household income from wages/profits over previous month	-1778.978	(1163.24)	22,799.30	2851
Total household income from all sources over previous month	-1746.531	(1607.57)	29,648.87	2851
Individual income from wages/profits as well as bank withdrawals over previous m	-1,757.57	(1139.45)	12,968.96	2851
Transfers to the respondent from spouse over previous month	306.86	(529.70)	4,364.41	2851
Transfers to the respondent from outside the household over previous month	2.958	(624.62)	3831.813	2851
Total personal income from all sources over previous month	-1,447.75	(1423.11)	21,165.18	2851
Transfers to spouse over previous month	331.49	(323.31)	2,255.96	2851
Transfers to children over previous month	-56.498	(64.05)	413.30	2851
Total transfers to all other individuals over previous month	85.34	(344.33)	3,623.01	2851
Deposits to formal banks over previous month	122.066	(351.51)	522.92	2851
Total cash in hand retained over previous month	-645.409	(328.640)*	2,650.53	2851
Total deposits to seetus over previous month	-108.501	(244.45)	1,548.34	2851
Savings deposits in other forms over previous month	62.024	(178.55)	682.529	2851
Total flow of savings deposits through all means over previous month	-569.82	(631.16)	5,404.32	2851
Total personal expenditures over previous month	56.28	(402.18)	11425.69	2851
Personal expenditures on cigs, alcohol, & gambling over previous month	-17.227	(50.62)	348.927	2851
Personal expenditures that would not have helped family members over previous mo	112.434	(128.85)	1,537.62	2851

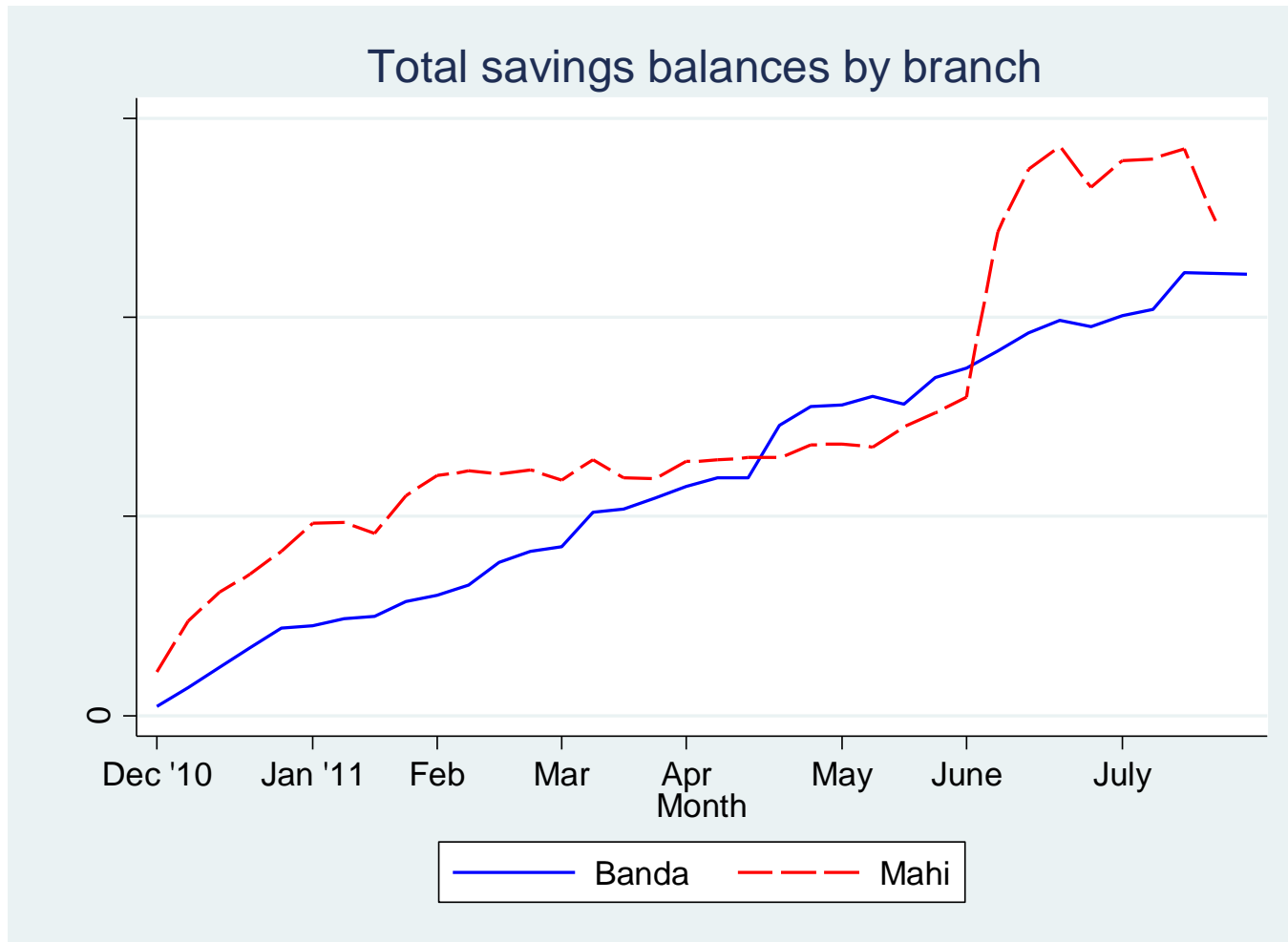
Determinants of Product Uptake:

Baseline Characteristics:	Opened Account	Made Any Deposit	Made Any Withdrawal	Number of Transactions	Log of Monthly Deposits (if any)	Log of Monthly Withdrawals (if any)	Log of Final Balance (if any)
Female	0.04 (0.03)	0.059 (0.033)*	-0.043 (0.03)	0.217 (0.26)	-0.24 (0.140)*	-1.451 (0.83)	-0.116 (0.10)
Years of Education	-0.008 (0.005)*	-0.01 (0.01)	0.01 (0.004)*	-0.036 (0.04)	0.041 (0.021)**	0.00 (0.13)	0.03 (0.014)*
Self Employed	-0.002 (0.04)	-0.027 (0.04)	0.023 (0.04)	0.396 (0.34)	0.451 (0.180)**	-0.866 (1.04)	0.221 (0.123)*
Employed in Agriculture	-0.045 (0.04)	-0.05 (0.04)	-0.04 (0.04)	-0.066 (0.37)	0.026 (0.20)	-0.94 (1.38)	0.06 (0.13)
Household Expenditure (000,000 R)	-0.068 (0.28)	-0.046 (0.28)	-0.067 (0.08)	-1.529 (1.93)	-0.89 (1.02)	-9.4 (25.21)	-0.525 (0.69)
Beta (Time inconsistency parameter)	0.038 (0.10)	0.09 (0.11)	0.07 (0.18)	0.335 (1.01)	-0.449 (0.54)	1.48 (2.05)	-0.43 (0.37)
Delta (Discounting parameter)	-0.085 (0.18)	0.007 (0.20)	-0.148 (0.18)	0.493 (1.44)	0.475 (0.79)	7.882 (4.050)*	0.249 (0.53)
Score on digitspan test	-0.023 (0.013)*	-0.02 (0.014)*	0.00 (0.01)	-0.109 (0.09)	-0.03 (0.05)	0.20 (0.26)	-0.03 (0.04)
Participates in Seetu	-0.019 (0.03)	-0.037 (0.04)	0.034 (0.03)	-0.107 (0.27)	-0.038 (0.15)	0.093 (0.81)	-0.043 (0.10)
Has a formal account	0.067 (0.036)*	0.08 (0.038)**	0.05 (0.026)**	0.812 (0.259)***	0.38 (0.143)***	1.01 (1.10)	0.15 (0.10)
Formal Savings Balance (000,000 R)	0.117 (0.46)	-0.182 (0.59)	-0.005 (0.54)	2.534 (3.90)	7.466 (2.133)***	15.802 (9.18)	5.717 (1.427)***
Constant	1.057 (0.258)***	0.91 (0.295)***	0.06 (0.28)	2.723 (2.05)	6.252 (1.124)***	-0.76 (5.16)	7.19 (0.755)***
Observations	380	380	380	380	344	28	348
R-squared	0.05	0.05	0.04	0.05	0.14	0.52	0.11

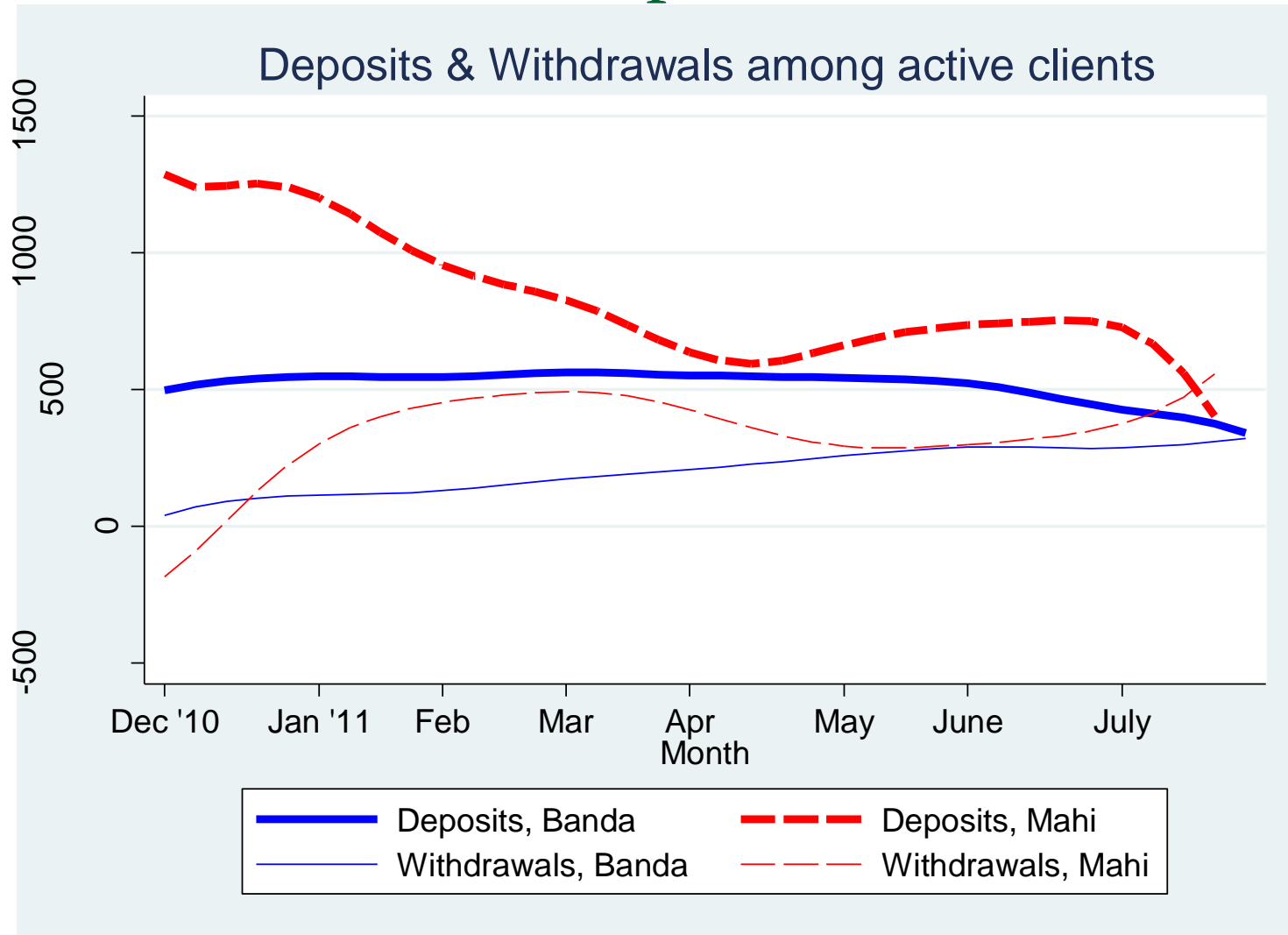
SEs are clustered at the individual level, regression includes month dummies and uses data for rounds 2-5.

* significant at 10%; ** significant at 5%; *** significant at 1%

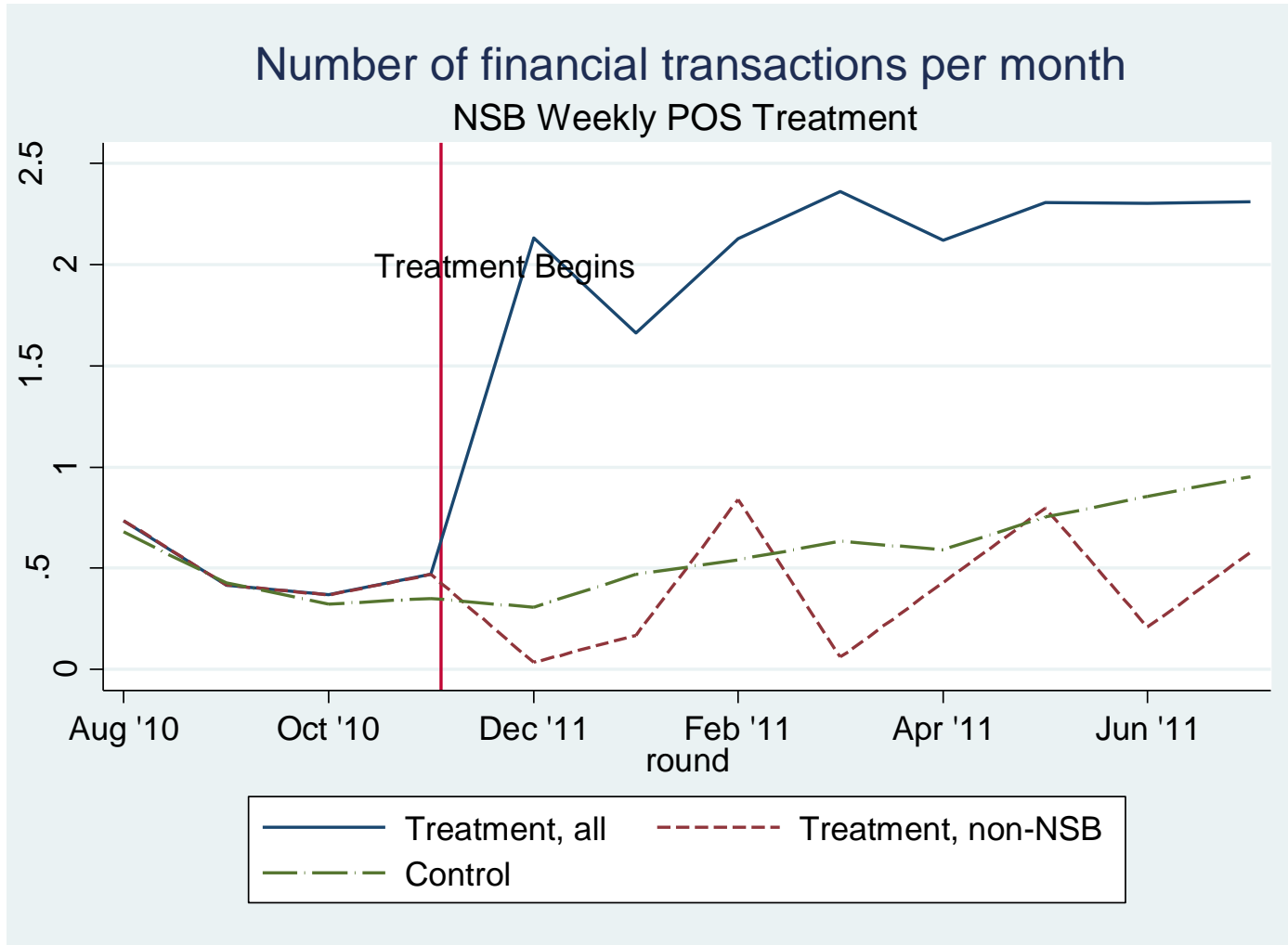
Use of Accounts: Balances:



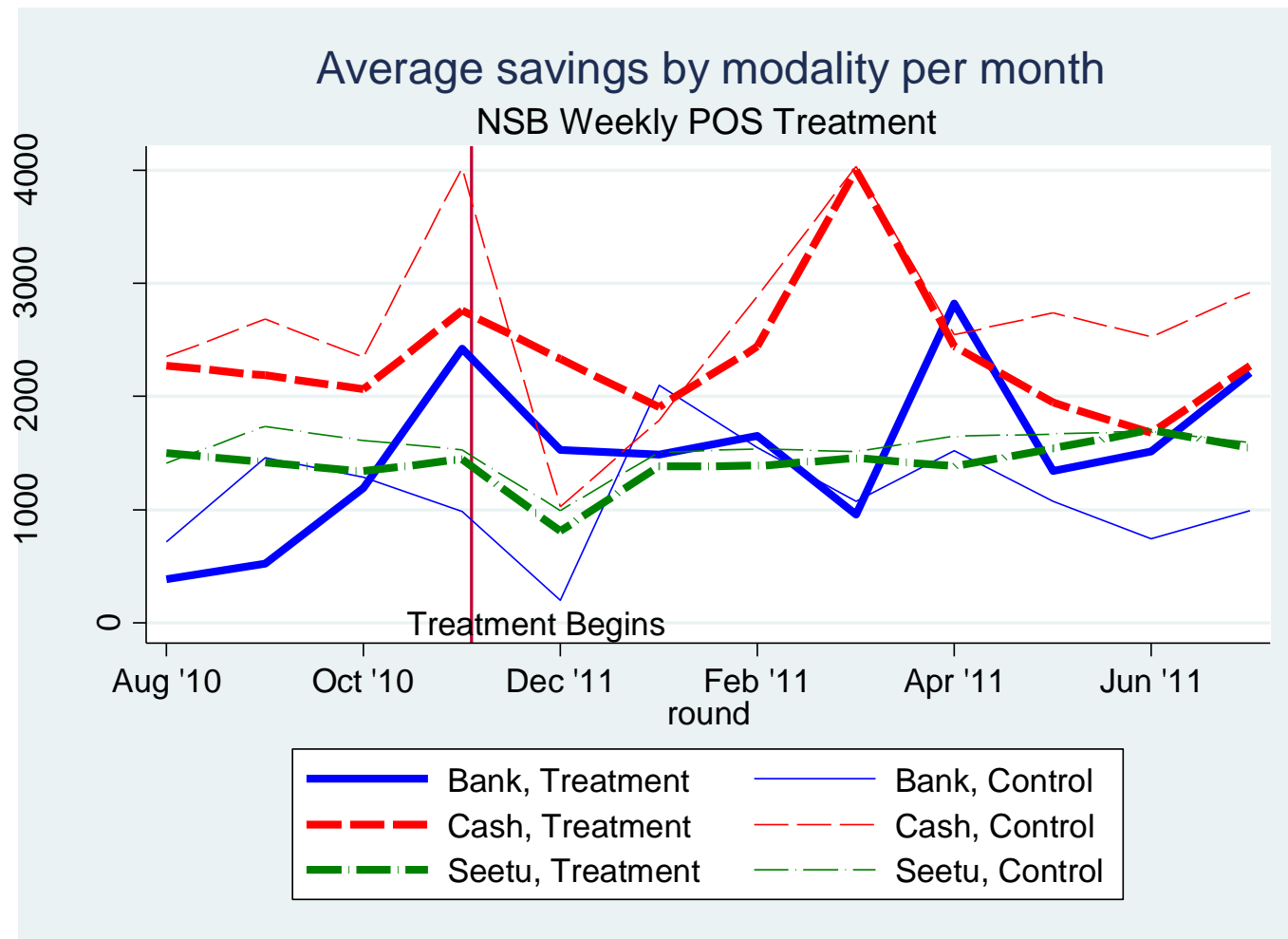
Use of Accounts: Deposits & Withdrawals:



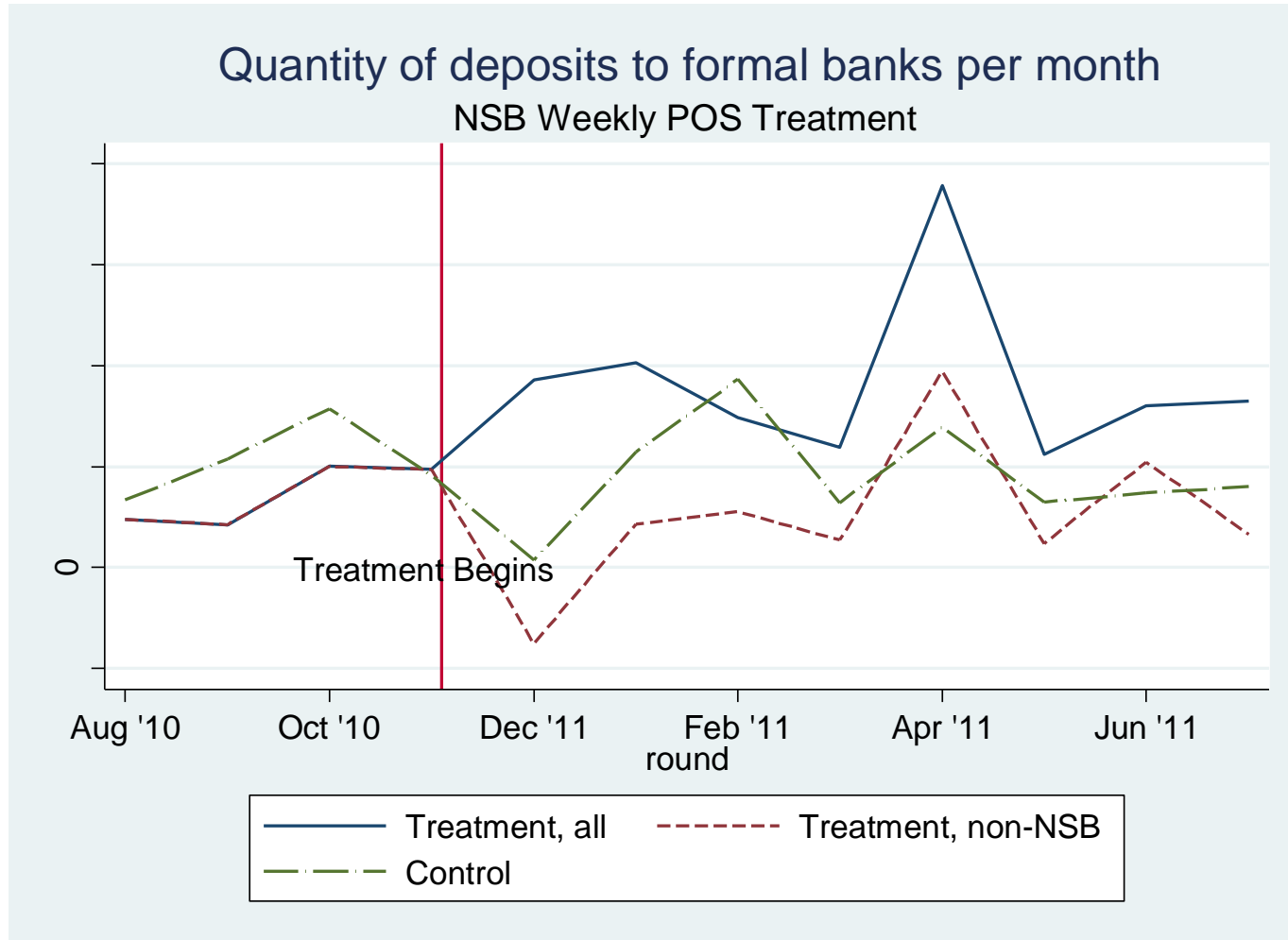
Impact on # of financial transactions:



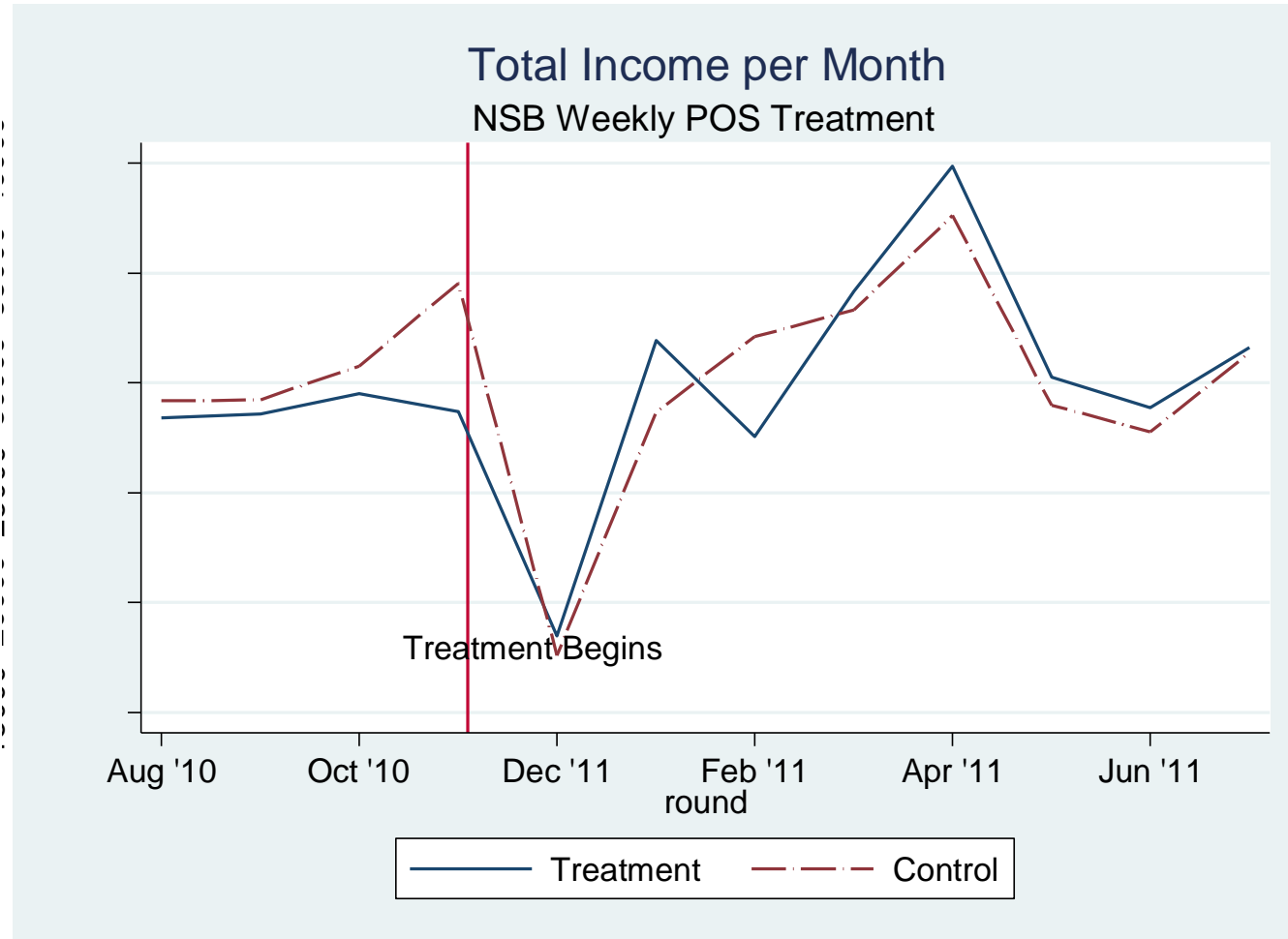
Impact on survey-reported savings:



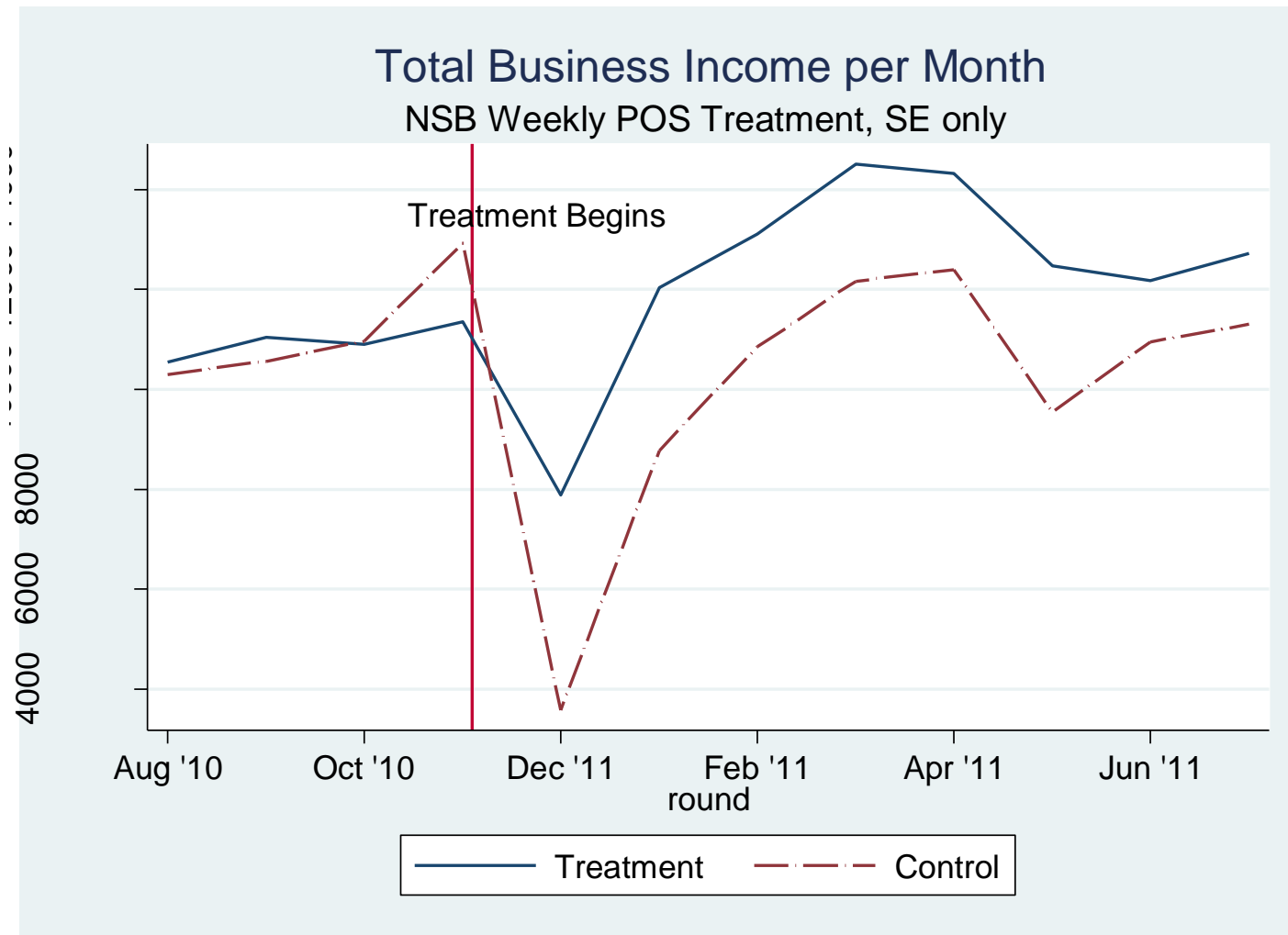
Impact on formal bank deposits:



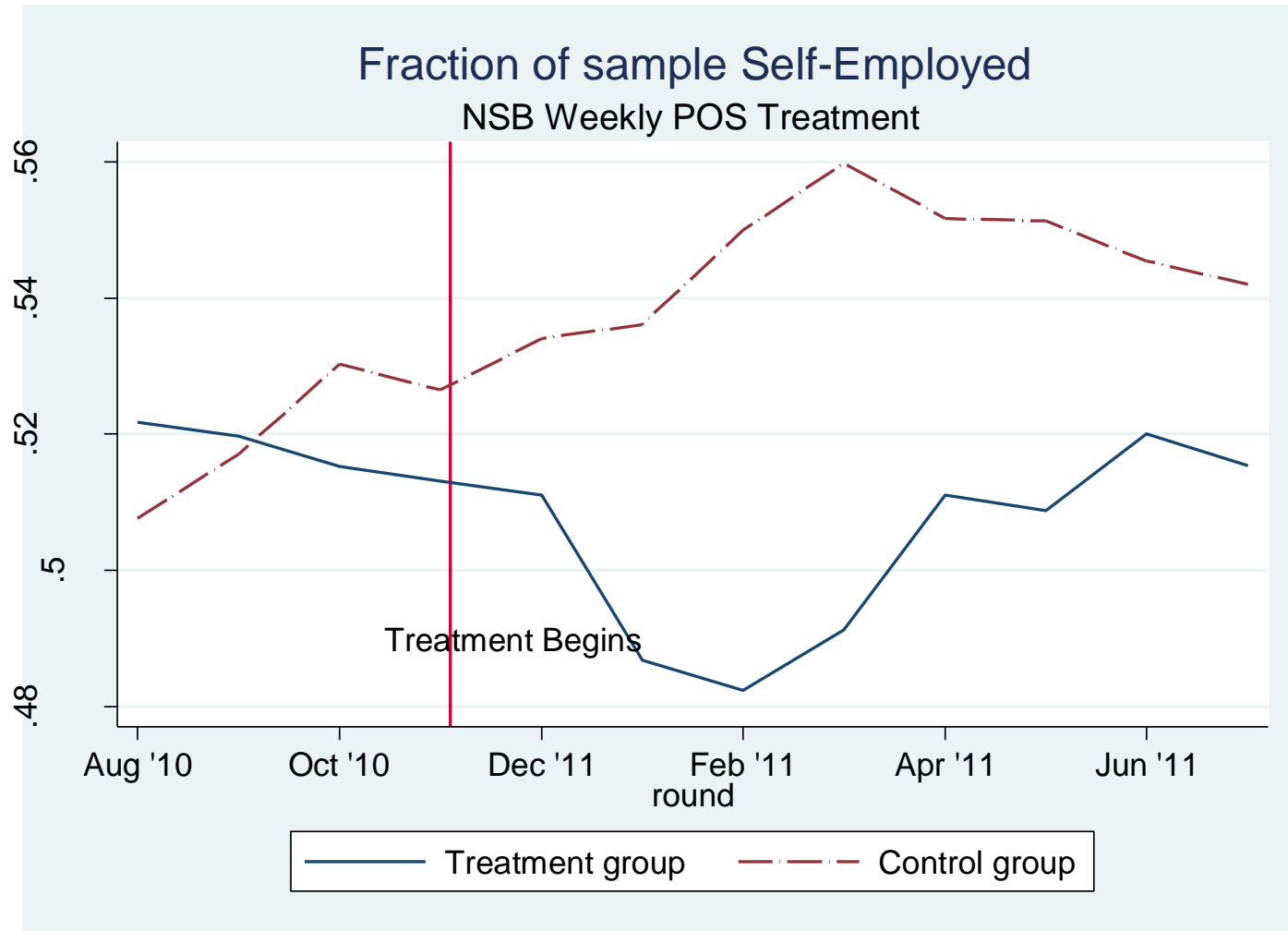
Impact on total income:



Impact on business income:



Impact on self-employment:



Unpacking the income results:

Business Income	All			Ever Self-Employed				Always Self-Employed:			
	Earned Income	Total Income	Self-Employed	Value of Inventory	Monthly Business Expenses	Monthly Sales	Business Income	Value of Inventory	Monthly Business Expenses	Monthly Sales	Business Income
Treated	2,715** (1059.00)	2746 (2027.00)	-0.0367** (0.02)	-1133 (5323.00)	4263 (3462.00)	9,730** (4327.00)	2,510** (1210.00)	-3205 (4737.00)	1454 (4010.00)	7284 (4894.00)	892.5 (998.60)
Constant	21,887*** (556.00)	28,795*** (921.90)	0.503*** (0.01)	44,903*** (2571.00)	20,376*** (1493.00)	29,915*** (1802.00)	10,357*** (388.50)	49,262*** (2905.00)	21,364*** (1596.00)	31,877*** (2038.00)	10,987*** (441.20)
Observations	5873	5873	5873	3043	3046	3046	3046	2318	2318	2318	2318
R-squared	0.035	0.02	0.001	0.005	0.014	0.016	0.021	0.005	0.014	0.017	0.034

Individual-level Fixed Effects regression with SEs clustered at the zone level; regression includes month dummies and uses data for rounds 2-10.

* significant at 10%; ** significant at 5%; *** significant at 1%

Increase in Earned Income. While the treatment appears to increase business income quite substantially (a 33% increase in sales and a 25% increase in income) it does so by pushing inferior entrepreneurs out of self-employment.

Looking at consumption:

Consumption.

Consumption of:

	Food at home	Food away from home	Housing	Utilities	Transport	Schooling	Health	Clothing	Assets	Sin' goods	Loan Repayment	Total
Treated	70.71 (213.20)	-70.77* (41.61)	-552.6 (965.70)	5.185 (38.98)	-25.73 (106.40)	-60.5 (85.52)	97.64 (112.70)	-102.9 (233.30)	172.3 (123.60)	46.58 (52.60)	820.4* (430.60)	1055 (1671.00)
Constant	6,179*** (119.20)	338.8*** (26.62)	3,020*** (509.30)	1,026*** (26.35)	1,302*** (84.80)	564.6*** (44.69)	561.7*** (46.71)	640.6*** (86.53)	199.3*** (58.57)	555.2*** (38.25)	1,681*** (242.70)	19,364*** (772.60)

Observations	5873	5873	5873	5873	5873	5873	5873	5873	5873	5873	5873	5873
R-squared	0.068	0.004	0.001	0.011	0.015	0.01	0.003	0.097	0.003	0.015	0.004	0.015

Individual-level Fixed Effects regression with SEs clustered at the zone level; regression includes month dummies and uses data for rounds 2-10.

* significant at 10%; ** significant at 5%; *** significant at 1%

Very muted effects on consumption overall; some decrease in food eaten away from home (less travel to town to get to banks?) and a faster paying down of debts.

‘Headwaters’: Crowd-out of informal financial services?

Informal savings mechanisms.

Money Saved:

	Seetus	Gold	Durables	Land	Informal Lending	Total
Treated	108.8 (99.24)	-81.16 (75.65)	217.7 (295.80)	487.3 (375.10)	-179.2 (170.90)	729 (525.20)
Constant	1,487*** (79.83)	123.3** (47.81)	820.7*** (214.60)	144 (148.10)	466.4*** (78.90)	3,277*** (360.60)

Money Withdrawn:

	Seetus	Gold	Durables	Land	Informal Lending	Total
Treated	-655.4 (809.80)	91.13 (233.60)	-11.85 (48.10)	111.2 (129.20)	132.2 (92.23)	-348.2 (841.80)
Constant	1,514*** (360.20)	1,173*** (188.80)	52.10 (46.23)	4.788 (30.33)	211.4*** (49.20)	2,971*** (452.10)

Observations 5873 5873 5873 5873 5873 5873

R-squared 0.001 0.011 0.001 0.001 0.001 0.001

Individual-level Fixed Effects regression with SEs clustered at the zone level; regression includes month dummies and uses data for rounds 2-10.

* significant at 10%; ** significant at 5%; *** significant at 1%

No; if anything slight increase in use of informal savings vehicles.

Crowd-out of formal loans?

Informal savings mechanisms.

Loan Applied for:

	Government	MFI	Private Bank
Treated	-0.00414 (0.01)	-0.00508 (0.01)	0.00756 (0.01)
Constant	0.0473*** (0.01)	0.0164*** (0.00)	0.0217*** (0.00)

Amount of Loan Received:

	Government	MFI	Private Bank
Treated	-17,919 (11856.00)	-19,645* (9998.00)	-11,644 (14653.00)
Constant	52,592*** (13453.00)	53,101*** (10194.00)	41,206*** (14301.00)

Observations

319

91

136

R-squared

0.094

0.199

0.224

Individual-level Fixed Effects regression with SEs clustered at the zone level; regression includes month dummies and uses data for rounds 2-10.

* significant at 10%; ** significant at 5%; *** significant at 1%

Some evidence of smaller loans, particularly from MFIs.

Have intra-household dynamics changed?

Intrahousehold Transfers.

	Monthly transfers to Spouse	Monthly transfers to Children	Monthly transfers to Everyone	Monthly Personal Income of Respondent	Monthly transfers to Spouse	Monthly transfers to Children	Monthly transfers to Everyone	Monthly Personal Income of Respondent
Baseline Characteristics:								
Treated	-47.03 (354.20)	144.4 (135.00)	-64.69 (492.40)	1815 (1758.00)	-96.75 (408.30)	45.26 (71.97)	-285.9 (537.30)	1292 (2350.00)
Female					-1,595*** (275.60)	-29.16 (67.81)	-1,799*** (347.10)	-5,819*** (1398.00)
Treated * Female					99.02 (436.20)	183.8 (180.20)	417.7 (521.00)	994.3 (2260.00)
Constant	2,428*** (275.10)	393.6*** (48.52)	3,674*** (330.50)	20,492*** (879.80)	3,275*** (283.90)	409.3*** (59.93)	4,630*** (338.10)	23,585*** (1017.00)
Observations	5873	5873	5873	5873	5873	5873	5873	5873
R-squared	0.004	0.002	0.005	0.012	0.015	0.003	0.012	0.018

SEs are clustered at the individual level, regression includes month dummies and uses data for rounds 2-5.

* significant at 10%; ** significant at 5%; *** significant at 1%

No: the treatment does not change reported intra-household transfers, nor does it have any differential effect on women.

More effective for behaviourally challenged?

	Number of Monthly Transaction	Monthly Bank Savings	Total Monthly Consumption	Self Employed	Business Income
Baseline Characteristics:					
Treated * Hyperbolic	-0.303 (0.44)	-2095 (2705.00)	-4821 (9756.00)	0.173 (0.20)	460.1 (6943.00)
Treated * Patient	0.866 (0.60)	-2155 (3929.00)	-16,236.00 (15369.00)	-0.23 (0.31)	8,880.00 (10870.00)
Treated * Digitspan	-0.0124 (0.04)	-39.39 (138.60)	-391.7 (615.00)	0.00421 (0.02)	319.9 (685.40)
Hyperbolic	0.311 (0.23)	1084 (704.80)	5,248.00 (5916.00)	-0.05 (0.16)	-2,285.00 (3197.00)
Patient	0.631** (0.32)	2,710** (1268.00)	21259 (13489.00)	0.687*** (0.22)	9040 (7992.00)
Digitspan	0.0311 (0.02)	135.3 (91.78)	910.8** (404.40)	0.0337** (0.01)	591.50 (434.60)
Treated	1.016 (0.88)	4568 (6063.00)	21974 (21005.00)	-0.00944 (0.44)	-7198 (13444.00)
Constant	-0.265 (0.44)	-3,327* (1823.00)	-7,919.00 (17422.00)	-0.17 (0.31)	2,459.00 (8177.00)

Observations 5873 5873 5873 5873 3046

No evidence of larger treatment effects, although patient and numerate do better overall.

Next steps: the move to deposit boxes



Next steps: the move to deposit boxes

Phase 1. Basic Savings technologies.

NSB.

Strata S1, S2, S3, and S4	Weekly POS visits to home treatment	78 zones
	Control	78 zones

Phase 2. Savings Product Innovations.

NSB.

Strata S1, S2, S3, and S4	Original POS treatment group	POS Treatment to home continues	Weekly collection	40	Biweekly collection	19
		Switch to zone center lock-box	Weekly collection	19	Biweekly collection	
	Original POS Control	Switch to zone center lock-box	Weekly collection	13	Biweekly collection	13
		Pure Control	52 zones			

Weekly home visits are not viable at this level of savings for the bank, so the next step is to move towards investigation of a more commercially viable set of products; less frequent visits and the use of lock boxes. **Do savings decrease with these more efficient collection technologies?**

Concluding Discussion

- Program extremely effective at generating formal savings; more than 1m rupees savings in each branch by the end of 6 months.
- Substantial increases in overall income and business income.
- Evidence of a switch from debt-financed to savings-financed entrepreneurship.

However,

- Sri Lanka is a country with strong rural banks and a deep culture of savings.
- We appear to have created savings in NSB primarily by cannibalizing savings that would anyways have gone into formal banks, although number of transactions soars with home visits.
- Most important determinants of takeup and use of NSB POS accounts is the use of other formal savings.
- No major increases in consumption.

Work yet to do: Are the income increases real? Where do they come from?

Thank you!
