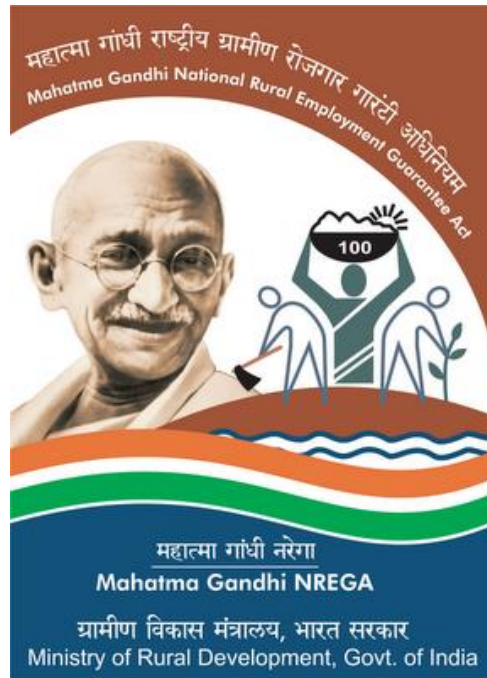


Workfare as “collateral”: the case of the National Rural Employment Guarantee Scheme (NREGS) in India.



Subhasish Dey, University of Warwick

Katsushi Imai, University of Manchester

UNU-WIDER-ESCAP Conference, Bangkok 11-13 September 2019

What is NREGA: a brief introduction

<http://www.youtube.com/watch?v=AJHVulb8IeM>

Outline

- Motivation for this research
 - Uniqueness of MG-NREGS
 - Main debate & Empirical challenges
 - Policy relevance
- Research Objectives & question(s)
- NREGS participation and household economic outcome: theoretical Link (Through a Trilateral stage game)
- Empirical work: Data & Methodology
- Results
- Conclusion

Motivation for this research

Uniqueness of NREGS

- ❑ NREGS – a self targeted workfare programme ensuring at least 100 days of unskilled manual/wage work on demand to each Rural Household.
- ❑ The Programme came in operation in phases. 2006 with 200 most backward districts , in 2007 more 137 districts and 2008 remaining 282 districts.
- ❑ The programme spent around 6.52 Billion USD as an average annual central budget in first 13 years (2006-07 to 2018-19)
- ❑ Decentralised Programme Implementation: Rural Municipality (Gram Panchayat- Rural Local self government) is the Programme implementing agency.



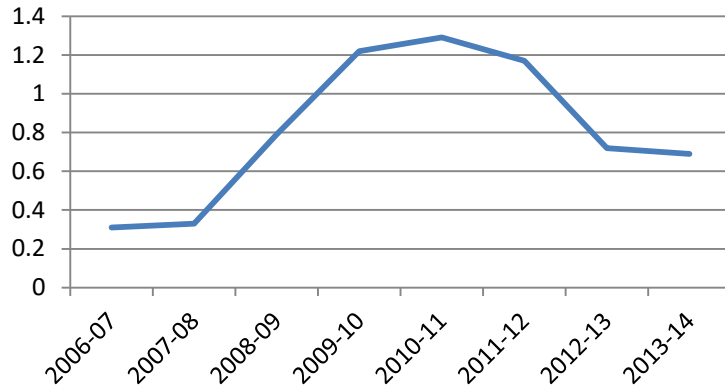
Proactive disclosure



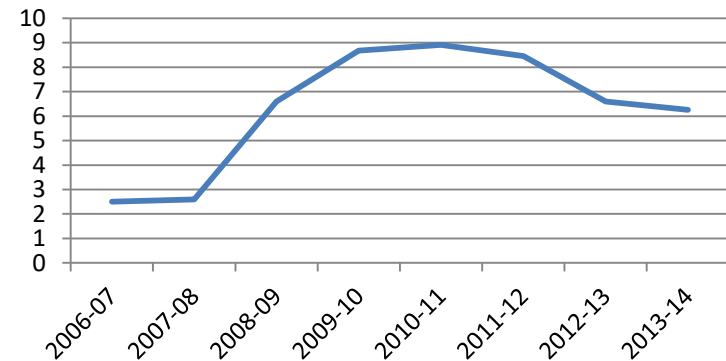
Measurement of physical progress of work, Social Audit, public scrutiny of Muster roll, women's active participation are part of uniqueness of NREGS.

Coverage and Outlay of NREGS: fall of Initial euphoria

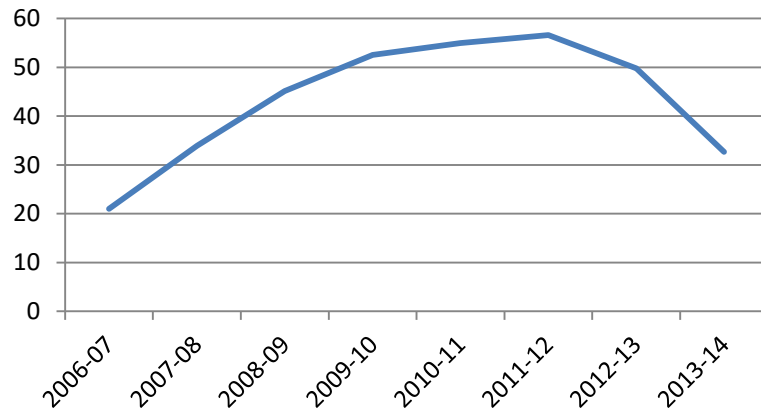
Annual outlay as % of GDP



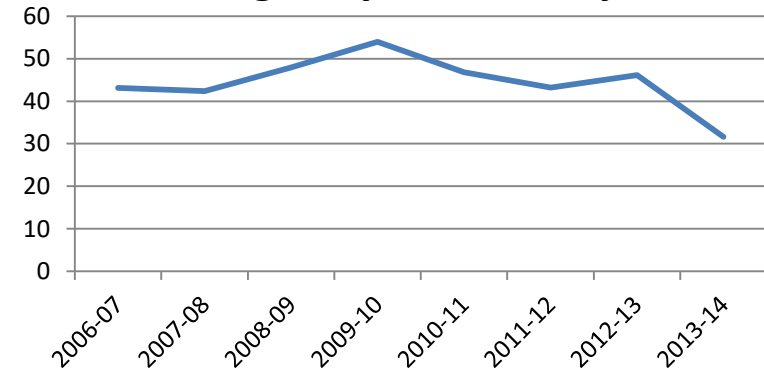
Actual financial outlay (in \$ bn)



HH coverage (In million)



Average days worked by a HH



Motivation cont.

Main analytical debate-

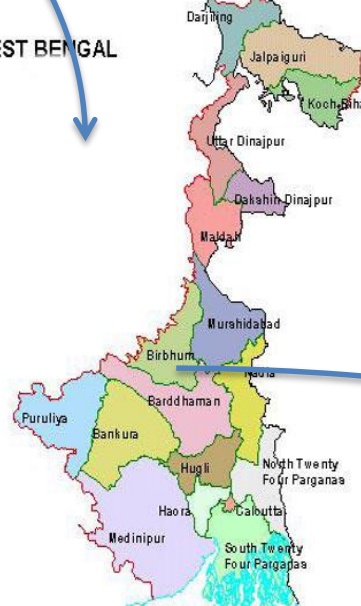
- Whether NREGS captured by the Non-Poor with an inappropriate incentive design
- Whether NREGS crowding out private employment from rural farm and non-farm sector with a competitive minimum wage (i.e. impact on rural lab. Mkt.)
- Whether NREGS influence the agricultural productivity and hence economic growth (i.e. long run impact on better agri. Infrastructure and growth)
- Whether NREGS can work as a safety net in midst of agricultural lean period

With these debates how to measure the impact at the household level

INDIA

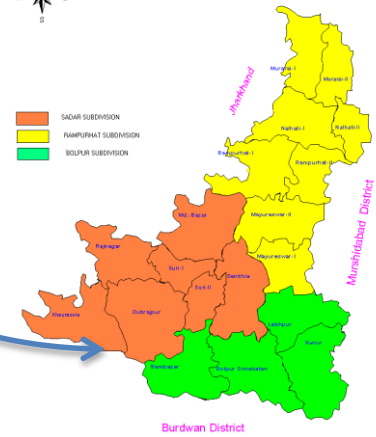


WEST BENGAL



Where I did my survey

BIRBHUM DISTRICT



Research Objectives & questions

NREGS and household economic security: Credibility & Concern

Main Objective: What are the effects of NREGS days of participation on the household's Economic outcomes?

Unpacking the main Research Questions:

- 1) Is there any effect of NREGS days of employment on household economic outcomes? (MPCE, monthly food & non-food consumption, education & health expenditure, saving and credit position)
- 2) Is NREGS providing an income insurance benefit which may prevent household from falling into poverty trap?

NREGS participation and household economic outcome: Theoretical Link

- **Who are participating in NREGS (Theoretically)?**

Mostly poor households who have incentive to work even at minimum wage with hard physical labour.

- **What Specific character these households have?**

No steady livelihood, making transaction mostly in credit, credit from friends, relatives, neighbors, local grocery owner for daily & petty transaction, No collateral for credit & loan, Can't signal themselves as a good borrower.

- **Why they are participating in NREGS?**

Mostly to tackle consumption poverty, To secure livelihood specially lean period.

- **What specificity NREGS work has?**

Notion of Govt. job, Guaranteed Job, otherwise unemployment dole, Political leader of local govt. has huge incentive to patronage this programme to increase the probability of re-election.

NREGS participation and household economic outcome: theoretical Link

- What one can get by working in NREGS? (Direct Effect!!)
 - ✓ Days of employment and certain amount of assured income.
- What else? (Important!!) (Sort of Indirect effect)
 - ✓ A signal to the potential lender (here the local grocery owner, relatives, friends, neighbors) that 'you' are now getting a GUARANTEED GOVERNMENT & LOCALLY AVAILABLE jobs in PANCHAYAT (i.e. local govt.)
 - What are the possible consequence of this signaling?
 - ✓ Being regular participant of NREGS (observed through one's previous stream of participation) this signaling may work as a (1) a proxy for collateral (2) reduce information asymmetry between Lender (here the grocery owner) and Borrower (here the NREGS worker) –

Credit worthiness improves and loan size restriction relaxed and consumption shocks smooth out overtime.

NREGS participation and household economic outcome: theoretical Link

- Previous theoretical arguments drawn from the literature on *credit market with incomplete information in the context of developing countries*. (Helmut Bester, AER 1985; Hoff & Stiglitz , WBER 1990; Stiglitz & Welss, AER 1981, Aleem, 1990)
- Several studies have proved such improvement of creditworthiness of the poor household through participation in such similar income transfer programme like EGS, CCT, Micro Finance etc. (Becchetti & Conzo, 2011; Urdinola & Monila,2008; Saraswat, 2011)

Lets formulate our model in terms of a game theoretic approach following the literature of community enforcement game (Kandori 1992; Fudenberg and Maskin 1986)

A Simple model of no-collateral lending and patronage game

- Considering ***tri-lateral stage game*** (involving NREGS participant, lender and PRI member/politician) with two components:
 - a) An infinitely-repeated game between participant and lender as bilateral lending game. (for decision on “no-collateral credit” and “repayment”)
 - b) An infinitely-repeated game between participant and PRI member as bilateral patronage game. (decision on “provision of NREGS” and “political support”)

Basic intuition: driving force is the mutual benefit between PRI member and NREGS participant and eventually lifting of credit constraint by provision of credit by lender without any collateral.

Set-up

Three actors: NREGS participants, Politician (PRI member), Lender (grocery owner)

NREGS participants (i.e. the potential borrower):

- Valuation of NREGS job : $V_N \in [0, \infty)$
- Value of Credit (as borrower) : $V_B \in [1-r, \infty)$;
- Cost of Political Support: 1 (after normalisation)
- Discount factor $\delta^B \in [0, 1)$

Note: Poorer the HH higher V_N

Politician (PRI member)

- Valuation of political support: $V_P \in [0, \infty)$
- Cost of NREGS Provision (i.e. not providing other): 1 (after normalisation)
- Discount factor $\delta^P \in [0, 1)$

Note: More closely contested last election higher V_P

Lender (here could be grocery owner/relatives/neighbour/friends)

- Offers uncollateralised credit with 'r' interest rate (included in price).
- Chooses whether to lend 1 unit of money worth of credited good to NREGS Participants at 'r' extra prices i.e. if price of credit product is 1 then actual price is (1-r)

Pay-offs of stage games

A: Bi-lateral lender-borrower game

		Lender	
		L	NL
NREGS Participants	R	$(1-r), r$	0,0
	NR	1,-1	0,0

B: Bi-lateral Patron-client game

		Politician	
		P	NP
NREGS Participants	S	$(V_N - 1), (V_P - 1)$	-1, V_P
	NS	$V_N, -1$	0,0

Strategy of the players

In Bi-lateral lender-borrower game

Both will employ “**lending grim trigger strategy**”: Lender chooses L (i.e. allowing lending or credit) iff the NREGS Participant chosen R (i.e. repayment) in all previous rounds and NREGS Participant chosen R iff the lender has chosen L in all previous rounds

In Bilateral Patron-client game :

Again both will employ “**patronage grim trigger strategy**”: The PRI member/politician chooses ‘P’ (i.e. continuous provision of NREGS) iff NREGS participant has chosen ‘S’ (i.e. political support) in all previous rounds and NREGS participant chooses ‘S’ iff PRI member has chosen ‘P’ in all previous years.

Moreover, all pay-offs of all the games are common knowledge and for each player Individual Rationality (IR) constraints are satisfied.

Out come of the bilateral games.

From Bilateral lending game:

- From IR constraint of NREGS participants we will get: $\delta^B \geq r$... (1)
- Under IR condition (L,R) is the optimal choice of NREGS Participants.
- Given that NREGS participant choose (L,R) under IR, Lender receives higher pay-off if he chooses (L,R) instead of a defecting option (NL,R).
- No incentive for Lender to deviate from (L,R)
- (1) is the necessary and sufficient condition to get (L,R) in Bilateral lending game.

From Bilateral Patronage game:

- From IR constraint of NREGS participants we will get: $\delta^B \geq \frac{1}{V_N}$... (2)
- From IR constraint of PRI member we will get: $\delta^P \geq \frac{1}{V_P}$... (3)
- Unlike the bilateral lending game even if 2 & 3 are satisfied we may not have (P,S) as optimal solution (if $V_N < 1$ or $V_S < 1$) for any $\delta^C \in [0, 1)$ and for any $\delta^P \in [0, 1)$
- (P,S) is not always the optimal choice even under IR Constraints.

To get (L,R) as solution in lending game we need (P,S) as solution in patronage game simultaneously. How to get $\{(L,R), (P,S)\}$ as final outcome?

So we just see (L,R) and (P,S) are not simultaneously achieved.

Trilateral game

- All players simultaneously play both the bilateral stage game.
- All player will consider **Trilateral grim trigger strategy**: meaning-
 - a) Lender chooses 'L' iff the NREGS participant has chosen 'R' and 'S' in all previous rounds and politician has chosen 'P' in all previous round.
 - b) NREGS participant chooses 'R' and 'S' iff lender has chosen 'L' and politician has chosen 'P' in all previous rounds.
 - c) Politician chooses 'P' iff lender has chosen 'L' in all previous round and NREGS participant has chosen 'R' in all previous round.

Under Trilateral game Politician's IR constraint will remain same as before but for NREGS participant's new IR constraint will be

$$\delta^B \geq \frac{1+r}{1+V_N} \dots\dots(4)$$

This Trilateral grim trigger strategy profile results in fully cooperative outcome (L, R, P, S) which is a pareto-optimal sub-game perfect Nash equilibrium. Here NREGS participation is sustaining over time due to re-election motive and thereby releasing credit even with out collateral.

Empirical Work based primary household level panel survey.

What is the effect of NREGS participation on gross volume of monthly credits and hence on other economic outcomes at the household level.

Empirical Challenge in assessing impact

- Since the provision of NREGS is universal self-targeting, finding counterfactual is very hard
- Programme placement is not random
- Self-selection bias (those who are poor they intend to access more NREGS)-impact contaminated
- Absence of credible panel data in public domain
- No base line of participating household prior to the programme

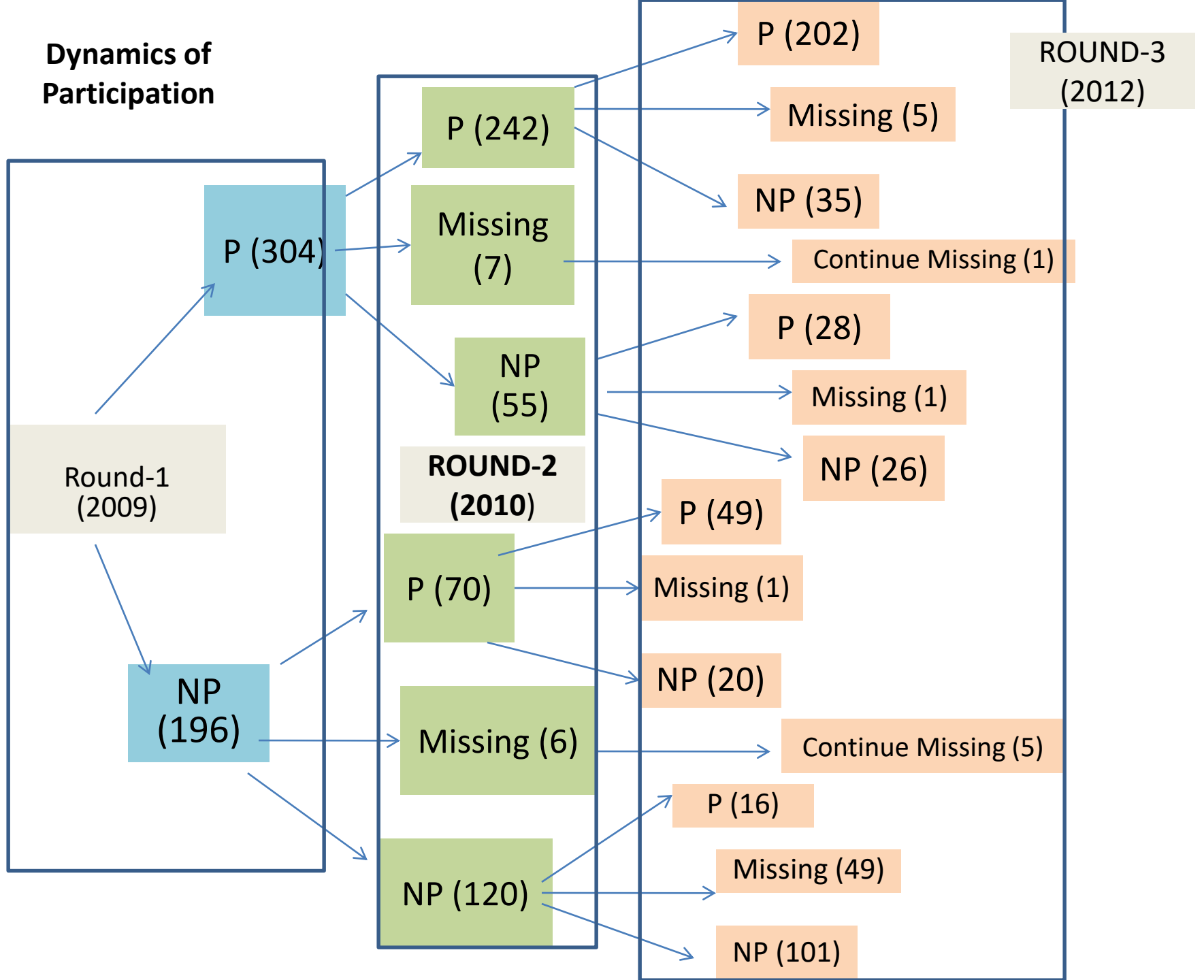
Data

- Longitudinal Primary survey at the household level has been conducted from 49 villages under 13 Rural Municipality (called Gram Panchayat) from West Bengal State of India.
- 3 waves (2009, 2010, 2012) of longitudinal data has been collected from 500 households.
- Choice of the Gram Panchayat was purposive based on stratification but households selected from these GP was random.
- Data was fairly balanced.

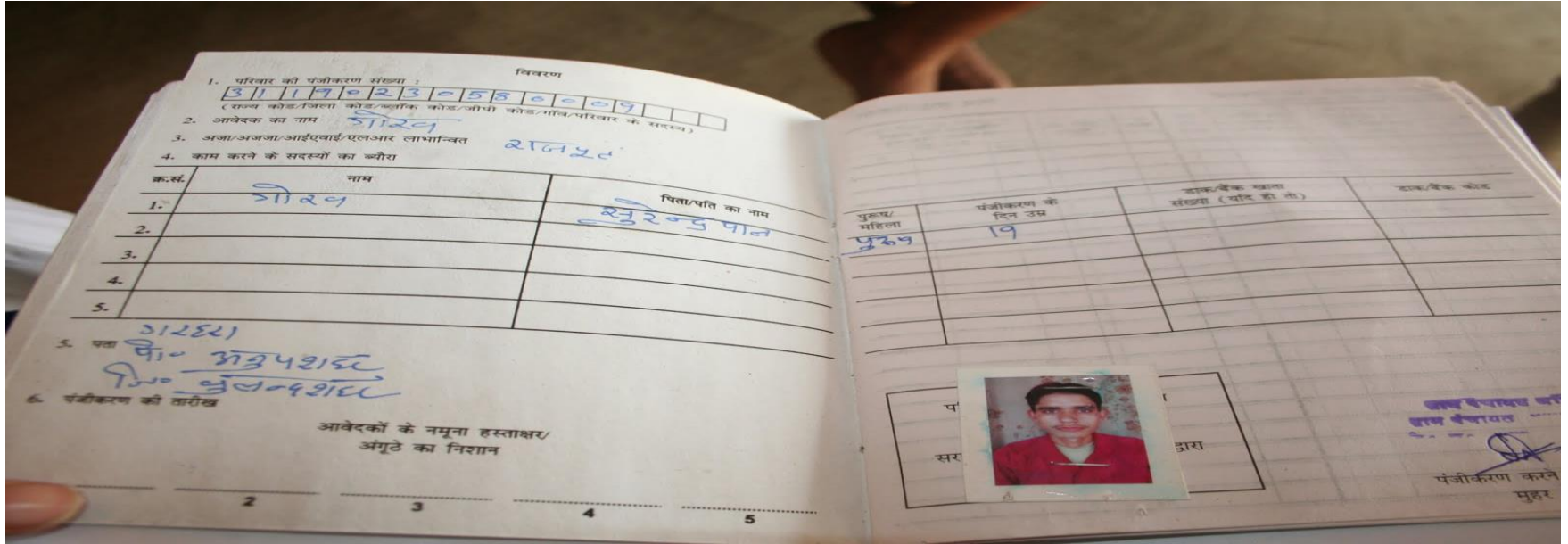
Freq.	Percent	Cum.	Pattern
477	95.40	95.40	111
11	2.20	97.60	1.1
10	2.00	99.60	11.
2	0.40	100.00	1..
500	100.00		XXX

Ni	Freq.	Percent	Cum.
1	2	0.14	0.14
2	42	2.85	2.98
3	1,431	97.02	100.00
Total	1,475	100.00	

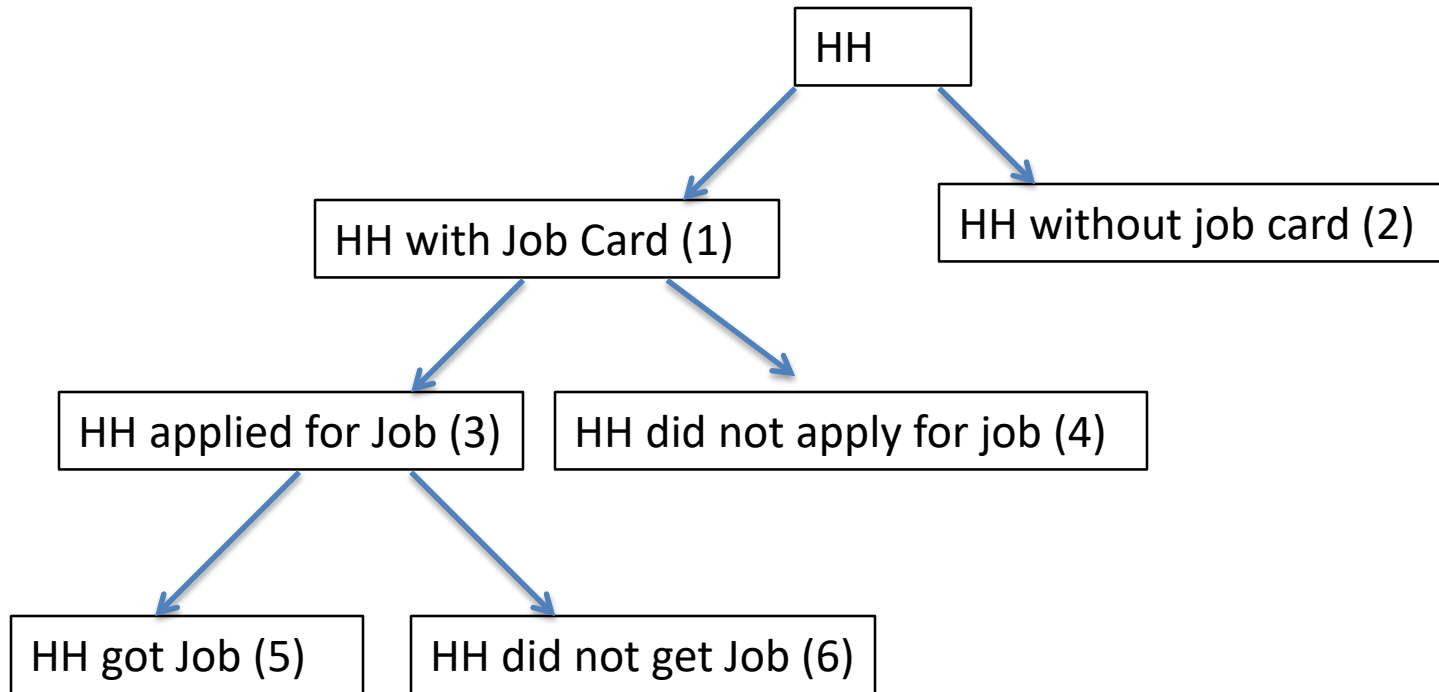
Dynamics of Participation



What is Job-Card? A must hold document to get access of NREGS JOBS



Glimpse on the category of HH in survey



Participant: (5)

Voluntary non-participant: (2) + (4)

Involuntary non-participant: (6)

Note: Category '5' and '6' are observationally equivalent except with programme placement

How to trace impact/effect of the Programme:

- 1) Intention To Treat (ITT) Effect
- 2) Treatment on Treated (ToT) Effect

ITT: What would be the effect to the average NREGS Participants who is willing to work (also called EFFECT of the programme)

ToT: The effect of the treatment on those who got the Job under NREGS. (also called IMPACT of the Programme)

What is treatment here:

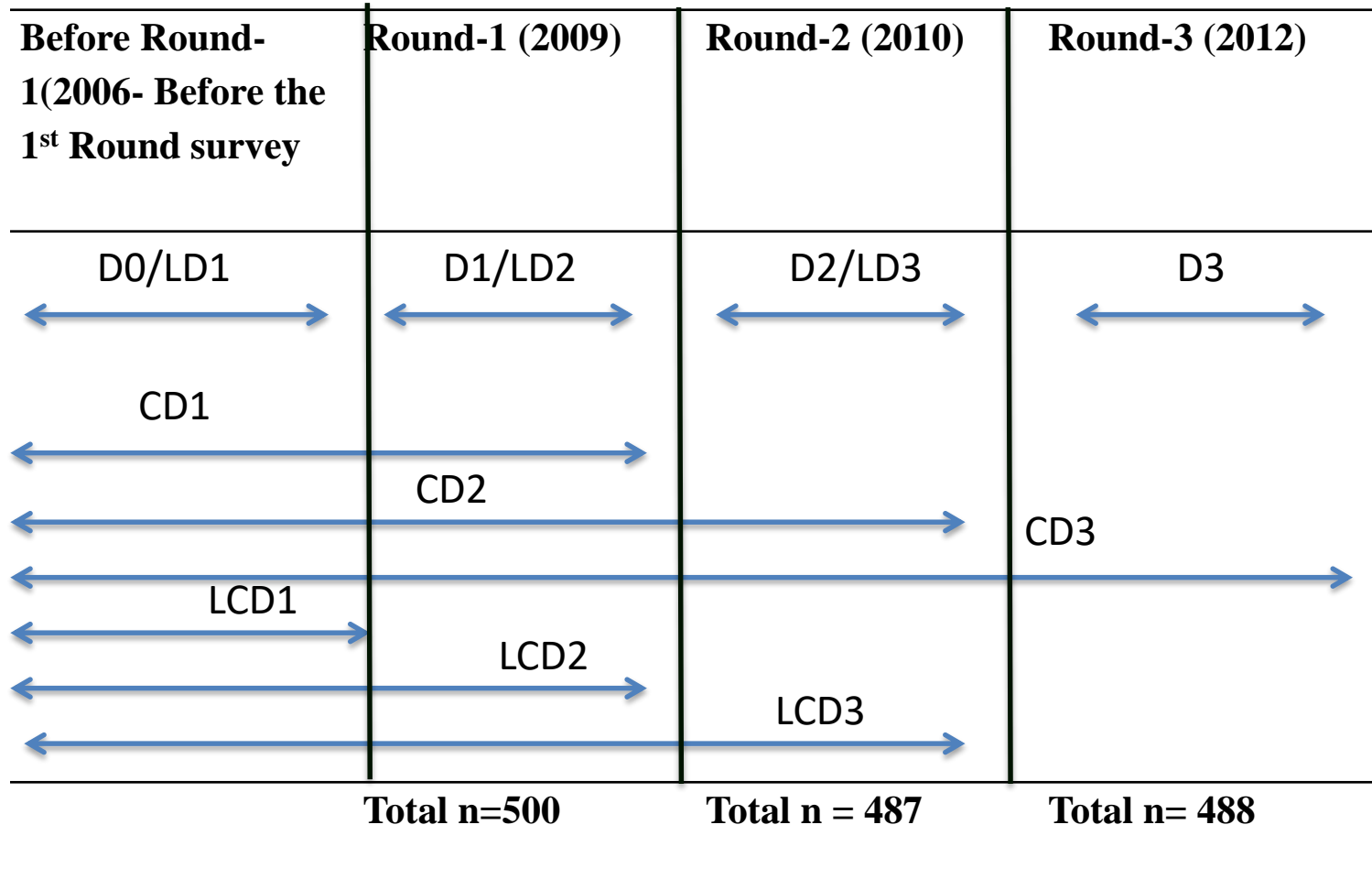
- 1) Binary Treatment: Participated or Not Participated in NREGS
- 2) Continuous Treatment: NREGS Participation over the years

In this paper we are NOT finding out ToT (or Impact) rather finding out ITT (or effect) through AVERAGE CONTINUOUS TREATMENT EFFECT of the Programme i.e. NREGS

Emerging literature around impact of NREGS

- Ravi and Engler (2009, 2013): Using 3 round panel data from Andhra Pradesh tried to find out the NREGS impact on health and education expenditure, savings and consumption. Used PSM & DID.
- Ravallion (2012): In Bihar, find out the impact of NREGS days of work on poverty situation after considering the forgone income and foregone employment of the participating households.
- Jha et.al (2011): Showed the impact of NREGS on BMI. Based primary survey from 3 states of India.
- Klaus Deininger & Yanyan Liu (2013): Estimated the Welfare and Poverty Impact of NREGS using 3 round Panel data of 4000 households from AP.
- Deepak, Saraswat (2011): Estimated the effect of NREGS on access to Credit.

Different notion of participation



$$CD = \sum D \text{ and } LCD = CD - D$$

'Days of Participation (D, CD)' by a household under NREGS

Year	D (Current Days of Participation)			CD (Cumulative days of participation since inception of the programme)		
	<i>n</i>	<i>mean</i>	<i>sd</i>	<i>n</i>	<i>mean</i>	<i>sd</i>
2009	304	24.46	19.78	304	72.33	50.91
2010	312	34.34	26.61	312	101.98	57.98
2012	299	37.52	28.34	299	148.24	81.29
Over all		32.09	25.75	-	107.25	71.58

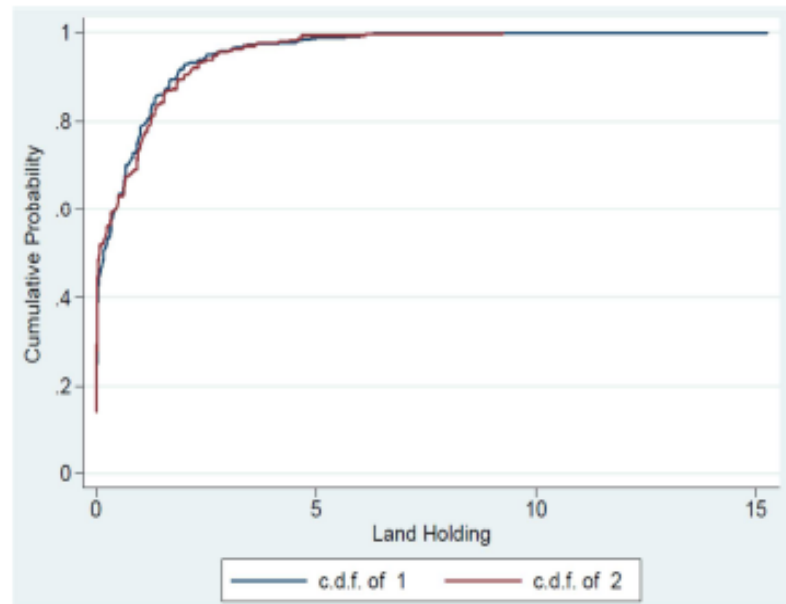
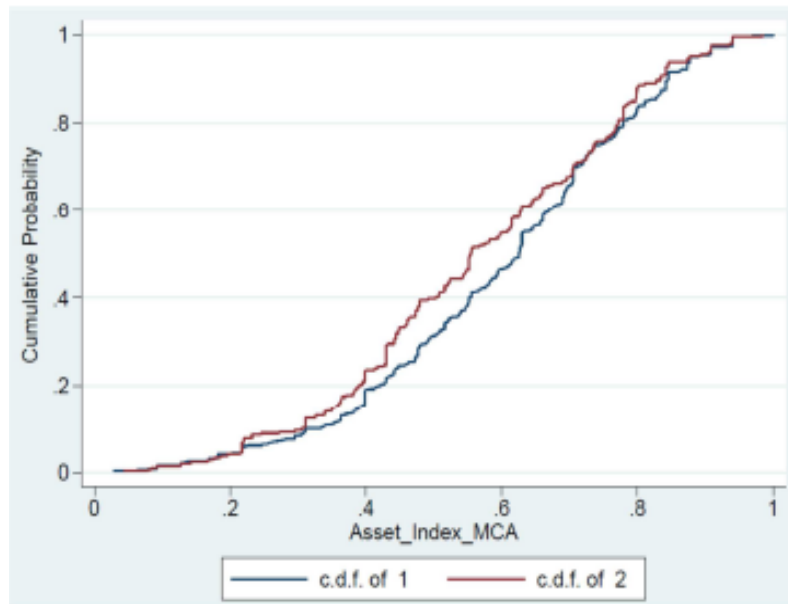
Observation: Current Days of participation is very low compared to the provision under the Act i.e. 100 days

Descriptive Results of HH Economic Variable across different households

Year	Type of household	Per-capita household expenditure		Per-capita monthly income		Per-capita Monthly food exp.		Per-capita Monthly non-food exp.	
2009	P(n=304)	613	(52.88)	582.8	(82.61)	401.65	(44.77)	46.83	(9.57)*
	IVNP(n=91)	685.93		700.83		471.96		65.73	
	VNP(n=105)	1402.86		2172.09		651.42		229.97	
2010	P(n=312)	653.63	(59.54)	662.39	(259.9)	439.81	(36.26)	54.70	(14.19)
	INVP(n=84)	735.79		922.29		469.03		72.58	
	VNP(n=91)	1212.01		2029.09		557.54		124.44	
2012	P (n=299)	724.36	(50.33)	630.15	(89.82)	481.32	(25.98)	71.10	(10.65)
	INVP(n=116)	781.12		709.87		506.77		84.60	
	VNP(n=73)	1169.34		1702.61		600.61		151.76	
pooled data	P(n=915)	663.25	(31.18)	625.41	(60.25)	440.69	(20.2)*	57.45	(6.77)*
	IVNP(n=291)	738.27	*	768.36	*	484.99		75.23	*
	VNP(n=269)	1274.93		1996.31		605.87		173.05	

Values in the bracket shows Standard Error of 't' test of whether difference in mean values of said variable for 'Participant' and 'Involuntary non-participants' are statistically significant. '*' $p < 0.05$ '**' $p < 0.01$

Figure-3: Cumulative Density function of tiny productive assets and landholding of NREGS participants and involuntary non-participants



Here '1' refers to NREGS participants and '2' refers to involuntary non-participants.

Econometric Model

- To analyse the effect of NREGS days of participation on the household level economic variable we start with the following equation.

$$y_{it} = \beta_1 LCD_{it} + \beta X_{it} + \delta_t + \gamma_r + a_i + \varepsilon_{it} \dots \dots \dots t = 1, 2, 3 \dots \dots \dots (1)$$

- y_{it} = log of main outcome variable (real terms)
- CD= cumulative days of NREGS participation
- X= Vector of other covariates (*'landholding'*, *'hhsiz'*, *'religion'*, *'sex of head of HH'*, *'current period non-nregp income'* *'value of livestock index'*,
- δ_t = year specific or wave dummy- which captures time FE
- γ_r = region specific (Rural Muni./GP) heterogeneity term- which captures region FE
- a_i = household specific and time-invariant heterogeneity term
- ε_{it} = idiosyncratic error term which is varying over time.

Here i = household, $i=1, \dots, 500$

And t = wave. $t= 1, 2, 3$

- ◆ As a first starting point we used **Fixed Effects (FE)** to tackle time invariant unobserved heterogeneity issue.
- ◆ Next to address the endogenous relation between Days of Participation and outcome variable along with unobserved heterogeneity issue we used **IV-Fixed Effect** where we instrumented our endogenous variable “cumulative Days of NREGS participation” with two instruments, viz. ‘*village_meeting*’- a dummy var. (0,1).
- ◆ Finally we used **FE-IV after PSM** where we trim down our sample within participants and involuntary non-participants followed by a propensity score matching exercise between these two categories of households to get the reconstructed panel. Eventually with the reconstructed panel we run the IV-fixed effects again.
- ◆ As an extension of the paper we run **IV after Collapsing** to see whether days of Participation has any consumption smoothing effect i.e. whether NREGS participation can reduce the volatility/variability of income and consumption .

Effects of NREGS participation on log of real monthly Per-capita Consumption Expenditure

Selected Explanatory variable	Log of real Monthly per-capita consumption exp.			
	(1) Pooled OLS	(2) Fixed Effect	(3) Fixed Effect with IV	(4) Fixed Effect-IV after PSM
CD (Cumulative Days)	-0.000 [0.000]	0.001 [0.00034]***	0.006 [0.003]*	0.010 [0.004]**
Land Holding	0.070 [0.016]***	0.049 [0.016]***	0.048 [0.017]***	0.039 [0.027]
Non-NREGP days	0.000 [0.000]***	0.000 [0.000]***	0.000 [0.000]*	0.000 [0.000]
Observations	1475	1475	1475	1050
R ²	0.349	0.118	0.054	0.737
F	19.873	7.512	5.975	3.513
Sargan test (p-value)	-	-	0.9771	0.5515
No. of excluded instruments	-	-	2	2
Under identification test (p-value)	-	-	0.0028	0.0079

Effects of NREGS participation on log of real monthly food Expenditure

Selected Explanatory variable	Log of real Monthly food exp.			
	(1) Pooled OLS	(2) Fixed Effect	(3) Fixed Effect with IV	(4) Fixed Effect-IV after PSM
LCD (Lagged Cumulative Days=CD-D)	-0.000 [0.000]	0.001 [0.00034]*	0.009 [0.004]**	0.011 [0.005]**
Land Holding	0.050 [0.012]***	0.033 [0.016]**	0.032 [0.021]	0.027 [0.029]
Non-NREGP days	0.000 [0.000]***	0.000 [0.000]**	0.000 [0.000]	0.000 [0.000]
Observations	1475	1475	1475	1050
R ²	0.253	0.101	0.508	0.938
F	13.295	6.364	4.004	2.810
Sargan test (p-value)	-	-	0.9048	0.8732
No. of excluded instruments	-	-	2	2
Under identification test (p-value)	-	-	0.0028	0.0079

Effects of NREGS participation on log of real monthly non-food Expenditure

Selected Explanatory variable	Log of real Monthly non-food exp.			
	(1) Pooled OLS	(2) Fixed Effect	(3) Fixed Effect with IV	(4) Fixed Effect-IV after PSM
CD (Cumulative Days)	-0.002 [0.000]***	0.002 [0.0016]**	0.008 [0.007]	0.011 [0.008]
Land Holding	0.096 [0.024]***	0.108 [0.036]***	0.108 [0.037]***	0.115 [0.050]**
Non-NREGP days	0.001 [0.000]***	0.000 [0.000]**	0.000 [0.000]*	0.000 [0.000]
Observations	1475	1475	1475	1050
R ²	0.357	0.126	0.073	0.032
F	27.344	8.124	7.456	5.732
Sargan test (p-value)	-	-	0.6995	0.9754
No. of excluded instruments	-	-	2	2
Under identification test (p-value)	-	-	0.0028	0.0079

Effects of NREGS participation on log of real monthly per-capita income adjusted after NREGS earning.

Selected Explanatory variable	Log of real Monthly per-capita income adjusted after NREGS earnings			
	(1) Pooled OLS	(2) Fixed Effect	(3) Fixed Effect with IV	(4) Fixed Effect-IV after PSM
CD (Cumulative Days)	-0.002 [0.000]***	0.001 [0.00046]**	0.012 [0.005]**	0.012 [0.005]**
Land Holding	0.132 [0.017]***	0.118 [0.021]**	0.117 [0.027]***	0.150 [0.034]***
Non-NREGP days	0.001 [0.000]***	0.000 [0.000]***	0.001 [0.000]***	0.001 [0.000]***
Observations	1475	1475	1475	1050
R ²	0.469	0.183	0.317	0.463
F	34.704	12.624	7.949	6.303
Sargan test (p-value)	-	-	0.8301	0.7957
No. of excluded instruments	-	-	2	2
Under identification test (p-value)	-	-	0.0028	0.0079

Effects of NREGS participation on log of real value of gross volume of monthly credit.

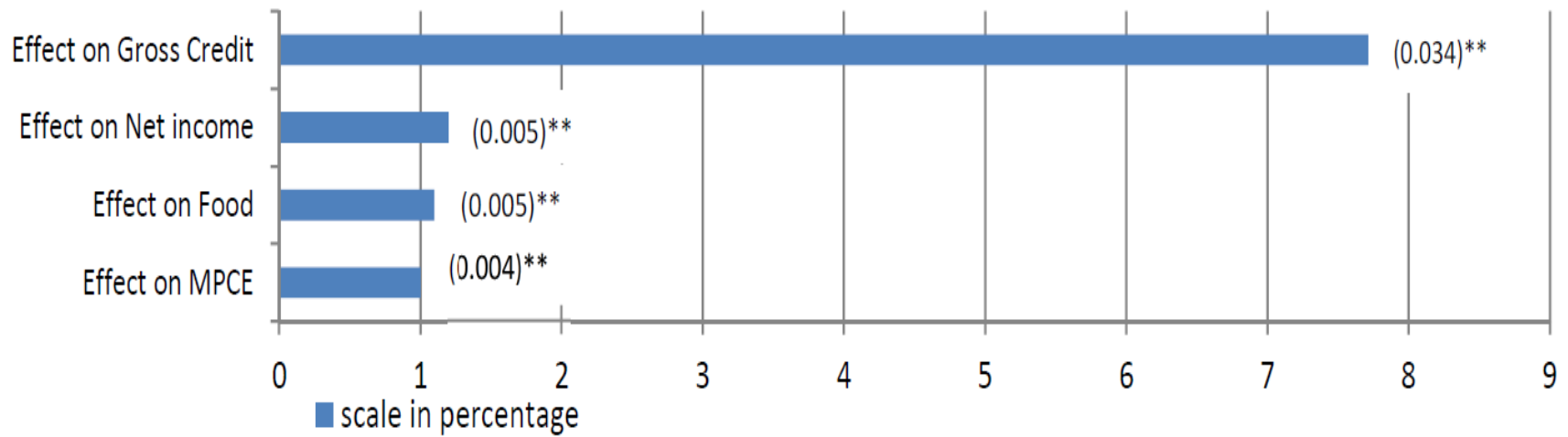
Selected Explanatory variable	log of real value of Gross Volume of monthly Credit			
	(1) Pooled OLS	(2) Fixed Effect	(3) Fixed Effect with IV	(4) Fixed Effect-IV after PSM
LCD (Lagged Cumulative Days=CD-D)	0.003 [0.002]*	0.004 [0.0024]*	0.046 [0.028]*	0.079 [0.034]**
Land Holding	0.179 [0.092]*	-0.162 [0.128]	-0.165 [0.142]	-0.186 [0.215]
Non-NREGP days	0.000 [0.001]	0.001 [0.001]*	0.001 [0.001]	-0.000 [0.001]
Observations	1475	1475	1475	1050
R ²	0.108	0.099	0.118	0.696
F	5.475	6.171	5.033	2.552
Sargan test (p-value)	-	-	0.662	0.8635
No. of excluded instruments	-	-	2	2
Under identification test (p-value)	-	-	0.0028	0.0079

Effects of NREGS participation on variability of consumption and income- OLS and IV estimation after collapsing the data

Covariates as Mean value	OLS estimation after collapsing the data				IV estimation after collapsing the data			
	SD of mpce	SD of Monthly food	SD of Monthly non-food	SD of mpi_ NREGS	SD mpce	SD of Monthly food.	SD of Monthly non-food	SD of mpi_ NREGS
(mean) LCD (CD-D)	-0.331 [0.238]	-0.076 [0.137]	-0.089 [0.056]	-1.112 [0.495]**	-6.106 [1.949]***	-1.540 [0.559]* **	-0.051 [0.778]	-8.550 [3.223]***
(mean) landholding	47.909 [24.555]*	23.655 [11.882]**	6.174 [7.096]	119.828 [70.842]*	48.369 [21.514]**	6.290 [6.174]	23.654 [8.589]* **	120.420 [35.569]***
(mean) Non-nregp days	0.216 [0.140]	0.116 [0.062]	0.037 [0.042]	0.568 [0.243]**	0.167 [0.154]	0.025 [0.044]	0.116 [0.061]	0.505 [0.254]**
Observations	500	500	500	500	500	500	500	500
R ²	0.247	0.146	0.202	0.276	0.154	0.088	0.146	0.083
F	3.058	2.969	4.164	4.380	5.023	4.314	3.682	6.705
Sargan test (p-value)	-	-	-	-	0.5090	0.8321	0.7280	0.3162
Under identification test (p-value)	-	-	-	-	0.0000	0.0000	0.0000	0.0000

Zooming on impact coefficients

Fig-3: Effect of one extra days of NREGS work in lagged cumulative terms on outcome variable in percentage terms



Note: Values in the bracket shows the standard error of impact co-efficient and ** shows they are statistically significant at 5 %

How to read the coefficient

- 1) These coefficients shows average continuous treatment effect of the programme NOT the ToT,
- 2) Coefficients shows the average effect of NREGS participation on top of alternative effect which one could have earned by engaging him/her self in other activities.

If CD increases by 1 day then their monthly per-capita consumption expenditure (include food & non-food both) would increase by 1%. With average *mpce* as INR 663.25. 1% increase of this average value will be 6.63 INR. HH with 5 members realise an increase of *mpce* by $5 \times 6.63 =$ INR. 33.15. Now one extra day of work in NREGS can transfer roughly around 105 INR during our survey time. Therefore by transferring INR.105 through NREGS, a participating household can increase monthly consumption by around INR 33.

Is it big or small??? Need to adjust with foregone income to interpret the impact coefficients

Interpreting impact coefficients.

- 1) If CD increases by 1 day then their monthly food expenditure (i.e. food expenditure for the family as a whole) would increase by 1.1% and mpi_nregs increase by 1.2%.
- 2) Both the increase in MPCE , monthly food expenditure & mpi_nregs are statically significant at 5% level.
- 3) However, based on our impact results) we cannot see any significant effect of NREGS days of participation on non-food expenditure.
- 4) This may indicate that NREGS is perhaps targeting primarily consumption poverty that too through increasing food expenditure.
- 5) **Most striking** and somewhat interesting results we get with monthly credit. 1 day extra work in NREGS till the last period (i.e. if CD increases by 1 day) then in the current period gross volume of monthly credit (which is basically for daily food and non-food items for subsistence) that the household can get from local grocery owner or from non-poor neighbour/friend/relatives increases by 7.9%.
- 6) This credit effect coefficient is really big in the context of poor rural households. It shows that the credit worthiness of the NREGS participating household increases with the increase of their previous accumulated days of participation.

Interpreting consumption smoothing effect.

- 1) we are interested to see the effect of NREGS days of participation on the variability of consumption and income or on consumption and income smoothness.
- 2) with one day increase in the CD variability of per-capita consumption expenditure reduces by 6.106 standard deviation point, variability of monthly food expenditure reduces by 1.540 standard deviation point, and variability of monthly per-capita income adjusted after NREGS earnings reduces by 8.55 standard deviation point.
- 3) However, standard deviation of per-capita monthly non-food is not significantly reducing with NREGS participation
- 4) We can conclude that NREGS participation (in lagged cumulative day's terms) could reduce overall consumption variability and especially with food consumption.

conclusion

- Current days of participation in NREGS has no effect on current period consumption.
- Rather lagged cumulative days of participation has significant effect on current period consumption.
- We find similar results with ‘monthly food expenditure’ but not with ‘monthly non-food expenditure’
- There is positive effect of lagged Cumulative days of NREGS participation on Credit Worthiness reflected through increase in average volume of HH’s monthly transaction in local grocery on credit.
- NREGS participation has consumption smoothing effect over relatively long run.

Link of empirical finding with theoretical underpinning

- Current participation in NREGS is not a good signal for credible borrower. (one may be Joiner-Quiter NOT the stayer)- so loan/credit size (i.e. here volume of grocery transaction on credit) still restricted
- Once one becomes sustained participant of NREGS (reflected through higher LCD) it gives a good **signal** that the individual could be a credible borrower (especially through Guaranteed notion and Panchayat involvement)
- Scope of having NREGS job in the vicinity of the village **reduce the information asymmetry** between borrower (the NREGS worker) and lender (the grocery owner)
- Sustained participation reflected through lagged cumulative days of participation worked as **Collateral**.

All these create a positive effect on the credit market behavior of NREGS participants and relaxing credit constraint in the current period , allowing NREGS participants to borrow more for consumption (mainly on food) in current period.

Larger conclusion:

If poverty alleviation programme(or conditional income transfer) like NREGS is implemented in a sustained manner and if participant is a stayer instead of being joiner & quitter in the programme then its cumulative effect would lead to a sustained positive effect on consumption poverty in the following periods.

Thank you.....