

Decentralised Targeting of Agricultural Credit: Private v. Political Intermediaries

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Work-in-Progress

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Targeting for Development Programmes

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- This provides the rationale for decentralizing beneficiary selection
- Commonly this involves delegating the formal selection role to local governments
- An alternative is to delegate to a private intermediary from within the local community
- This paper compares two alternative intermediaries: private v. political

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- What is the role of local intermediaries?
 - Selection of beneficiaries
 - Subsequent engagement with beneficiaries (monitoring/assistance to beneficiaries)
- The literature has focused mostly on the former.
- We provide evidence on the relative importance of the selection and engagement roles of local intermediaries.

Decentralization

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- Local governments have better information & incentives than central bureaucrats
- But decentralization is not a panacea (WDR 2004, Mansuri & Rao 2013)
 - local govts. subject to elite capture
 - low competence and training
 - problems of coordination across jurisdictions, loss of scale economies
- Growing evidence that local governments have clientelistic motives (Stokes 2005, Devarajan-Khemani 2016, Bardhan-Mookherjee 2012 & 2016)
- These political distortions motivate search for alternative ways to decentralize: for example, appointment of private intermediaries

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 - Role:
 - formal: selects borrowers depending on information and personal/political motives
 - informal: engagement (monitoring/assistance) with beneficiaries

Key Questions

- (a) Relative performance of private and political intermediary schemes
- (b) Relative importance of (formal) selection and (informal) engagement roles of local intermediaries

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 - elite capture, cronyism, clientelism
- In both schemes, only landless & marginal landowners (≤ 1.5 acres) could be beneficiaries, to limit cronyism, corruption/elite capture

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 - borrower selection patterns (ability)
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- Try to explain these by differences in underlying information and incentives of the intermediary

Preview of Results

- TRAIL scheme outperforms GRAIL scheme in terms of borrower income
 - Potato Production effects were similar: 26% in TRAIL vs 23% in GRAIL
 - Potato Imputed Profits were significantly higher in TRAIL: 41% vs 3%
 - Overall Farm Value Added was significantly higher in TRAIL: 21% vs 2%

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- Selection differences explain a small part of differences in impact on borrowers
- Differences between TRAIL and GRAIL agents in both selection and engagement roles can be explained by differences in their incentives

Road Map

- Experimental Context & Design
- Empirical Results on Borrower Outcomes: ATEs
- Explanations
 - Understanding Selection Differences
 - Quantifying the Role of Selection Differences
 - Explaining differences in Conditional Treatment Effects (CTEs)
- Discussion & Conclusion

Related Literature

- *Targeting and Networks*: Selecting pivotal members of a community as a node for development interventions
 - Bandiera and Rasul (2006), Alatas, Banerjee, Hanna, Olken and others (AER 2012, 2016; JPE 2016), Hussam, Rigol & Roth (2017)
- *Clientelism and Targeting*: Do appointed politically influential members use their discretion clientelistically to garner votes; how does this affect the effectiveness of the intervention?
 - Stokes (2005), Bardhan-Mookherjee (2012) & (2016), Robinson-Verdier (2013), Bardhan, Mitra, Mookherjee & Nath (2016), Dey and Sen (2016)

Location



Intervention
Districts

Experimental Setting

- Focus on potatoes, leading cash crop in West Bengal

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- Focus on potatoes, leading cash crop in West Bengal
- Two potato-growing districts: Hugli and West Medinipur
 - TRAIL: 24 villages
 - GRAIL: 24 villages
- Experiment lasted eight 4-month cycles over the period: Sept 2010 - July 2013

Baseline: Selected Crop Characteristics

	Sesame (1)	Paddy (2)	Potatoes (3)
Cultivate the crop (%)	0.49	0.69	0.64
Acreage (acres)	0.45	0.69	0.49
Harvested quantity (kg)	141	1175	5301
Cost of production (Rs)	703	4396	12083
Price (Rs/kg)	30.71	10.30	4.67
Revenue (Rs)	3423	8095	21298
Value added (Rs)	2720	3787	9215
Value added per acre (Rs/acre)	6348	6568	17779

The Agent-Intermediated Lending Scheme

- Agent recommends 30 landless or marginal landowners (owning ≤ 1.5 acres of cultivable land)
 - subset of these are chosen randomly to receive offer of individual liability loans
- Agent plays no further (formal) role:
 - MFI sets loan terms, directly lends to and collects repayments from borrowers

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- Agent plays no further (formal) role:
 - MFI sets loan terms, directly lends to and collects repayments from borrowers
- But agent could be motivated to monitor or help borrowers informally
- No group meetings, savings requirements or gender restrictions

Common Loan Features

- Loan interest rate pegged at APR of 18%, well below average rates (25%) on informal credit
- Dynamic borrower incentives
 - start with small loans (Rs 2000 (\sim \$40), $\frac{1}{4}$ of average working capital used)
 - future credit access grows at 33% across cycles, subject to current repayment

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 - future credit access grows at 33% across cycles, subject to current repayment
- *Loan durations/timing: 4 months, match potato planting-harvesting-selling cycle
- *Insurance against covariate (price-yield) risks in potato cultivation
- *Doorstep banking, no bank accounts

(*: non-standard)

Agents and their Incentives

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- GRAIL: local government council chooses the agent
- Agent's incentives:
 - forfeitable deposit (= 2.5% of first loan amount (\equiv Rs 50)) per borrower
 - commission = 75% of interest payments received from borrowers
 - termination if $\geq 50\%$ of borrowers defaulted
 - paid holiday at the end of 2 years in the scheme

Experimental Context: Agent Characteristics

	GRAIL (1)	TRAIL (2)	Difference (3)
Occupation: Cultivator	0.375 (0.101)	0.042 (0.042)	0.33*** (0.109)
Occupation: Shop/business	0.292 (0.095)	0.958 (0.042)	-0.667*** (0.104)
Occupation: Government job	0.125 (0.690)	0.000 (0.000)	0.125* (0.690)
Owned agricultural land	2.63 (0.198)	3.29 (0.244)	-0.667** (0.314)
Educated above primary school	0.958 (0.042)	0.792 (0.085)	0.167* (0.094)
Weekly income (Rupees)	1102.895 (138.99)	1668.75 (278.16)	-565.855 (336.78)
Village society member	0.292 (0.095)	0.083 (0.058)	0.208* (0.111)
Party hierarchy member	0.167 (0.078)	0.000 (0.00)	0.167** (0.079)
Panchayat member	0.125 (0.069)	0.000 (0.00)	0.125* (0.069)
Self/family ran for village head	0.083 (0.058)	0.000 (0.00)	0.083 (0.058)

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Household Characteristics and Randomisation Check

	TRAIL (1)	GRAIL (2)	TRAIL-GRAIL (3)
Head: More than Primary School	0.407 0.015	0.420 0.015	-0.013
Head: Cultivator	0.441 0.015	0.415 0.015	0.026
Head: Labourer	0.340 0.015	0.343 0.015	-0.003
Area of house and homestead (Acres)	0.052 0.001	0.052 0.002	0.000
Separate toilet in house	0.564 0.015	0.608 0.015	-0.044
Landholding (Acres)	0.456 0.013	0.443 0.013	0.013
Own a motorized vehicle	0.124 0.010	0.126 0.010	-0.002
Own a Savings Bank Account	0.447 0.015	0.475 0.015	-0.028
F-test of joint significance (p-value)			0.996

Design and Sample

- Experiment designed to estimate separately the effects of selection and conditional treatment effects (Karlan & Zinman 2010)
- In each scheme
 - In each village, the agent recommends 30 borrowers...
 - ...and the lender offers the loans to a *randomly chosen subset* of 10 individuals (Treatment, T)

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- In each scheme
 - In each village, the agent recommends 30 borrowers...
 - ...and the lender offers the loans to a *randomly chosen subset* of 10 individuals (Treatment, T)
 - We sample:
 - 10 recommended but not chosen to receive the loans: Control 1 (C1)
 - 30 of those not recommended: Control 2 (C2)

Average Treatment Effects

$$\begin{aligned}
 y_{ivt} = & \beta_0 + \beta_1 \text{TRAIL}_v + \beta_2(\text{TRAIL}_v \times \text{Treatment}_{iv}) + \beta_3(\text{TRAIL}_v \times \text{Control } 1_{iv}) \\
 & + \beta_4(\text{GRAIL}_v \times \text{Treatment}_{iv}) + \beta_5(\text{GRAIL}_v \times \text{Control } 1_{iv}) \\
 & + \gamma \mathbf{X}_{iv} + T_t + \varepsilon_{ivt}
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- Conditional treatment effects (ITT estimates), *conditional on selection*:
Difference between T and C1:
 - TRAIL: $\beta_2 - \beta_3$
 - GRAIL: $\beta_4 - \beta_5$

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 \end{aligned}$$

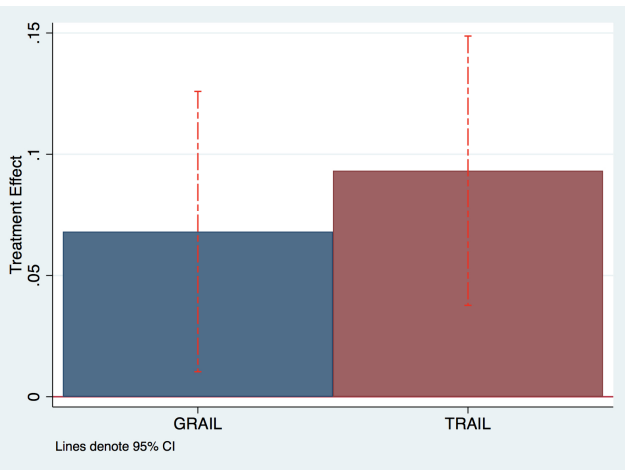
- Conditional treatment effects (ITT estimates), *conditional on selection*:
Difference between T and C1:
 - TRAIL: $\beta_2 - \beta_3$
 - GRAIL: $\beta_4 - \beta_5$
- Selection effects: Difference between C1 and C2:
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 - GRAIL: β_5

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- Selection effects: Difference between C1 and C2:
 - TRAIL: $\beta_3 - \beta_1$
 - GRAIL: β_5
- Controls for age, education, occupation of oldest male, land owned, year dummies, price information intervention
- Standard errors clustered at the hamlet level to account for spatial correlation

RESULTS: Average Treatment Effects on Potato Acreage



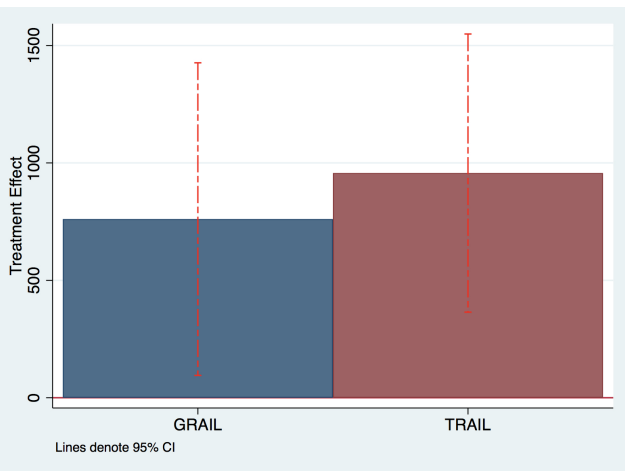
% Effects

TRAIL	27.78
GRAIL	23.00

Treatment Differences

TRAIL-GRAIL	0.025 (0.041)
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RESULTS: Average Treatment Effects on Potato Output



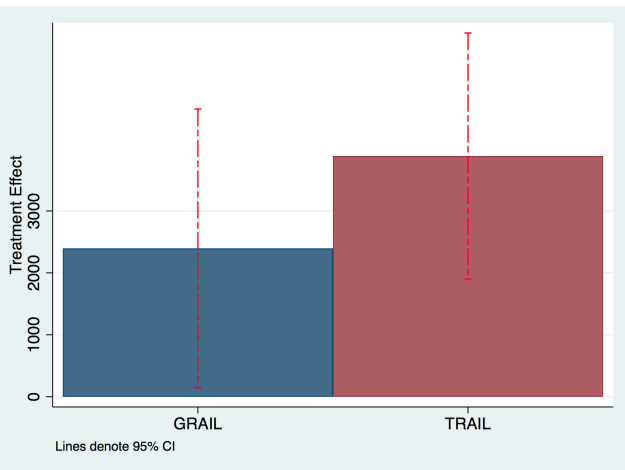
% Effects

TRAIL	26.24
GRAIL	23.50

Treatment Differences

TRAIL-GRAIL	196.11 (456.13)
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RESULTS: Average Treatment Effects on Potato Revenues



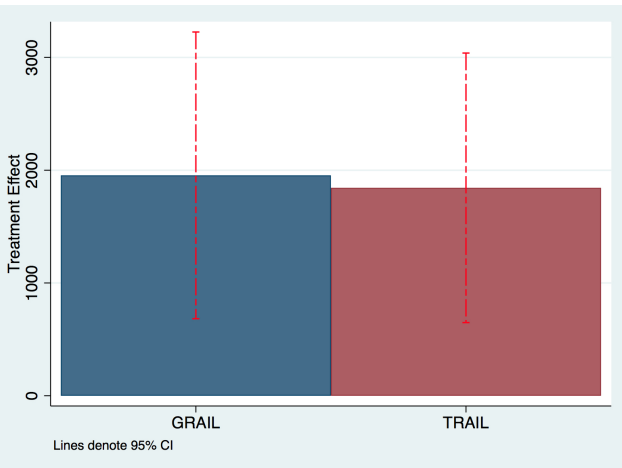
% Effects

TRAIL	27.2
GRAIL	18.5

Treatment Differences

TRAIL-GRAIL	1491.8 (1829.7)
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RESULTS: Average Treatment Effects on Potato Production Cost



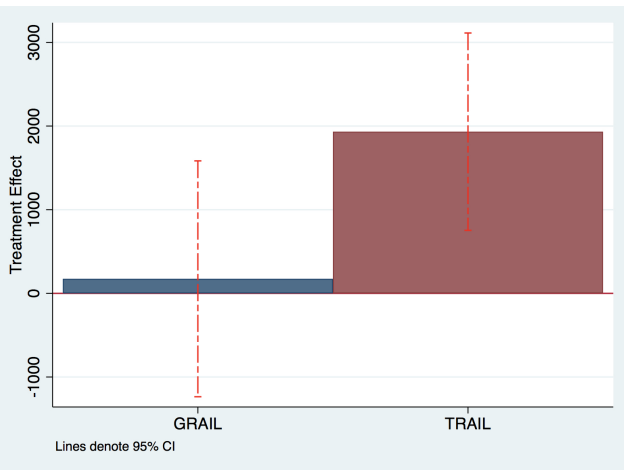
% Effects

TRAIL	21.7
GRAIL	27.6

Treatment Differences

TRAIL-GRAIL	-110.6 (1067.70)
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Average Treatment Effects: Potato Imputed Profit



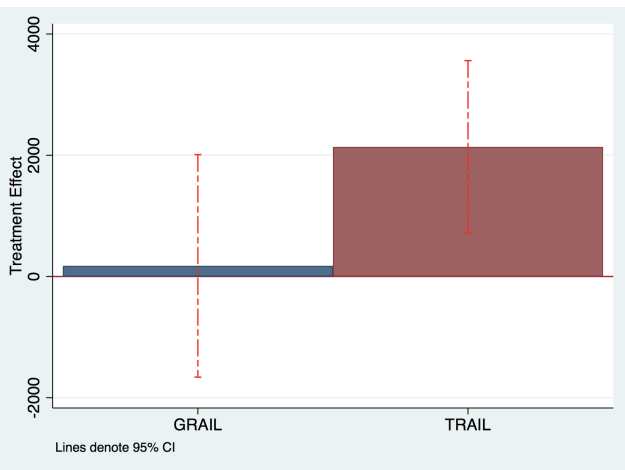
% Effects

TRAIL	40.83
GRAIL	3.52

Treatment Differences

TRAIL-GRAIL	1758.85*
	(939.64)

Average Treatment Effects: Farm Value Added



% Effects

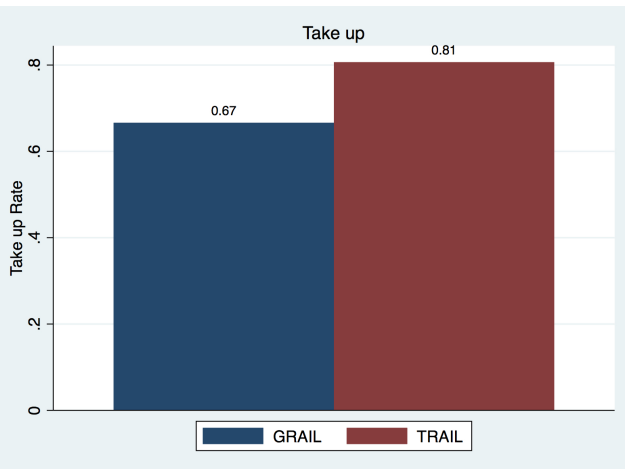
TRAIL	20.68
GRAIL	1.66

Treatment Differences

TRAIL-GRAIL	1962.38*
	(1186.64)

Loan Performance

Takeup



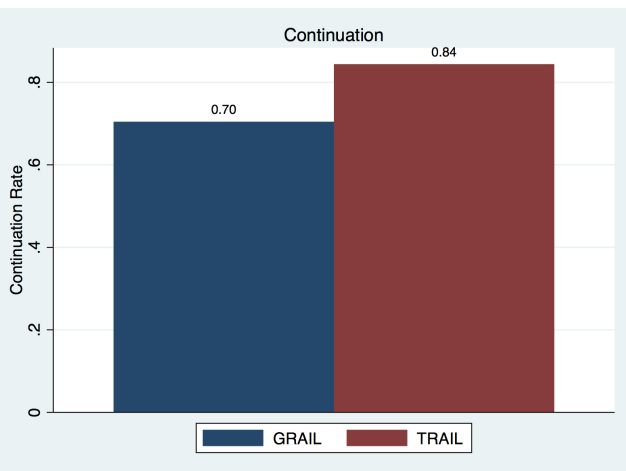
Differences in Means

TRAIL-GRAIL 0.131**

Estimated from a regression including cycle dummies. Sample restricted to households that were eligible to take the program loan in that cycle.

Loan Performance

Continuation



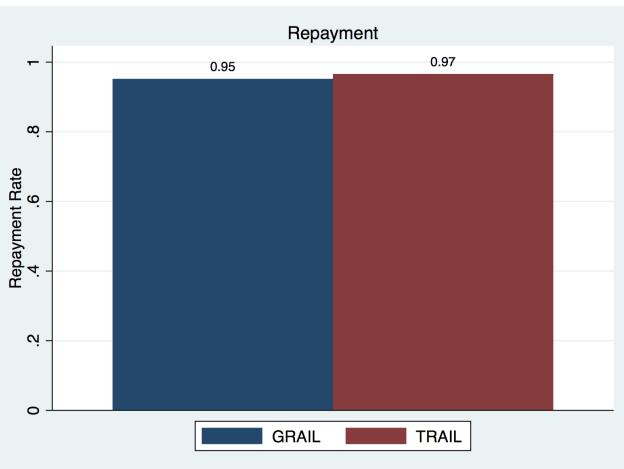
Differences in Means

TRAIL-GRAIL 0.133***

Estimated from a regression including cycle dummies. Sample restricted to households that were eligible to receive the program loan in cycle 1.

Loan Performance

Repayment



Differences in Means

TRAIL-GRAIL 0.015*

Estimated from a regression including cycle dummies. Sample restricted to households that had taken the program loan in the cycle.

Questions

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 - (1) Do TRAIL and GRAIL agents select borrowers differently?
 - (2) Conditional on selection, do TRAIL and GRAIL generate different treatment effects?
- Relative role of selection and conditional treatment effects in overall ATE differences
- What explains (1) and (2)?

Estimating and Understanding Selection Differences

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- Examine how selection patterns by ability differ between the two schemes
- Decompose ATE difference: role of selection differences
- Examine role of agent motivation in explaining selection differences

Estimating Ability

- Ability is correlated with observable and unobservable characteristics.
 - More landed households, those whose heads were Hindu, who did not belong to the lower castes/tribes, and whose primary occupation was cultivation all devoted more land to potato cultivation
 - Unobservable factors such as skill and technical know-how might also contribute to farmer ability and therefore determine cultivation
- We estimate ability as a function of household-specific factors, incorporating both observable and unobservable characteristics.

How do we estimate “Ability”?

- Output of farmer h with ability θ_h located in village v in year t (conditional on success):

$$Y_{hvt} = \theta_h^{1-\gamma} \left[\frac{1}{1-\alpha} l^{1-\alpha} \right]$$

- Probability of success:

$$p_{hvt} = P_{vt} \theta_h^{1-\nu}$$

- Competitive informal credit market with informed private lenders (with cost of capital ρ_{vt}), hence informal interest rate for household h is $\frac{\rho_{vt}}{p_{hvt}}$

How do we estimate “Ability”?

Continued

- Loan size or scale of cultivation $l = l_{hvt}$ maximizes

$$p_{hvt}(\theta_h)\theta_h^{1-\gamma}\left[\frac{1}{1-\alpha}l^{1-\alpha}\right] - \rho_{vt}l$$

- This implies:

$$\log l_{hvt}^C = \frac{1}{\alpha} \log A_h + \frac{1}{\alpha} [\log P_{vt} - \log \rho_{vt}]$$

- $A_h \equiv \theta_h^{2-\gamma-\nu}$
- $\delta \equiv \frac{1-\gamma}{2-\gamma-\nu} \in (0, 1)$ is the *compression parameter*
- Household fixed effect in panel regression of scale of cultivation (or expected output value) can be interpreted as ability (fixed effect version of Olley-Pakes (1996))

“Ability” of Selected Borrowers

Assume

$$A_h = T_h X_{1h}^{\psi_1} X_{2h}^{\psi_2} \dots$$

where T_h is unobservable to us (but observed by agent), and X_{kh} is observed household characteristic

⇒

$$\log I_{ht}^C = \frac{1}{\alpha} \sum_k \psi_k X_{kh} + \frac{1}{\alpha} [\log T_h + \log P_{vt} - \log \rho_{vt}] + \epsilon_{ht}$$

$$\log I_{ht}^C = \underbrace{\sum_k \beta_k X_{kh}}_{\zeta_h} + u_h + \mu_{vt} + \epsilon_{ht}$$

$$\log I_{ht}^C = \zeta_h + \mu_{vt} + \epsilon_{ht}$$

Estimate ability by household fixed effect ζ_h for C1/C2 households, after controlling for village-year dummies; then assess selection by comparing ability between C1 and C2 groups

How do we estimate “Ability”?: Summary

- Use fixed-effects version of Olley-Pakes (1996) & Levinsohn-Petrin (2003) method to estimate TFP of farmers

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- Idea is that more productive farmers devote greater acreage and produce higher output
- For C2 and C1 households, this delivers an ability estimate
- For T households, ability estimate is contaminated by treatment

How do we estimate “Ability”?: Summary

- Use fixed-effects version of Olley-Pakes (1996) & Levinsohn-Petrin (2003) method to estimate TFP of farmers
- Farmer fixed effects panel regression of potato acreage, after controlling for year dummies & other policy treatment
- Idea is that more productive farmers devote greater acreage and produce higher output
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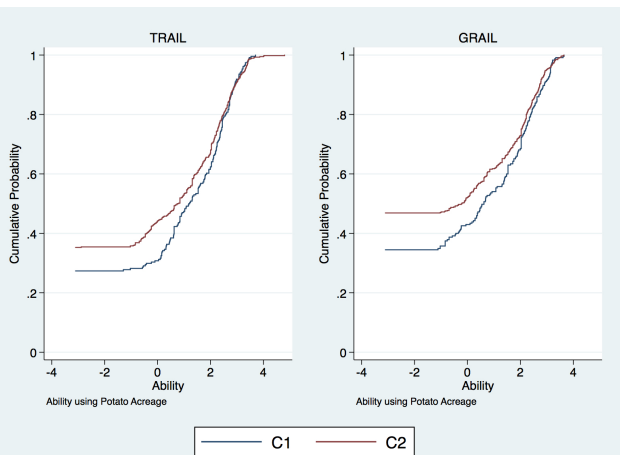
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- Match T & C1 households of equal rank and assign C1's ability to T household
- Result: Ability distribution for all sample households

Ability Estimates

- Non-cultivators: Bin 1 (we can estimate only the upper bound of ability)
- Cultivators: Continuous ability estimates; classified into
 - Below median ability: Bin 2
 - Above median ability: Bin 3

Ability of the Selected v. Non-selected: TRAIL and GRAIL

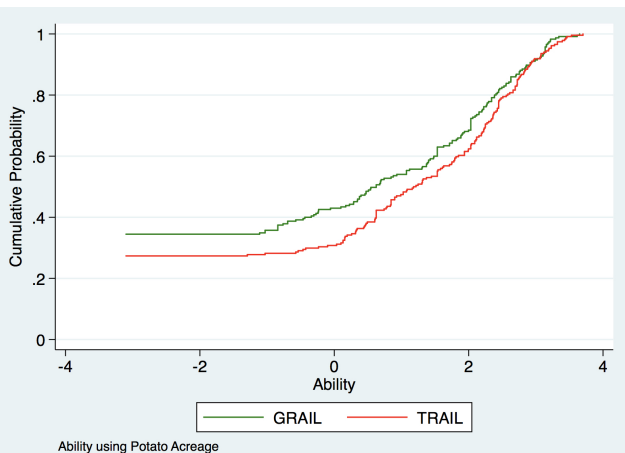


K-S Test (p-value)

TRAIL: 0.005
GRAIL: 0.011

In both TRAIL and GRAIL schemes, selected households have higher ability than non-selected.

Ability estimates for the Selected (C1): TRAIL and GRAIL

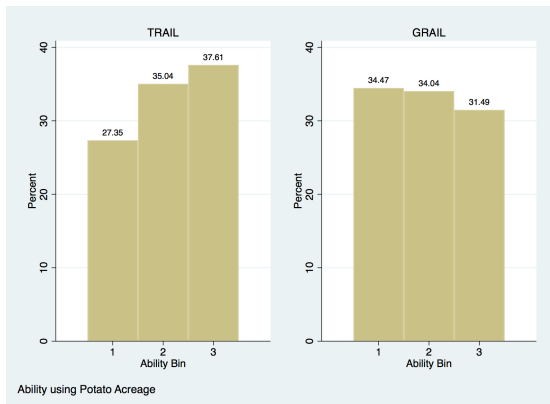


K-S Test (p-value) 0.061

TRAIL selected households have higher ability than GRAIL selected households.

Proportion of Households in Each Ability Bin. C1 households only

TRAIL and GRAIL



Descriptive Statistics by Ability Bin

C1 Households only. TRAIL and GRAIL

	All	Bin 1	Bin 2	Bin 3
Landholding	0.448 (0.009)	0.263 (0.014)	0.429 (0.014)	0.713 (0.015)
Non Hindu	0.181 (0.008)	0.239 (0.016)	0.154 (0.014)	0.133 (0.013)
Low Caste	0.321 (0.010)	0.414 (0.018)	0.314 (0.018)	0.206 (0.016)
Age of Oldest Male in Household	47.609 (0.295)	45.085 (0.504)	48.347 (0.493)	50.081 (0.512)
Oldest Male has more than Primary Schooling	0.417 (0.011)	0.348 (0.017)	0.382 (0.019)	0.543 (0.019)
Oldest Male Cultivator	0.713 (0.010)	0.428 (0.018)	0.893 (0.012)	0.905 (0.011)
Oldest Male Agricultural Labourer	0.504 (0.011)	0.581 (0.018)	0.578 (0.019)	0.328 (0.018)

Estimating Ability: First Stage Regressions

	OLS (1)	FE (2)
Year 2	-0.318*** (0.042)	-0.323*** (0.042)
Year 3	-0.433*** (0.053)	-0.434*** (0.053)
Landholding	1.638*** (0.195)	
Non Hindu	-0.840*** (0.206)	
Low caste	-0.566*** (0.158)	
Age of Oldest Male in Household	0.015*** (0.004)	
Oldest Male has more than Primary Schooling	-0.244** (0.107)	
Oldest Male Cultivator	2.591*** (0.146)	
Oldest Male Agricultural Labourer	-0.359*** (0.136)	
Constant	-5.665*** (0.286)	-2.885*** (0.028)
R-squared	0.312	0.026
Sample Size	6,156	6,243
Number of Households		2,081

Discussion: TRAIL agents conduct superior selection

- In both TRAIL and GRAIL schemes: selected households are more able than non-selected households.
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- Why?

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- Agent incentives could be:
 - commissions (avoid defaults): common to all
 - sales margins: salient for traders
 - political motives: salient for GRAIL agents

Sales to agents

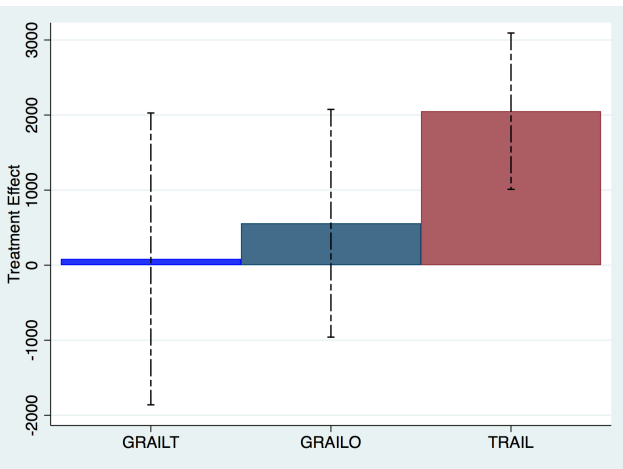
Classification of Agents

- 3-group classification of agents:
 - TRAIL (Traders: $N=24/24$)
 - GRAILT (Traders: $N=7/24$)
 - GRAILO (Non-traders: $N=17/24$)

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- 3-group classification of agents:
 - TRAIL (Traders: $N=24/24$)
 - GRAILT (Traders: $N=7/24$)
 - GRAILO (Non-traders: $N=17/24$)
- By comparing GRAILT and GRAILO with TRAIL, we can understand the relative importance of
 - expertise & procurement motive
 - political incentives

ATEs for TRAIL, GRAILT and GRAILO (Potato Value-added)



% Effects

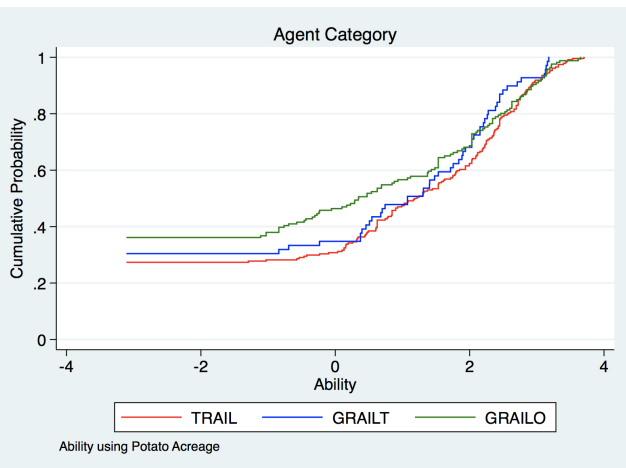
TRAIL (N=24)	35.80
GRAILT (N=7)	1.59
GRAILO (N=17)	9.20

Treatment Differences

TRAIL-GRAILT	1968.69 (1333.63)
TRAIL-GRAILO	1493.68 (1119.99)
GRAILT-GRAILO	-475.01 (1513.16)

GRAILT and GRAILO both generate small and non-significant ATEs.

Ability of the Selected: TRAIL, GRAILT and GRAILO



K-S Test (p-values)

TRAIL-GRAILT	0.616
TRAIL-GRAILO	0.016
GRAILT-GRAILO	0.174

Selection by TRAIL \succ Selection by GRAILT \succ Selection by GRAILO

What Drives Selection?

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 - Selection by GRAILT \succ Selection by GRAIO: Suggests role of agent information/expertise
- Examine political incentives

Political Incentives: Evidence

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- Treatment effect: $\beta_1 - \beta_2$ indicates clientelism
- Selection effect: $\beta_2 - \beta_0$ indicates loyalism/cronyism
- Controls for age, education, occupation of oldest male, land owned, year dummies, price information intervention

Effect of Treatment on Voting Patterns in Straw Poll

	TRAIL (1)	GRAIL (2)	TRAIL (3)	GRAIL (4)
Treatment Effect	0.024 (0.05)	0.078** (0.03)	-0.041 (0.044)	0.161*** (0.039)
Selection Effect	-0.065 (0.04)	0.083** (0.04)	-.065 (0.045)	0.083** (0.037)
Household Controls	N	N	Y	Y
Observations	1,011	1,026	1,021	1,044

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 - maybe GRAIL agents have better information about loyals and so select better
 - maybe GRAIL agents' loyals are high-ability farmers

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- To what extent is superior selection driving the ATE differences?
- Our previous work (MMMMV 2017) shows that TRAIL treatment effects increase in ability
- We decompose the treatment effect differences into:
 - contribution of selection differences
 - contribution of conditional treatment effect (CTE) differences

Decomposition of ATE Differences; TRAIL v. GRAIL

	TRAIL weights	GRAIL weights	TRAIL - GRAIL weights	TRAIL HTEs	GRAIL HTEs	TRAIL - GRAIL HTEs	TRAIL - GRAIL weights × TRAIL HTEs (3) × (4)	GRAIL weights × TRAIL - GRAIL HTEs (2) × (6)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bin 1	0.263	0.329	-0.066	1505.79	-737.92	2243.71	-99.38	738.18
Bin 2	0.356	0.349	0.007	1552.34	758.93	793.41	10.87	276.90
Bin 3	0.382	0.322	0.060	2638.28	1086.82	1551.47	158.30	499.57
ATE				2058.40	492.73	1565.67	69.78	1514.65
% of Diff in ATE Due to Selection								4.46
% of Diff in ATE Due to Conditional Treatment Effects								96.74

- Selection explains only 4% of ATE differences.
- The bulk is explained by treatment effects conditional on selection.
- Agent engagement seems far more important than selection in determining treatment effects.

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- Default risk (hence value of monitoring) is decreasing in farmer ability (ability bin 1 pays 4.4% higher interest rate compared to others, stat. significant at 10%)
- Effectiveness of help in increasing farmer income is increasing in farmer ability (complementarity between ability and help)

Agent Engagement Incentives, contd.

commissions sales margins political gains

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TRAIL

✓

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Agent Engagement Incentives, contd.

	commissions	sales margins	political gains
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TRAIL	✓		
GRAILO	✓		

		✓	
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Agent Engagement Incentives, contd.

	commissions	sales margins	political gains
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TRAIL	✓	✓	
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GRAILO	✓		✓
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GRAILT	✓	✓	✓
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Explaining Differences in Agent Engagement, contd.

- Focus mainly on TRAIL v. GRAILO agents, since 17/24 GRAIL agents are

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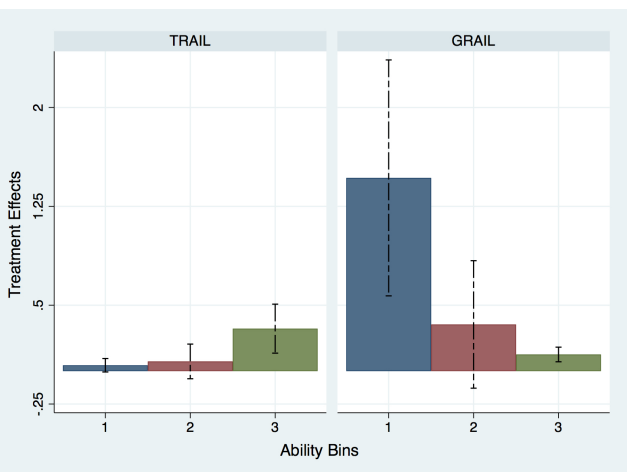
TRAIL interactions

- Owing to sales margin motive, and to selection of fewer low ability borrowers, TRAIL agent will have greater motivation to help rather than monitor, and will allocate most of their help to high ability agents

GRAIL interactions

Interactions with Agent. HTE

Conversations about Cultivation and Trade. TRAIL and GRAIL



Treatment effect differences
p-value

Bin 1	-1.422
	<i>0.009</i>
Bin 2	-0.281
	<i>0.345</i>
Bin 3	0.196
	<i>0.088</i>

Implications for Borrower Income (Cond.) Treatment Effects

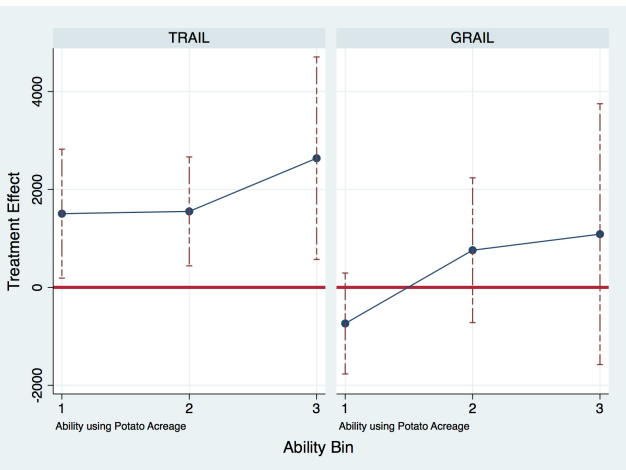
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Implications for Borrower Income (Cond.) Treatment Effects

- Since TRAIL agent offers more help to higher ability borrowers, (and given complementarity between ability and help) we expect TRAIL CTE on borrower incomes to be rising in ability
- GRAIL agent on the other hand focuses more on monitoring low ability borrowers, which could lower their mean incomes, hence GRAIL CTE could be negative esp for low ability borrowers

Heterogeneous Treatment Effects on Value-added

TRAIL v. GRAIL



Difference in Treatment Effects TRAIL-GRAIL

Ability Bin 1	2243.71** (1016.85)
Ability Bin 2	793.41 (1126.28)
Ability Bin 3	1551.47 (2052.56)

TRAIL: Conditional Treatment Effects on value-added mirror those on time spent talking to agent.

(Preliminary) IV estimates of Heterogenous Treatment Effects of Agent Engagement

- Estimate

$$\log Y_{ivt} = \beta \log A_{ivt} + \gamma \log(1 + E_{ivt}) + \mu X_{ivt} + \epsilon_{ivt}$$

where Y is Farm Value Added, A is area cultivated, E is agent engagement/interactions, and X_{ivt} is set of household, year, village controls

- Estimate separately for TRAIL and GRAIL (since effect of agent engagement could differ)
- Instrument A, E with treatment dummy, borrower ability, and interactions

(Preliminary) IV estimates of Income Effects of Agent Engagement

VARIABLES	OLS (1)	TRAIL IV (2)	IV (3)	OLS (4)	GRAIL IV (5)	IV (6)
Log Acres	0.032*** (0.002)	0.033*** (0.004)	0.031*** (0.004)	0.030*** (0.003)	0.033*** (0.004)	0.026*** (0.005)
Log (1 + help)	-0.009 (0.024)	0.345** (0.173)	0.318** (0.160)	-0.011* (0.006)	-0.092** (0.041)	-0.096** (0.048)
Additional Household Controls	No	No	No	No	Yes	Yes
Sample Size	1,380	1,380	1,377	1,374	1,374	1,359
R-squared	0.239	-0.044	0.063	0.076	0.063	0.083
Hanson J		2.318	0.461		0.257	0.387
First Stage F						
Log Acres		1471.98***	1059.43***		1517.42***	830.05***
Log (1 + help)		3.95***	3.91***		3.32**	4.45***
Cragg-Donald F		8.503	8.237		46.963	46.887

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- This difference is partly due to superior borrower selection by TRAIL agent
- Explanations:
 - Superior expertise of traders
 - GRAIL agents' political (clientelistic) incentives bias them toward low ability farmers
- There are substantial differences in conditional treatment effects
 - Local intermediaries' engagement thus appears quantitatively more important than formal selection role

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- Hence GRAIL income CTEs tend to be smaller than TRAIL
- Key differences in agent incentives:
 - stronger sales motive in TRAIL
 - absence of political motives

Conclusion

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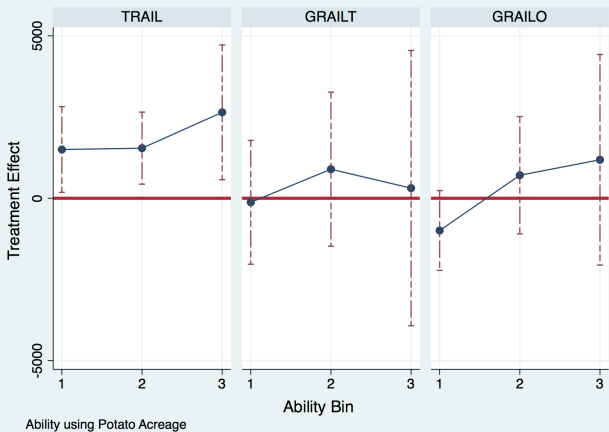
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- Agent incentives can explain differences in both selection and engagement roles between private and political intermediaries
- TRAIL agents' economic incentives are more closely aligned with raising incomes of (esp. high productivity) borrowers
- GRAIL agents are motivated mainly to lower default risk (esp. of low productivity borrowers), accentuated by political incentives

The End

Heterogeneous Treatment Effects on Potato Value-added. By Agent Type

TRAIL, GRAILT and GRAILO



Difference in Treatment Effects

TRAIL-GRAILT

Ability Bin 1	1624.148
Ability Bin 2	648.212
Ability Bin 3	2332.902

TRAIL-GRAILO

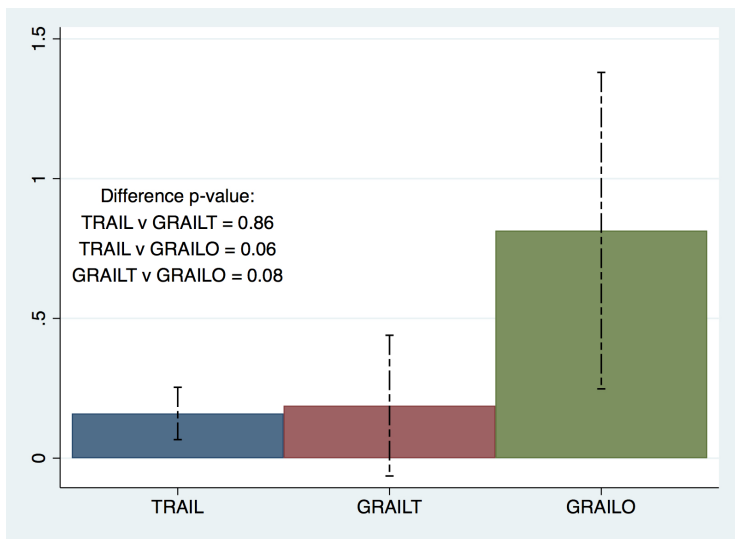
Ability Bin 1	2493.514**
Ability Bin 2	833.523
Ability Bin 3	1459.857

GRAILT-GRAILO

Ability Bin 1	869.365
Ability Bin 2	185.311
Ability Bin 3	-873.045

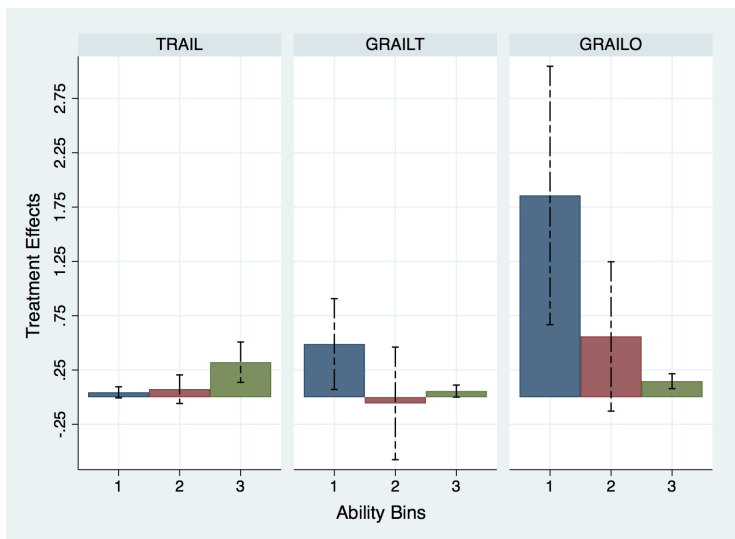
Interactions with Agent. ATE

Conversations about Cultivation and Trade. TRAIL, GRAILT and GRAILO



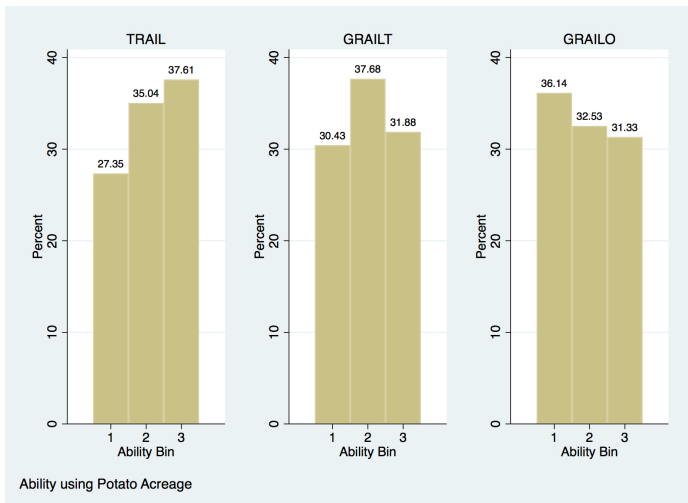
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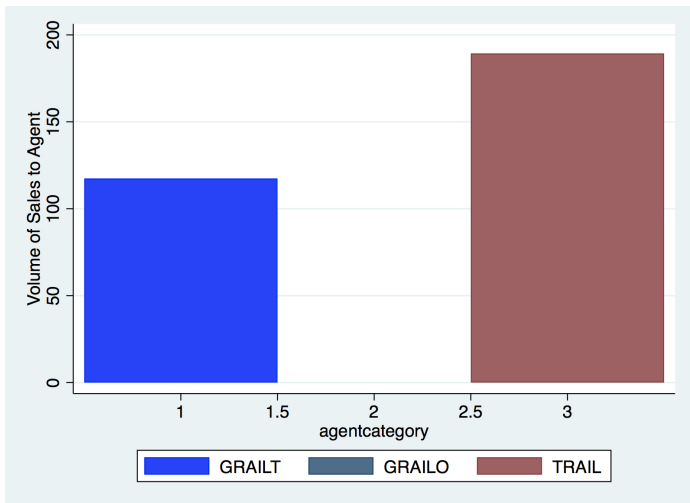


Proportion of C1 Households in Each Ability Bin

TRAIL, GRAILT and GRAILO



Volume of Potato Sales to Agent



Middlemen margins are 64-83% of farmgate prices (Mitra et al. 2018)

[back](#)

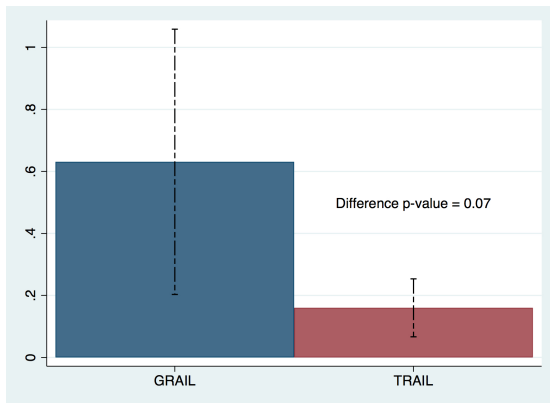
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Selection Effect	-0.065 (0.04)	0.083** (0.04)		
Treatment Effects:				
Bin 1			0.09 (0.09)	0.13* (0.07)
Bin 2			-0.07 (0.08)	0.03 (0.07)
Bin 3			0.06 (0.06)	0.01 (0.07)
Selection Effects:				
Bin 1			-0.13** (0.06)	0.02 (0.06)
Bin 2			-0.03 (0.07)	0.12* (0.07)
Bin 3			-0.03 (0.06)	0.11 (0.07)
Observations	1,011	1,026	1,021	1,044

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Interactions with Agent. ATE

Conversations about Cultivation and Trade. TRAIL vs GRAIL

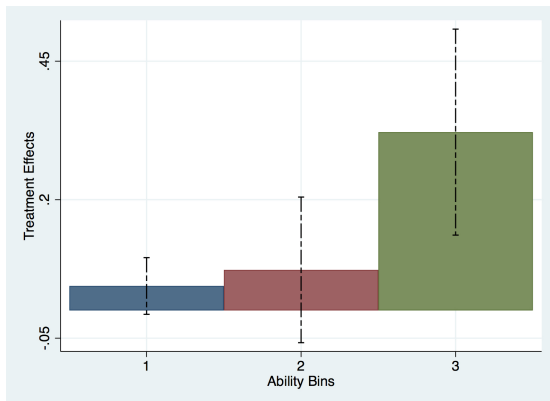


Marginal cost of TRAIL agent's time $>$ Marginal cost of GRAIL agent's time

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Interactions with Agent. HTE

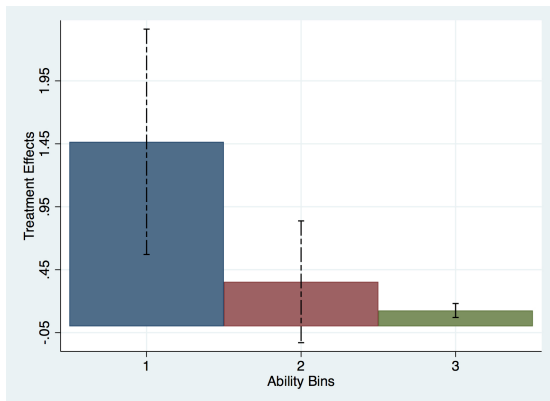
Conversations about Cultivation and Trade. TRAIL



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Interactions with Agent. HTE

Conversations about Cultivation and Trade. GRAIL



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