



Community-based Conservation Projects: Do networks affect slash and burn?

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Question

Motivation:

- Deforestation is caused mainly by households
- Community-based initiatives as option to achieve development and conservation

Research question:

- How land clearing by people living at edge of forest is correlated with networks.



Outline

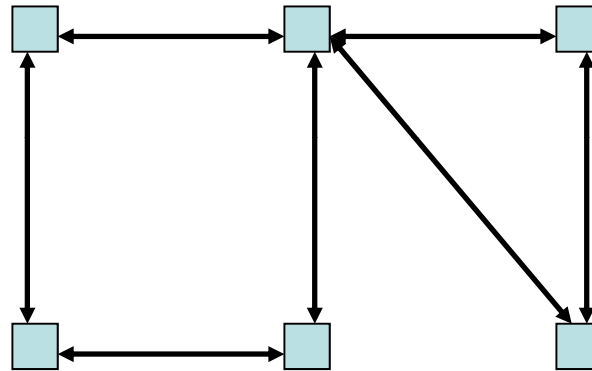
- Introduction
- Theoretical framework
- Case study: Brazilian Amazon
- Empirical specification and results
- Conclusions





Social networks

Ties an individual has with other individuals

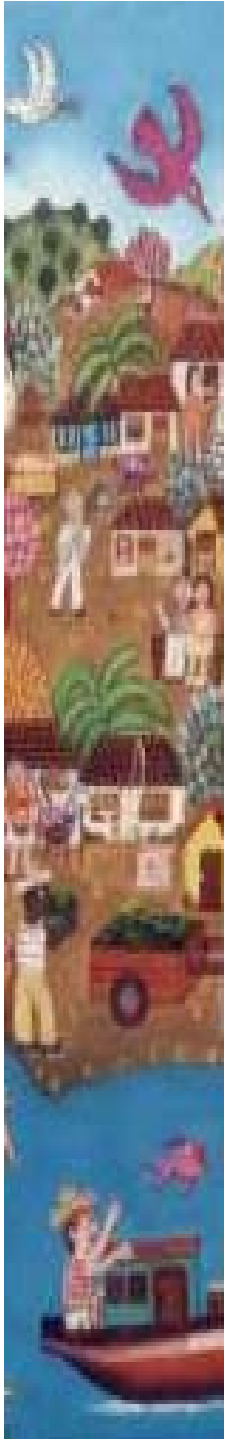


- Agents create networks partly in response to information asymmetries (Loader, 1997).
- Trust-based and thus depend on the knowledge that each household has about others to mitigate risk

Theoretical framework

- Framework:
 - Household U max model based on Munshi (2004)
 - Labor allocation between ag and non-ag to generate hh income
 - Ag prod is well known by all hhs
 - Income associated with other activities is less known and social networks can diminish uncertainties by providing a hh with information on the expected returns to labor.
 - Hhs are risk averse.





Imperfect information

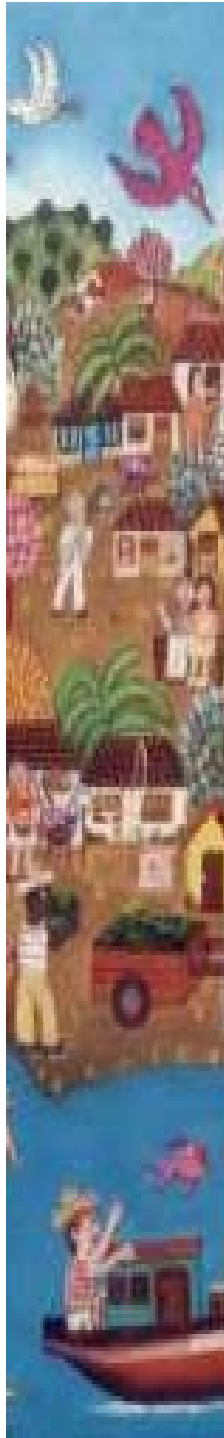
- Household's labor allocation decision is based on:

$$A_i^* = A(y(Z_i) - y_{ag}, \lambda_i)$$

- λ_i^2 is the variance in non-ag income
- In the case of imperfect information expected return to labor ($y(Z_i)$) is uncertain.

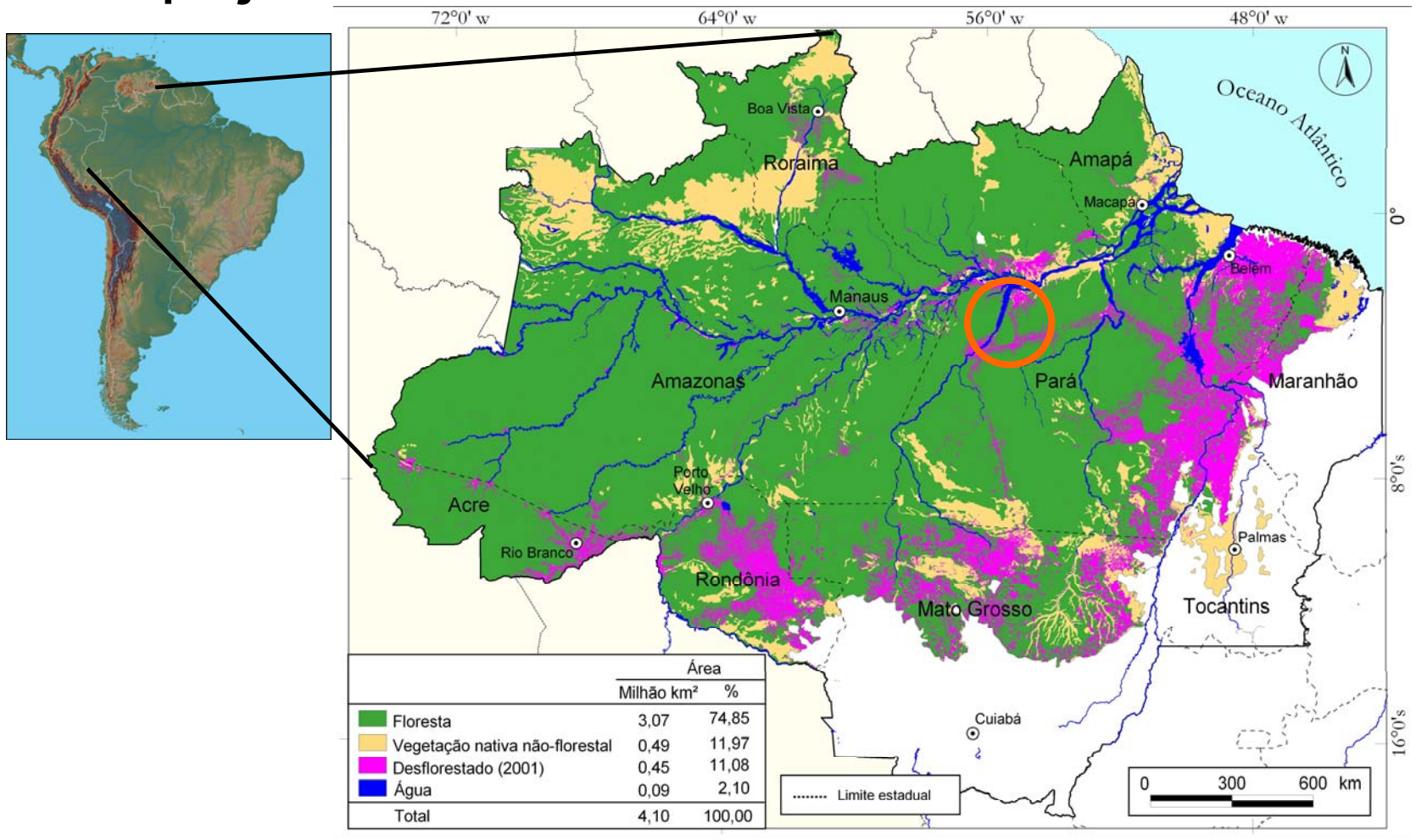
$$L_{it} = L(y_{it}(Z_i) - y_{ag}, \lambda_i, \sigma_{it})$$

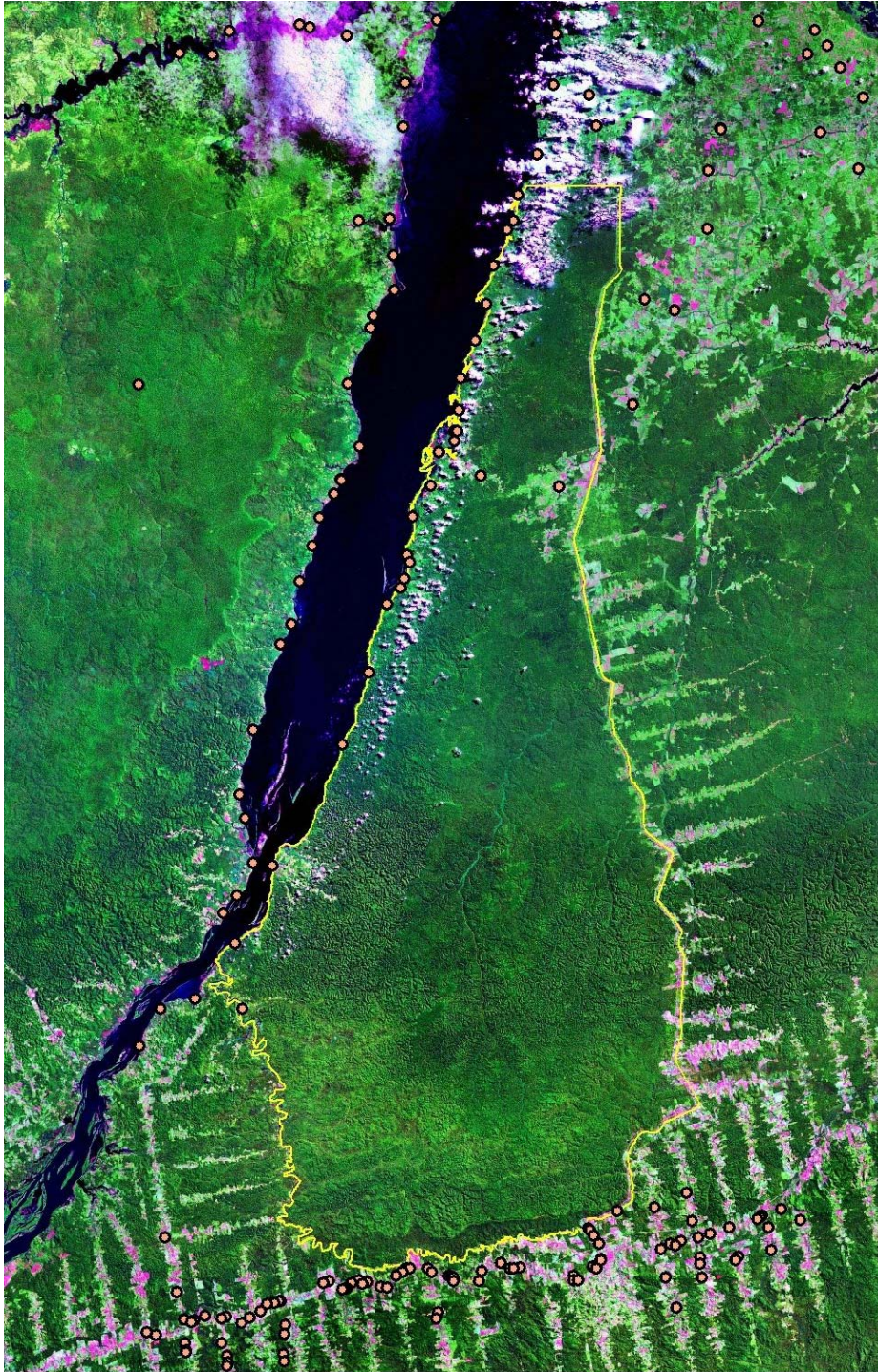
- σ_{it}^2 is the variance of the household expected return to labor estimate (determined exogenously).
- Over time, as household gets more information:
 $\hat{y} \rightarrow y(Z_i)$ and $A_{it} \rightarrow A_i^*$



Case Study

- Tapajós National Forest



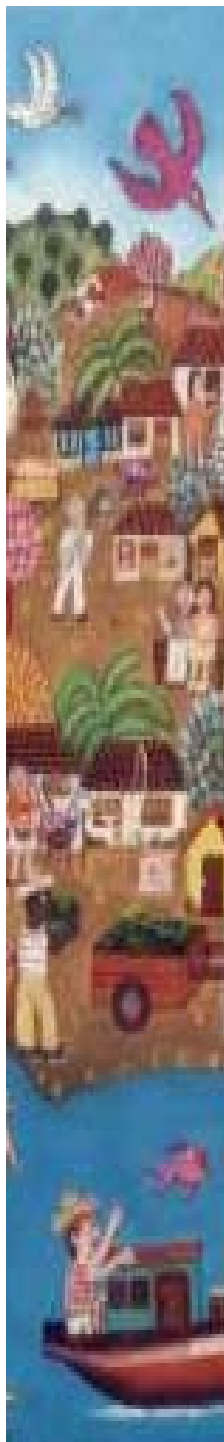


FLONA Tapajós:

- 600,000 ha
- 1200 families in 26 communities

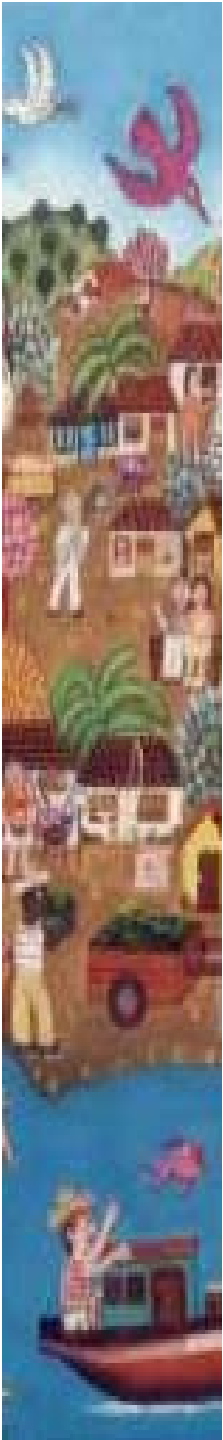
PROMANEJO:

- \$ 1.4 million invested in projects to divert households from slash and burn agriculture.
- Carried out between 1999 and 2006.

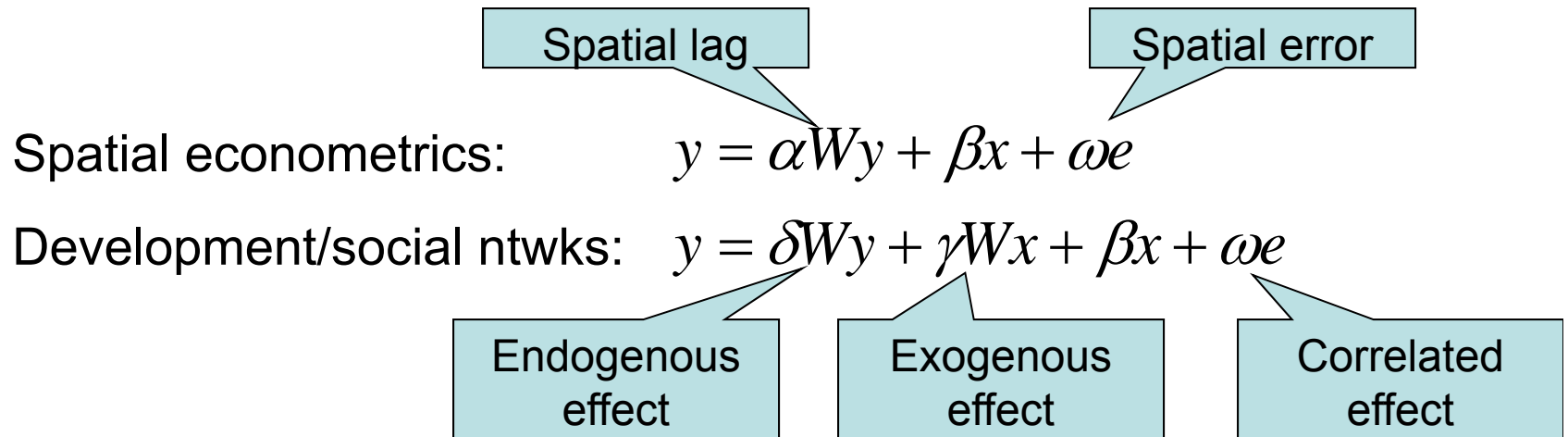


Case study

- Survey of 312 households in 2008 supplemented with panel data on a sub-set of the same households in 1997 and 2006;
- Analyze household decisions of allocation of land and labor to agriculture and non-ag activities;



Literature: empirical specifications



	Spatial econ	Others (i.e. Bramouille)
Point in common	SAR	SAR
Terminology	spatial lag and spatial error	endogenous, exogenous and correlated effects
Difference in RHS	Wy	Wy and Wx
Estimation strategy	ML	2SLS



Empirical specification

- Issues to address:
 - Include WX?
 - Endogeneity of W (self-selection into networks)
 - Network specifications

SAR/ 2SLS:

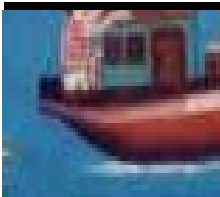
$$A_i = \overline{WA}_j + X_i + e$$

$$\overline{WA}_j = WX_j + W * IV_j$$



Descriptive statistics

	Definition	Variable	Mean	Std Dev	Min	Max
LHS	Area of agriculture in 2008	rocaq	3.30	2.16	0	16
	# days not working in last month	dnw	10.82	15.72	0	60
IVs	% of life spent in community	lifecom	0.78	0.32	0	1
	# of siblings in community	broc	4.20	3.76	0	19
	Area of agriculture in 2006	lagr	3.86	3.05	0	22
	Time from community center	tbarrac	13.85	21.04	1	150
	soil quality dummy	lind	0.39	0.80	0	10
	if receives retirement pension	retire	0.31	0.46	0	1
RHS	amount received in government transfer	bolsafp	64.87	51.67	0	152
	number of children living outside hh	childout	1.52	1.89	0	9
	number of project in which participates	projectp	0.25	0.48	0	2
	average age of household heads	agehhhm	46.55	14.28	21	81
	number of people in household	nhh	5.88	2.42	1	13
	number of trips to city per month	citytrip	2.23	1.70	0	11



(N=310)



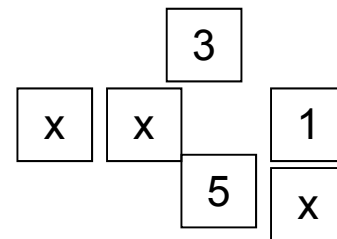
Network definitions

1) Geographic neighbors: Case (1993)

2

4

x



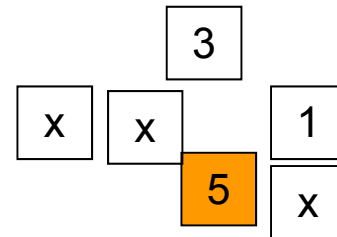
Network definitions

2) Producer association membership: Saha (2008)

2

4

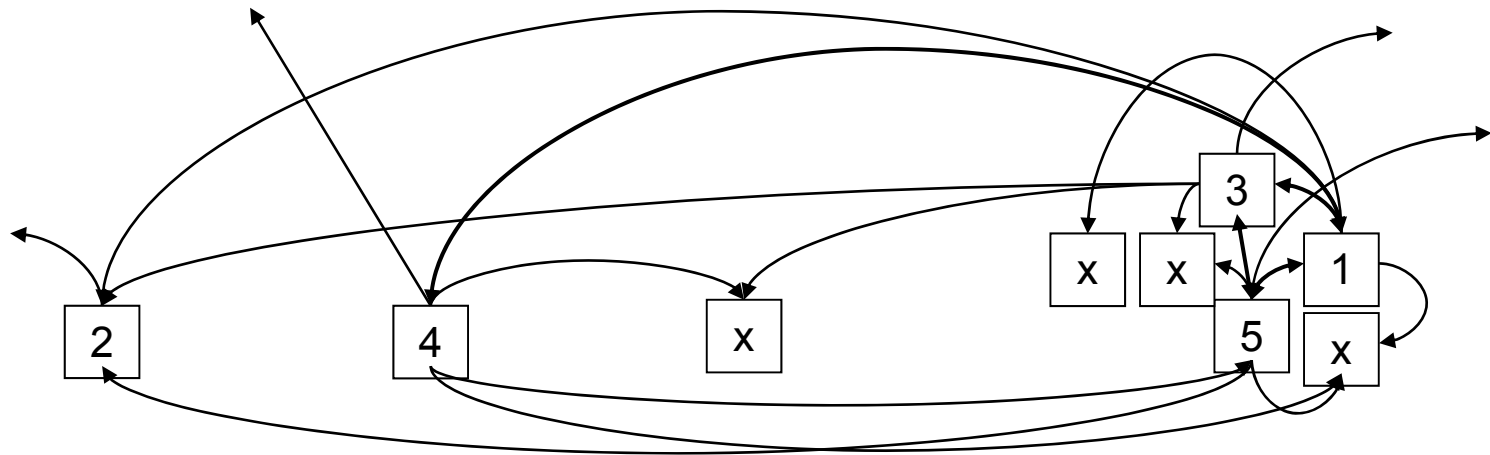
x

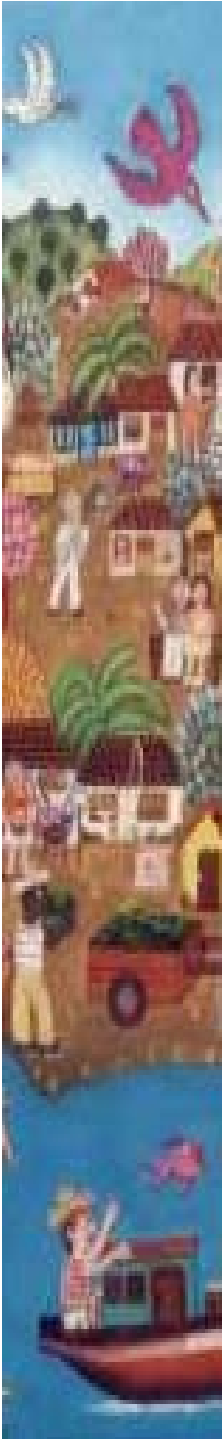




Network definitions

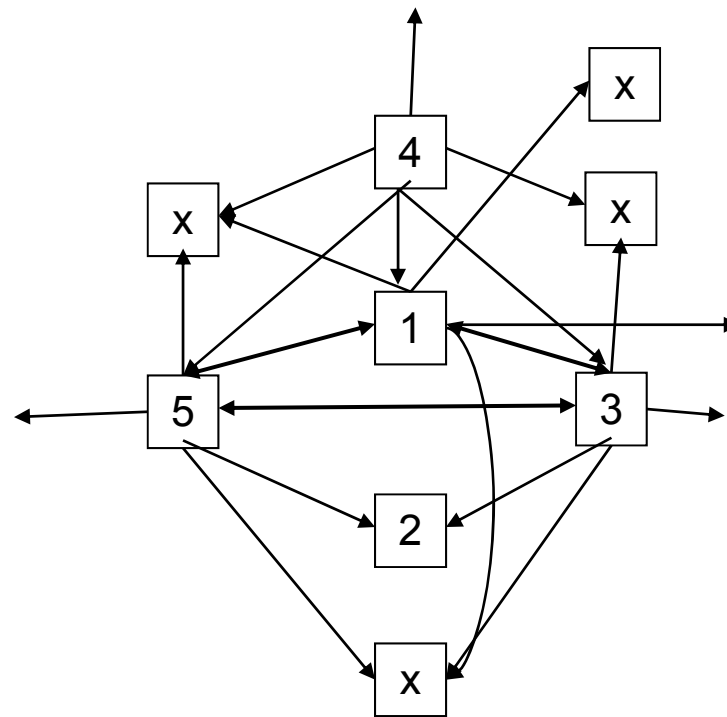
3) Who do you talk to about projects:
Conley and Udry (forthcoming)





Network definitions

3) Who would you choose to work with:

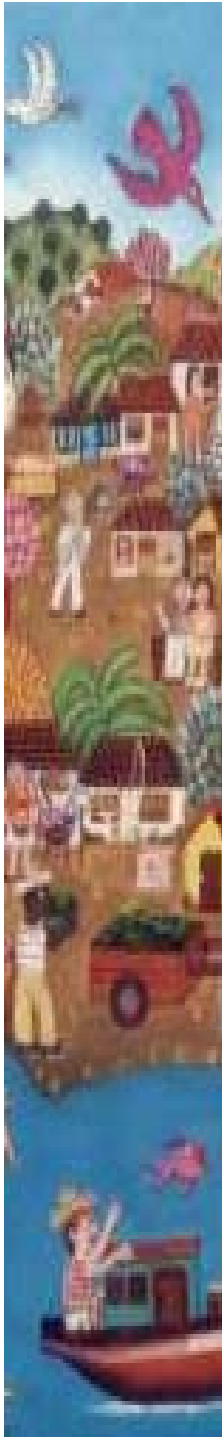




IV to identify WY

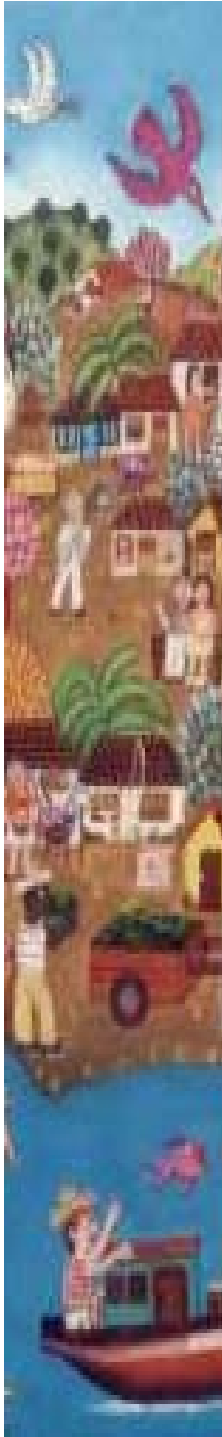
DNW - Days not working due to sickness or someone else's sickness in last month

- correlation between DNW and IRAs in 2006: positive but not significant
- correlation between own DNW and network's DNW not significant



SAR: 1st stage

Ntwk matrix	Neighbors			Association		
F	85.35			376.97		
R2	0.84			0.9576		
Variable	Estimate	Std error		Estimate	Std error	
Intercept	2.03E-02	7.66E-02		-3.98E-03	3.73E-02	
dnw	1.59E-02 **	7.33E-03		3.73E-02 ***	8.05E-03	
tbarrac	1.18E-02 **	4.94E-03		-4.74E-04	3.81E-03	
lagr	0.24 ***	3.39E-02		0.38 ***	4.36E-02	
lind	-0.18	0.13		0.62 **	0.26	
retire	-1.12 ***	0.30		1.99 ***	0.36	
bolsafp	-4.24E-03 *	2.51E-03		2.52E-02 ***	4.36E-03	
childout	0.24 ***	4.96E-02		0.39 ***	7.11E-02	
projectp	-0.46 **	0.20		1.00 ***	0.22	
agehhm	1.08E-02	7.32E-03		-7.16E-04	8.50E-03	
nhh	0.16 ***	5.30E-02		-0.13 ***	4.58E-02	
citytrip	0.45 ***	5.69E-02		-0.31 ***	6.22E-02	
broc	1.10E-05	4.67E-04		6.20E-03 ***	7.74E-04	
lifecom	0.29	0.26		-0.75 *	0.40	



SAR: 2nd stage

W = Who would you choose to work with:

$R^2 = .24$

Definition	Variable	Estimate	Std error
	Intercept	0.94	0.73
Wyhat	wyhatn	0.15 **	9.06E-02
Time from community center	tbarrac	1.45E-02 **	6.18E-03
area of agriculture in 2006	lagr	0.27 ***	4.38E-02
soil quality dummy (terra preta de índio)	lind	-0.21	0.17
if receives retirement pension	retire	-5.63E-02	0.40
amount received in government transfer	bolsafp	-1.54E-03	3.19E-03
number of children living outside household	childout	0.10	7.76E-02
number of project in which participates	projectp	0.61 **	0.28
average age of household heads	agehshm	-3.00E-03	1.42E-02
number of people in household	nhh	9.41E-02 *	5.76E-02
number of trips to city per month	citytrip	8.81E-02	7.83E-02
# days not working in last month	dnw	1.62E-03	8.36E-03

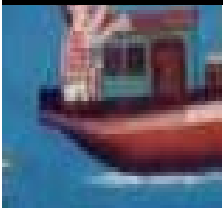
*** significant at 1%, ** significant at 5%, * significant at 10%



SAR: 2nd stage with WXs

W = Who would you choose to work with $R^2 = .28$

		Variable	Estimate	std error
		Intercept	12.61 ***	3.37
	Predicted Wy	wyhatc	-81.63 ***	23.22
Own characteristics	Time from community center	tbarrac	1.46E-02 **	6.88E-03
	area of agriculture in 2006	lagr	2.68E-01 ***	4.63E-02
	soil quality dummy (terra preta de índio)	lind	-2.66E-01	1.71E-01
	if receives retirement pension	retire	-2.17E-02	4.05E-01
	amount received in government transfer	bolsafp	6.43E-05	3.26E-03
	number of children living outside household	childout	1.12E-01	7.84E-02
	number of project in which participates	projectp	5.11E-01 *	2.87E-01
	average age of household heads	agehhhm	-1.39E-03	1.44E-02
	number of people in household	nhh	7.24E-02	5.81E-02
	number of trips to city per month	citytrip	9.44E-02	8.11E-02
	# days not working in last month	dnw	-2.56E-03	8.43E-03



Strong exogenous effects.



SAR: 2nd stage

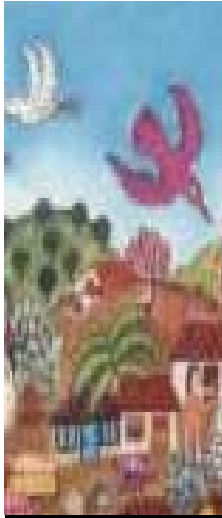
W = geographical neighbors

R² = .23

Definition	Variable	Estimate	Std error
	Intercept	1.26 *	0.70
Wyhat	wyhatn	4.68E-02	7.24E-02
Time from community center	tbarrac	1.47E-02 **	6.27E-03
area of agriculture in 2006	lagr	0.27 ***	4.40E-02
soil quality dummy (terra preta de índio)	lind	-0.22	0.17
if receives retirement pension	retire	-7.95E-02	0.41
amount received in government transfer	bolsafp	-1.20E-03	3.22E-03
number of children living outside household	childout	0.10	7.81E-02
number of project in which participates	projectp	0.63 **	0.28
average age of household heads	agehshm	-4.10E-03	1.43E-02
number of people in household	nhh	9.37E-02 *	5.81E-02
number of trips to city per month	citytrip	8.85E-02	7.87E-02
# days sick per month	sick	2.63E-03	8.45E-03

*** significant at 1%, ** significant at 5%, * significant at 10%





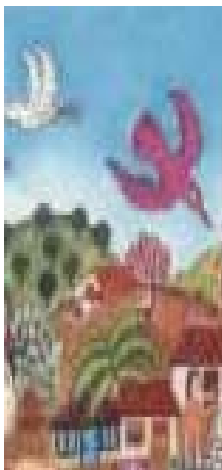
SAR: 2nd stage

W = members of the same producer association

$R^2 = .23$

Definition	Variable	Estimate	Std error
	Intercept	1.60 **	0.82
Wyhat	wyhatn	-0.14	0.23
Time from community center area of agriculture in 2006	tbarrac	1.37E-02 **	6.25E-03
soil quality dummy (terra preta de índio)	lagr	0.28 ***	4.50E-02
if receives retirement pension	lind	-0.23	0.17
amount received in government transfer	retire	-6.50E-02	0.41
number of children living outside household	bolsafp	-1.10E-03	3.20E-03
number of project in which participates	childout	0.10	7.83E-02
average age of household heads	projectp	0.61 **	0.28
number of people in household	agehshm	-4.53E-03	1.43E-02
number of trips to city per month	nhh	8.97E-02	5.79E-02
# days sick per month	citytrip	9.44E-02	7.95E-02
	sick	1.99E-03	8.40E-03

*** significant at 1%, ** significant at 5%, * significant at 10%



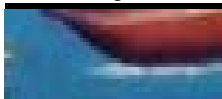
SAR: 2nd stage

W = who do you talk to about projects

$R^2 = .23$

Definition	Variable	Estimate	Std error
	Intercept	1.75 **	0.86
Wyhat	wyhatn	-0.16	0.20
Time from community center	tbarrac	1.34E-02 **	6.26E-03
area of agriculture in 2006	lagr	0.28 ***	4.40E-02
soil quality dummy (terra preta de índio)	lind	-0.23	0.17
if receives retirement pension	retire	-0.10	0.41
amount received in government transfer	bolsafp	-9.56E-04	3.18E-03
number of children living outside household	childout	9.40E-02	7.80E-02
number of project in which participates	projectp	0.62 **	0.28
average age of household heads	agehshm	-3.26E-03	1.43E-02
number of people in household	nhh	8.84E-02	5.79E-02
number of trips to city per month	citytrip	9.02E-02	7.87E-02
# days sick per month	sick	1.82E-03	8.40E-03

*** significant at 1%, ** significant at 5%, * significant at 10%





Conclusions

- Social networks can impact household decision
 - Different definitions of networks have different effects (some insignificant)
- Next steps:
- Test other instruments
 - Incorporate endogeneity of W
 - Account for correlated effects in empirical specification
 - Alternative RHS: participation in projects, land clearing, etc



THANK YOU!

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