Evaluating Local General Equilibrium Impacts of Lesotho's Child Grants Program

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A question and a story

- "From Protection to Production" cash transfers.

Target the "labor-constrained, asset-poor"

$\Rightarrow$ Should we expect productive impacts?

- "Once upon a time …

…"I don't get Progresa, but tomorrow there will be a line outside my shop"

Local GE effects and spillovers

Sneak peak

- **Theory**: GE effects matter
- **Methodology**:
  - Local Economy-Wide Impact Evaluation (LEWIE) gets at those spillovers
  - Standard RCTs do not
- **Results from Lesotho:**
  - Spillovers in the Lesotho LEWIE
  - Markets matter
- **Conclusions:** Gold standard of impact evaluation

INTRO

Lesotho's Cash Grants Program

Main Goal:

"Improve the living standards of Orphans and Vulnerable Children (OVC)"

Transfer Scheme

- **Unconditional cash transfer**

targeted to poor and vulnerable households

- **Represents about 30% of income for the treated**

360 Lesotho loti (~7LSL=US$1) per quarter and targets "poor households with children selected through a combination of Proxy Means Testing (PMT) and community validation."

Transfer Scheme

- Randomized Control Trial (RCT) design:
  - Clustered randomization
  - Clusters enter program in two phases:
    - "Pilot" = Treated
    - "Scale-Up" = Control

$\Rightarrow$Tempting to just do difference in differences

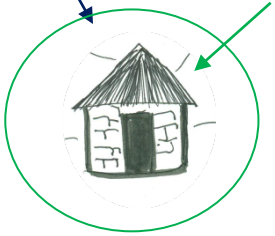
Q: What Happens When a Transfer Hits the Target Household?

A: It Spends It

Expenditure shares on:	A	B	C	D
Crop	22%	27%	12%	15%
Livestock	25%	16%	30%	21%
Retail	32%	37%	27%	33%
Services	4%	4%	4%	6%
Production	2%	2%	2%	1%
ROW	15%	15%	25%	24%

Transfer

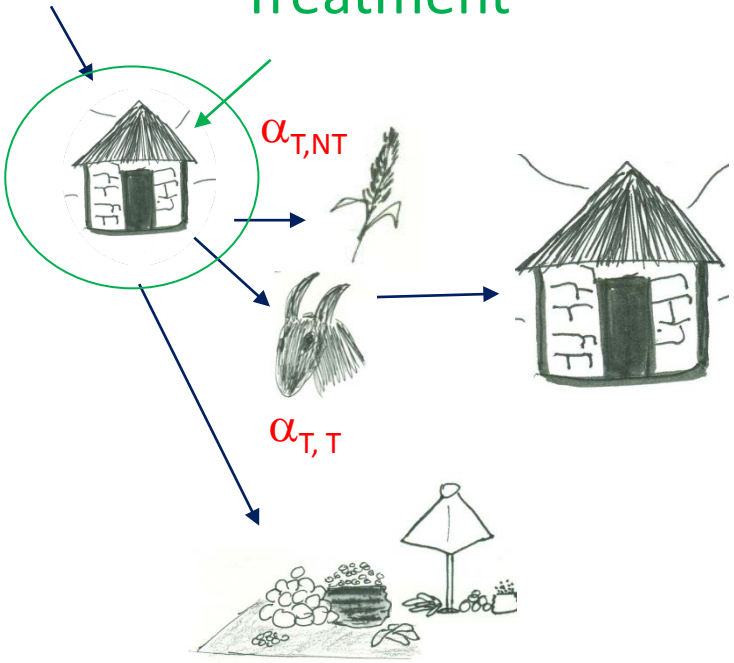
Treatment



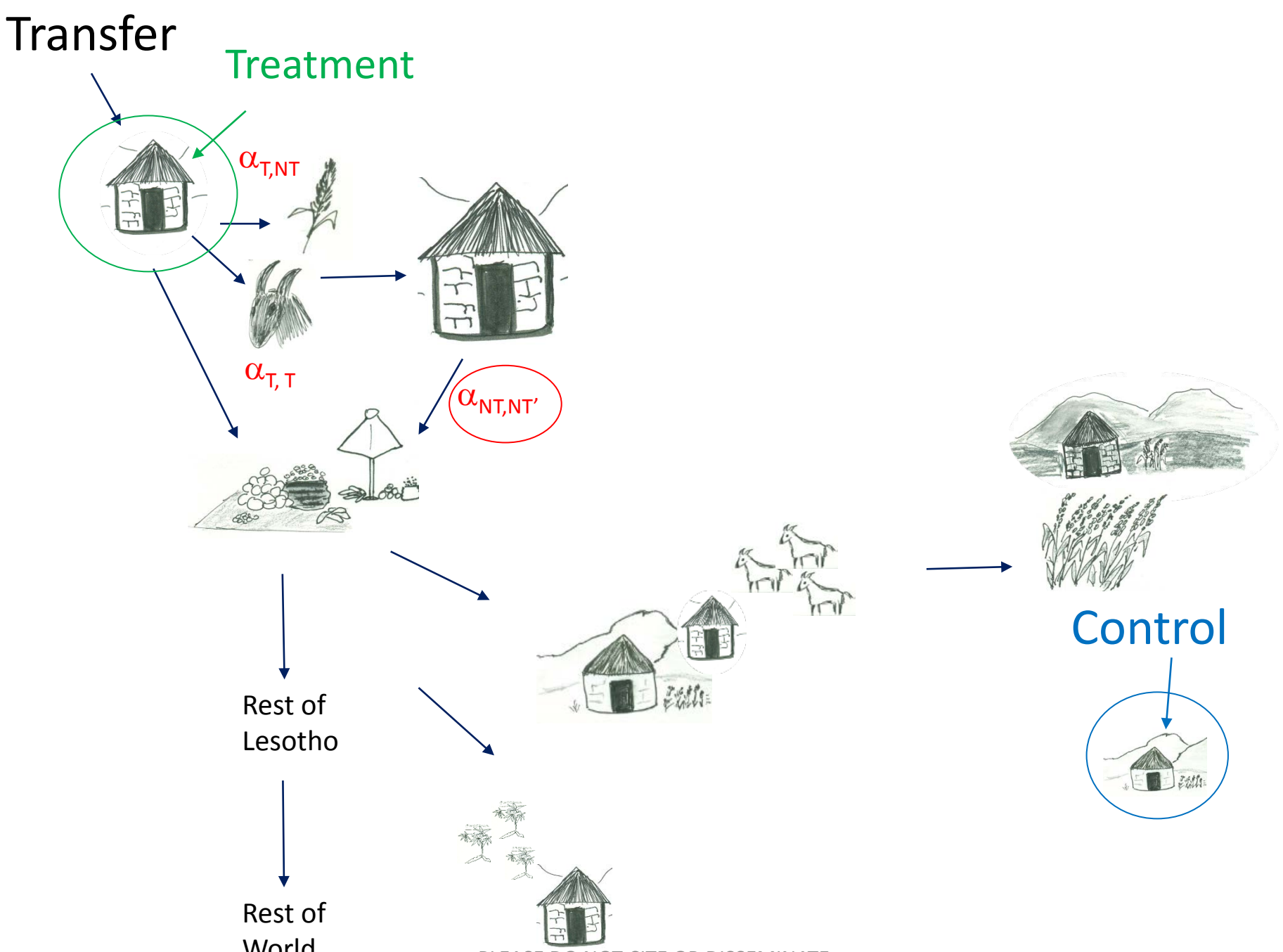
Control

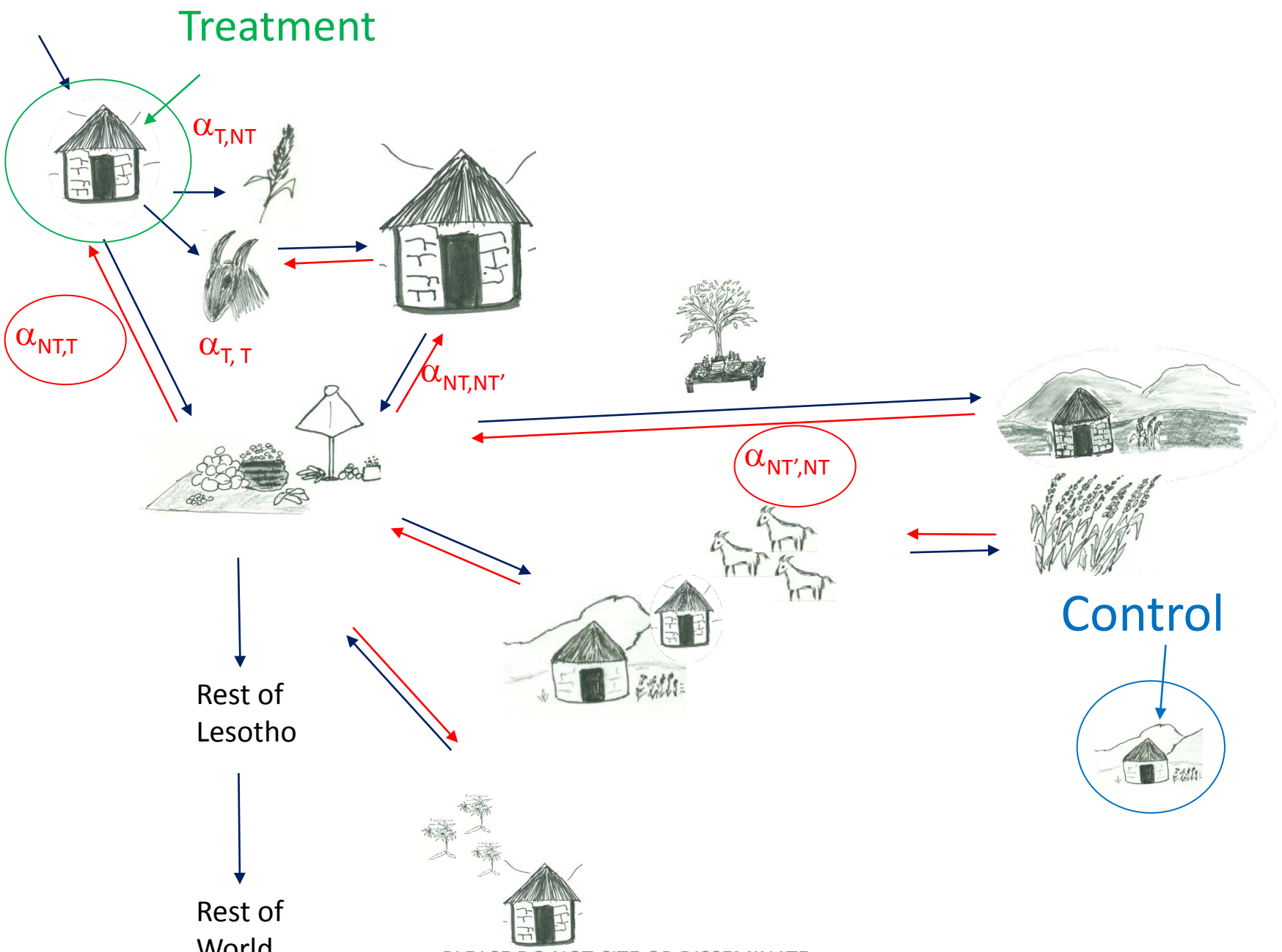
Transfer

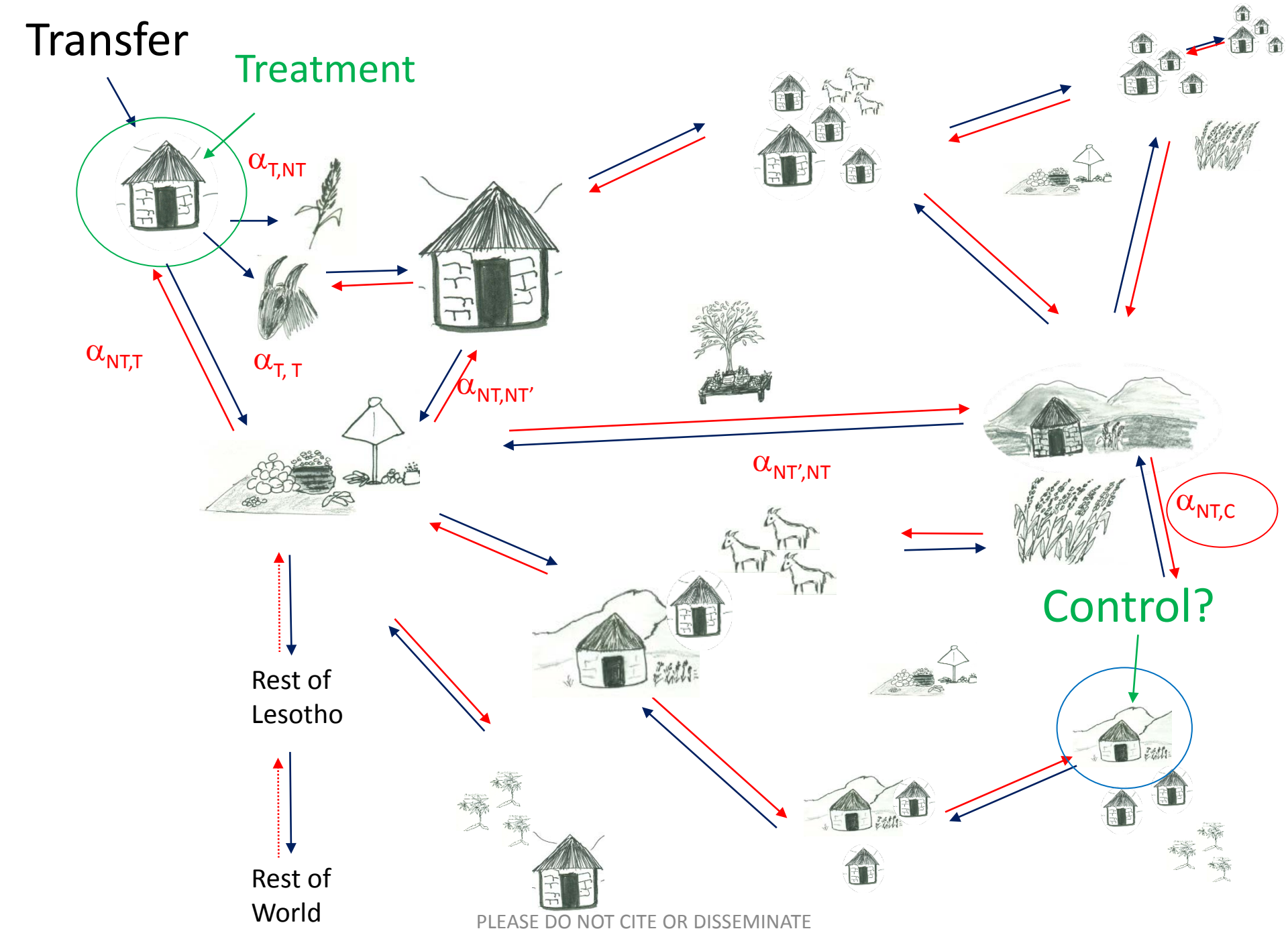
Treatment



Control







Why Look Beyond the Treated?

a) When we want to understand the full impact of treatments on the treated economy

- People spend their cash
- This instantly transmits the impacts of the CGP transfer to others in the local economy
- There may be feedback effects on the treated within the project area

b) When we want to know the impacts on the nontreated economy

- Impacts leak out of the treated economy
- They create general-equilibrium effects there
- …possibly "contaminating" control groups
- …and feeding back on the project area

c) When we want to know "Why" as well as "whether" there are impacts

d) When impacts are heterogeneous, with possible winners and losers

e) When We Worry About the Invariance Assumption

- "Full-scale programs may change the environment in ways that influence outcomes."
  - Manski

Randomization helps

- Rids us of selection bias
- Clustered randomization design minimizes the chance of control-group contamination

Randomization Doesn't Solve the GE Problem

If ρ is the ATT estimated from a randomized experiment, the total expected income impact is:

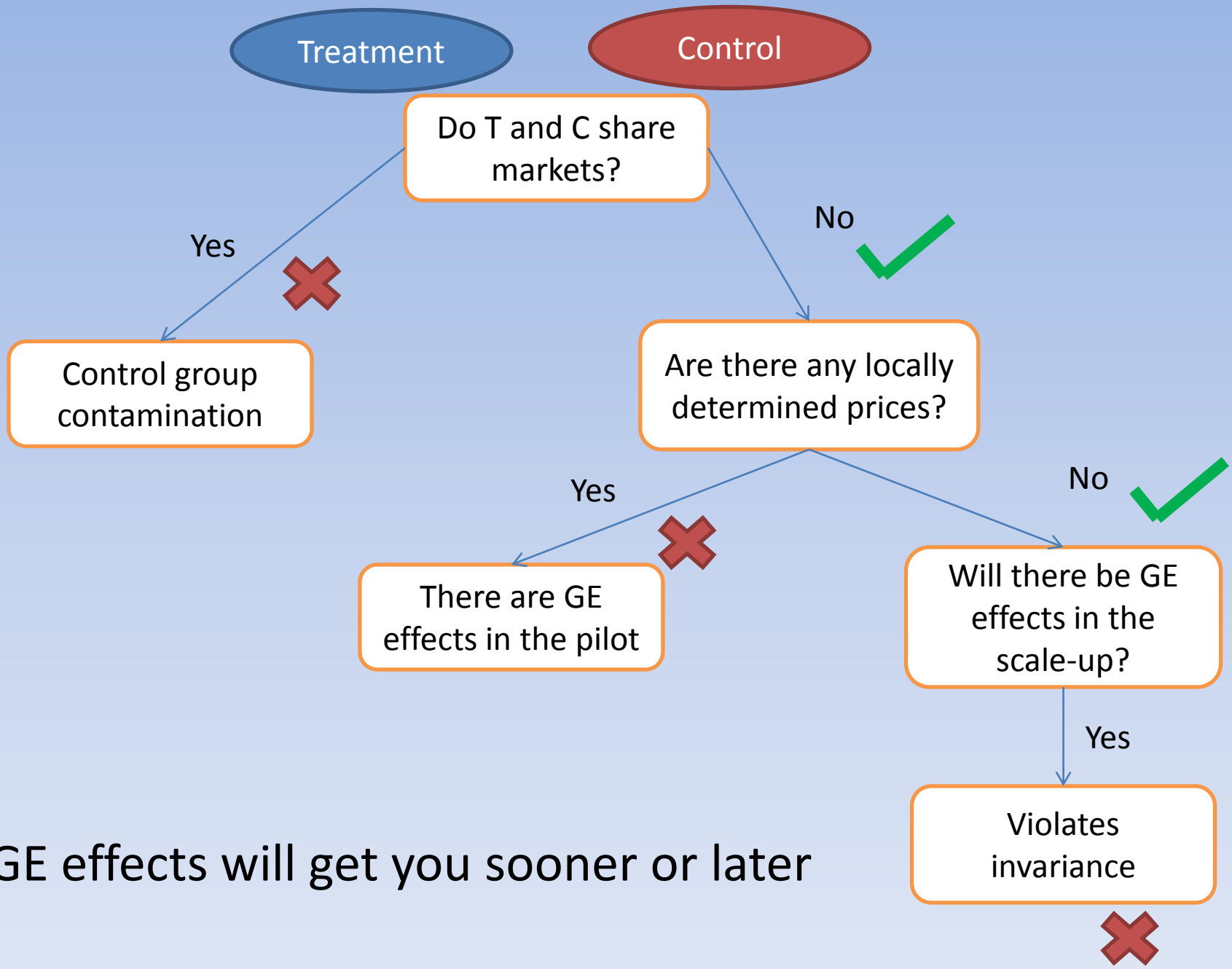
$$\rho\alpha^{GE} = \rho(1+\alpha_{NT}^{GE})$$

where…

$$\alpha^{GE}, \alpha_T^{GE} \text{ and } \alpha_{NT}^{GE}$$

are the GE impacts of 1 LSL of cash transfer on total, treatment-group and nontreatment-group incomes

$\rightarrow$They come out of a local GE model

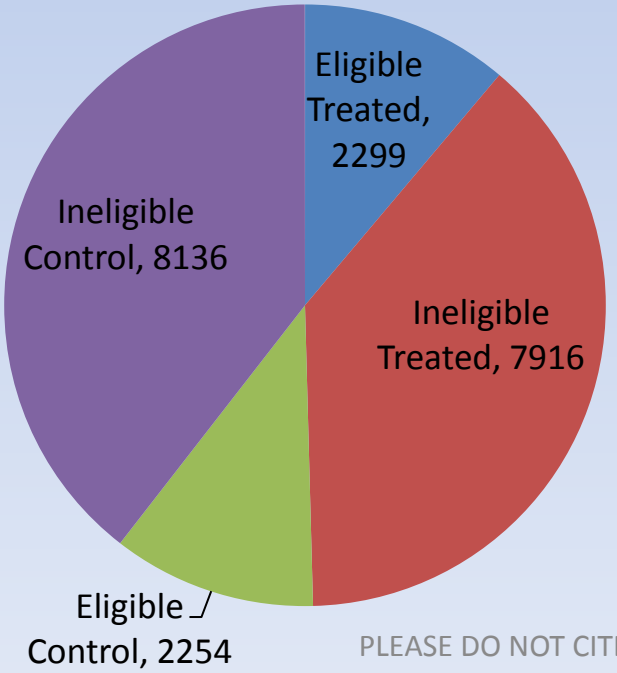


⇒GE effects will get you sooner or later

MODELING

Lesotho LEWIE

- Local Economy-Wide Impact Evaluation
- 2 villages (Treated/Non-treated)
- 2 households in each village (Eligible/Non-Eligible)



Household-farm economy

$$FD_{h,\,factor} = \frac{P_{h,good} \cdot QP_{h,good} \cdot \beta_{h,\,factor}}{P_{h,\,factor}}$$

$$QP_{h,good} = A_h \cdot \prod_{f \in Factors} \left(FD_{h,f} \right)^{\beta_{g,f}}$$

FD, QP
Y, QC

$$Y_h = \sum_{Factors} \text{Value of Endowment}$$

$$QC_{h,good} = \frac{\alpha_{h,good}}{P_{h,good}} Y_h$$

Table 3a. Top Panel of LEWIE Input Spreadsheet

Variable	Commodity	Factor	Households			
			Treated Villages		Control Villages	
			A	B	C	D
FD	crop	HL	150283.91	170974.01	1552819.18	2140229.31
FD	crop	FL	930154.11	818267.67	2859873.84	2432985.77
FD	crop	LAND	873093.98	768071.19	2684435.40	2283734.71
FD	crop	K	1092395.01	960992.93	3358703.55	2857356.10
FD	crop	PURCH	113174.87	99239.27	919594.60	838077.97
beta	crop	HL	0.0750011	0.0750011	0.0750011	0.0750011
beta	crop	FL	0.2401784	0.2401784	0.2401784	0.2401784
beta	crop	LAND	0.2254447	0.2254447	0.2254447	0.2254447
beta	crop	K	0.2820712	0.2820712	0.2820712	0.2820712
beta	crop	PURCH	0.1773046	0.1773046	0.1773046	0.1773046
se	crop	HL	0.0172838	0.0172838	0.0172838	0.0172838
se	crop	FL	0.0882176	0.0882176	0.0882176	0.0882176
se	crop	LAND	0.0661637	0.0661637	0.0661637	0.0661637
se	crop	K				
se	crop	PURCH	0.0391298	0.0391298	0.0391298	0.0391298
acobb	crop		4.238052	4.238052	4.238052	4.238052
acobbse	crop		0.2097159	0.2097159	0.2097159	0.2097159
alpha	crop		0.0915113	0.1289393	0.0188418	0.034959
alphase			0.0108685	0.0132612	0.0043281	0.0068111
cmin	crop		0.00	0.00	0.00	0.00

Household-farm economy

$$FD_{h,\,factor} = \frac{P_{h,good} \cdot QP_{h,good} \cdot \beta_{h,\,factor}}{P_{h,\,factor}}$$

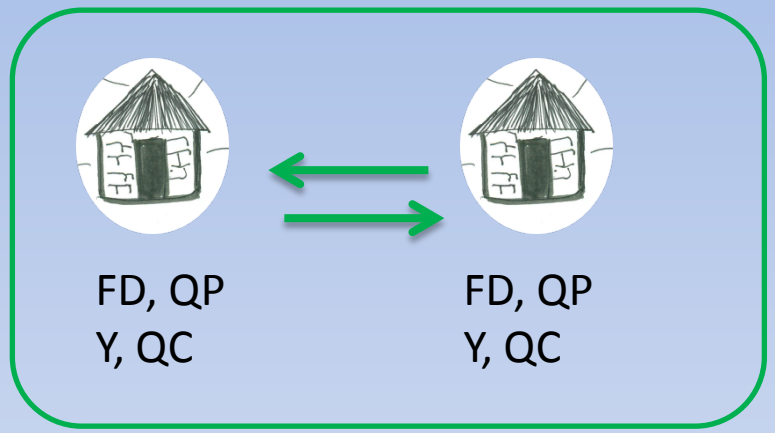
$$QP_{h,good} = A_h \cdot \prod_{f \in Factors} \left(FD_{h,f} \right)^{\beta_{g,f}}$$

$$QC_{h,good} = \frac{\alpha_{h,good}}{P_{h,good}} Y_h$$

$$Y_h = \sum_{Factors} Endow_{fac} \times W_{fac} + FD_{g,land} \times R_{g,land}$$

FD= factor demand; P=price, QP= quantity produced; QC =quantity consumed; Endow=factor endowments; W = factor wage; R=rent on fixed factor;
g=good, f=factor,h=household

Village Economy



$$FD_{h,\,factor} = \frac{P_{h,good} \cdot QP_{h,good} \cdot \beta_{h,\,factor}}{P_{h,\,factor}}$$

$$QP_{h,good} = A_h \cdot \prod_{f \in Factors} \left(FD_{h,f}\right)^{\beta_{g,f}}$$

$$QC_{h,good} = \frac{\alpha_{h,good}}{P_{h,good}} Y_h$$

$$Y_h = \sum_{Factors} Endow_{fac} \times W_{fac} + FD_{g,land} \times R_{g,land}$$

- **Market clearing constraint (across both households)**

$$\sum_{a \in A} QP_a + \sum_{h \in H} E_{h,gf} \geq \sum_{h \in H} MS_{h,gf} + QC_{h,gf} + \sum_{a \in A} FD_{a,gf}$$

Produced

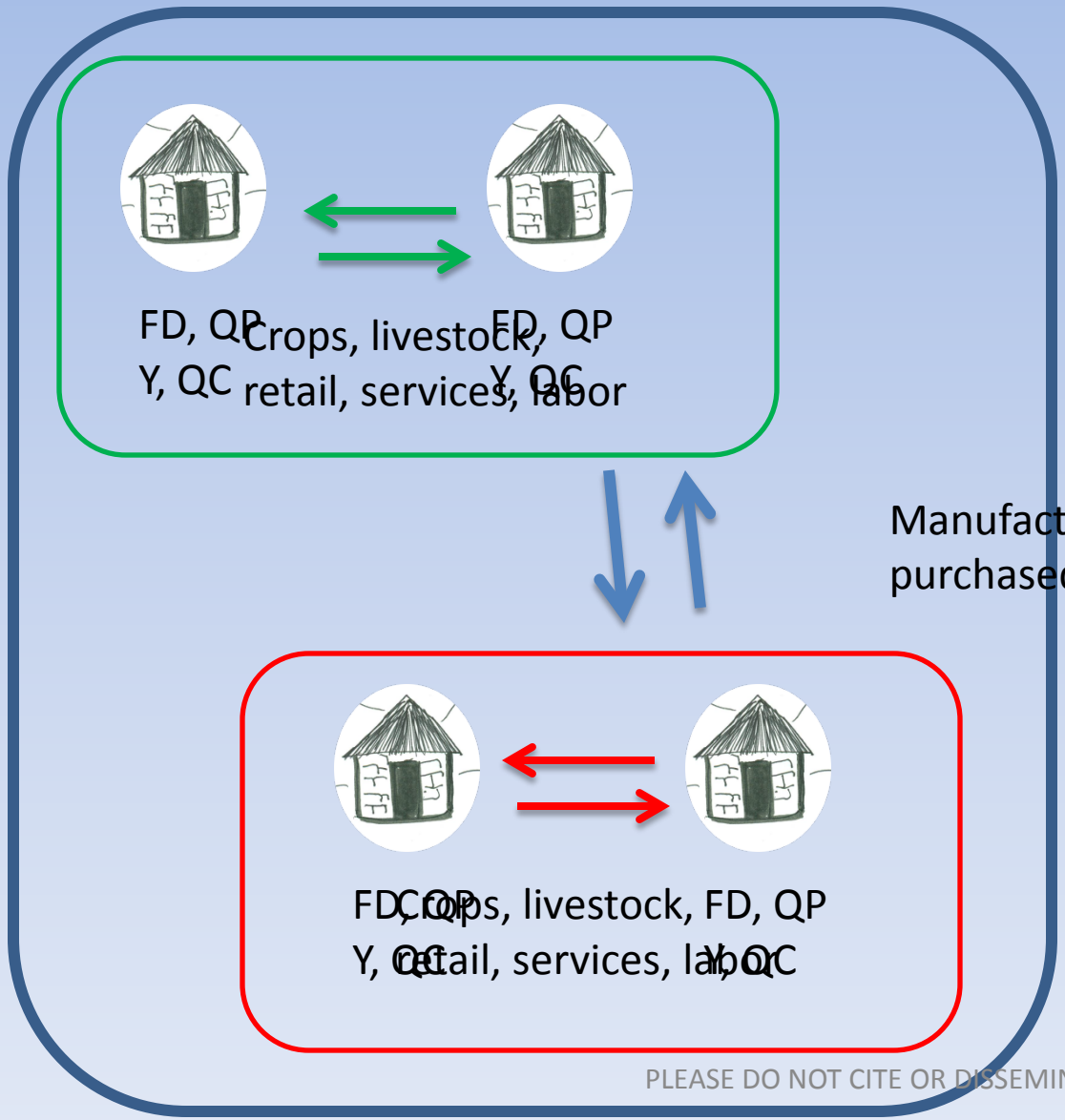
Endowments

Mkt Surplus

Consumed

Used as Factors

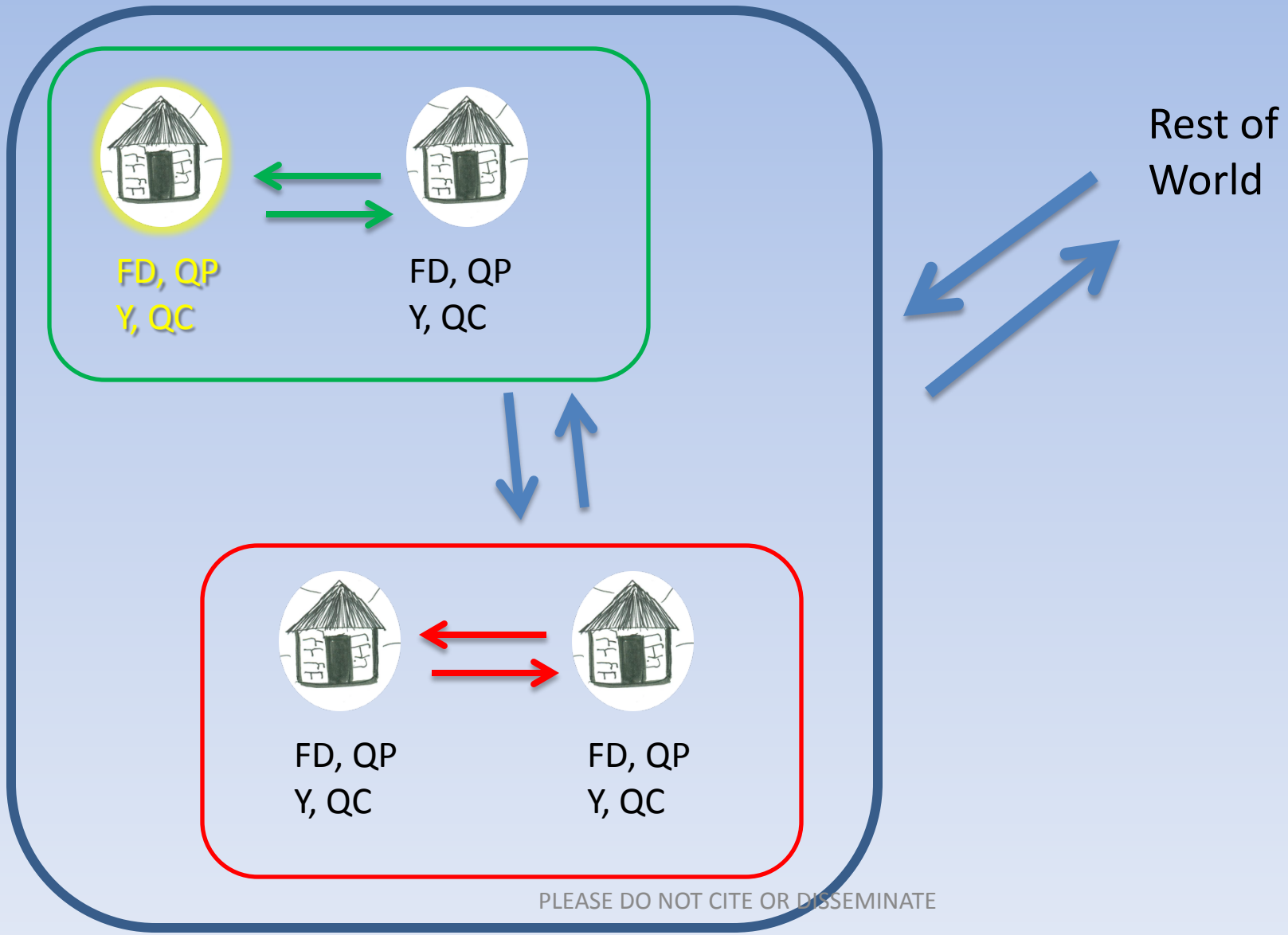
Lesotho LEWIE



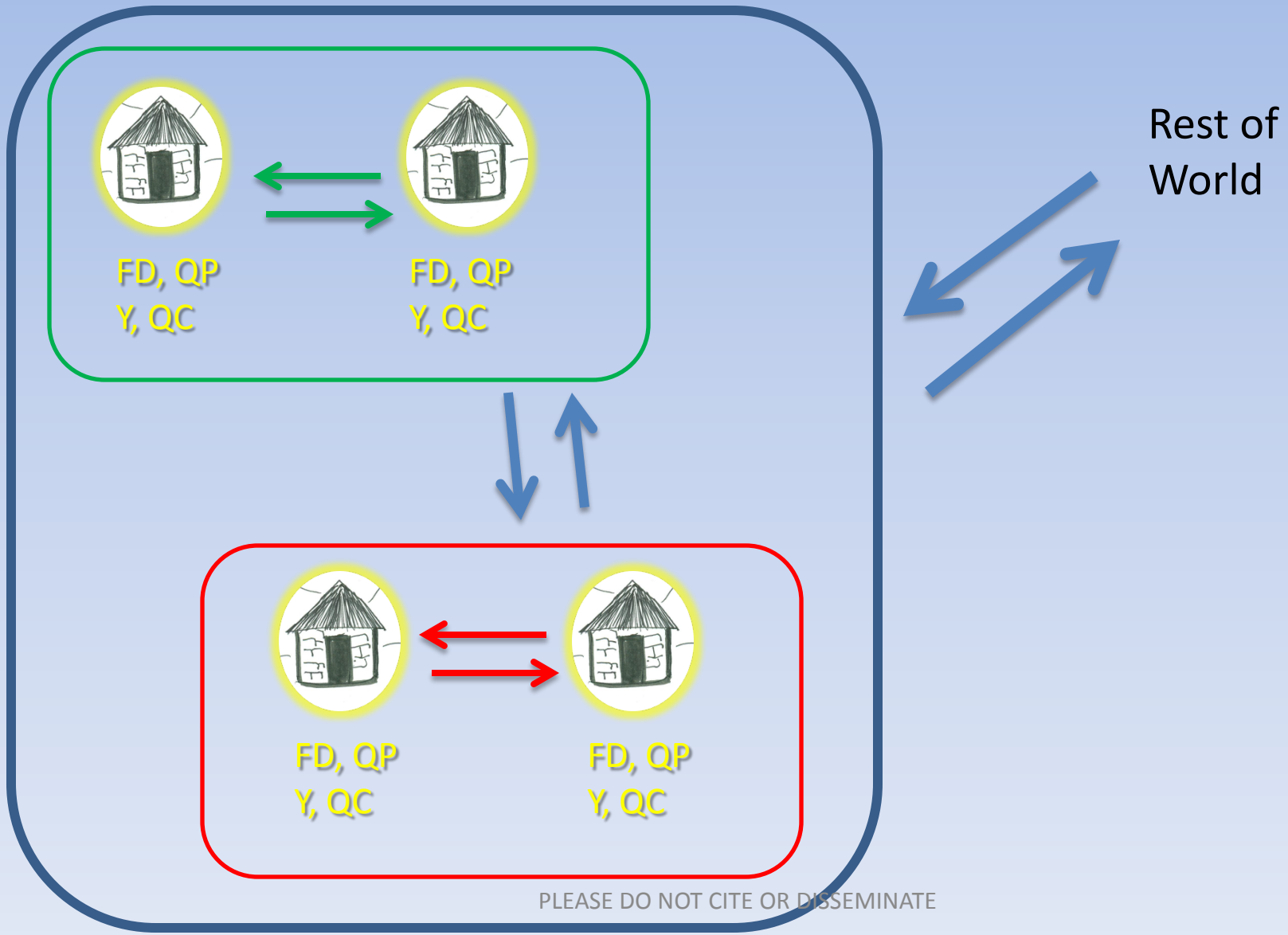
27 equation blocks (559 equations)

Calibrated from the CGP's survey data

Lesotho LEWIE

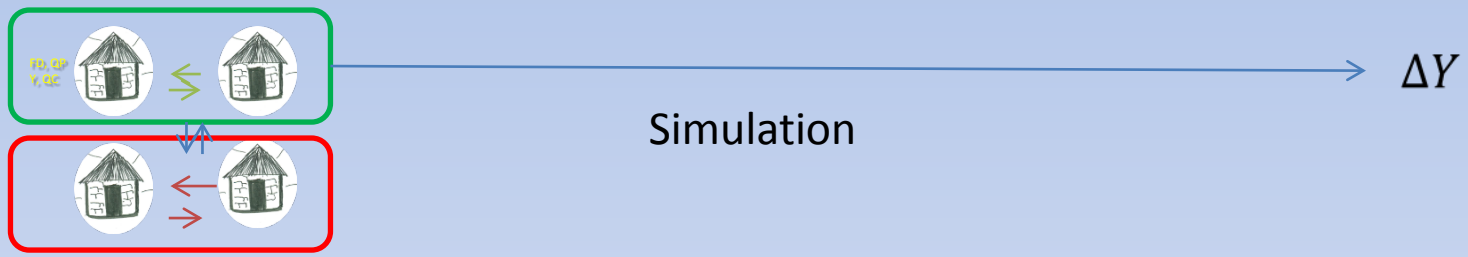


Lesotho LEWIE



Simulating with confidence

- **Treatment:** 3m Loti to Household A.



- **Results: $\Delta Y = 7.3$m Loti** (Total Nominal Income)

Getting confidence bounds on results

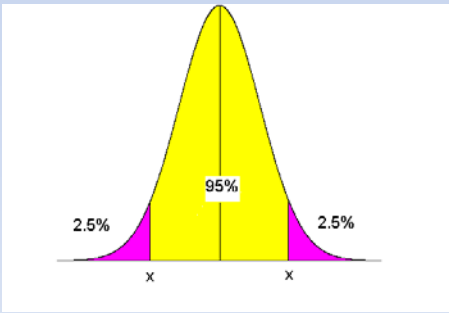
Labor 0.2 +/- 0.01
Capital 0.4 +/- 0.05
Land 0.3 +/- 0.1
Purchased 0.1 +/- 0.02

$$QP_{f,g,h} = A_{g,h} \cdot \prod_{F} FD^{\beta_{f,g,h}}$$

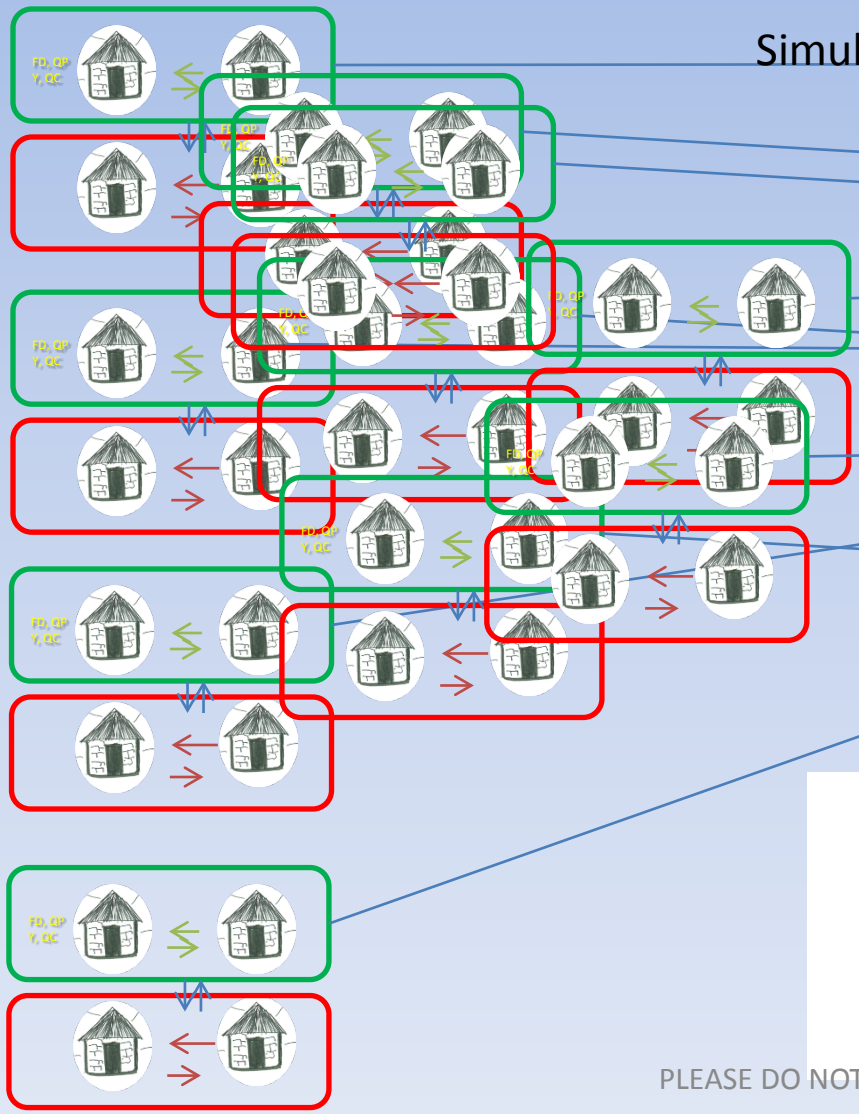
$QP +/- QP_{s.e.}$

4.5 +/- 0.5

And the same for all variables in the model



Getting confidence bounds on results



Simulation

ΔY^{i}

ΔY^{i}

ΔY^{i}

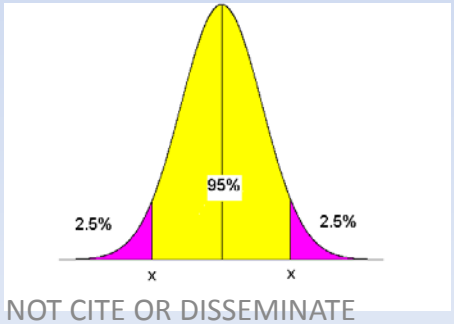
$\Delta Y'$ ΔY^{i}

$\Delta Y''$ ΔY^{i}

ΔY^{3}

ΔY^{i}

Distribution of ΔY



$\Delta Y \in [6.89; 8.06]$ with 90% confidence

RESULTS

Effect on Total Income

	Multiplier	Level Change
Total Income Y		
Nominal	2.23	7.38
(CI)	(2.08- 2.44)	(6.89 -8.06)
Real	1.36	4.5
(CI)	(1.25- 1.45)	(4.15 -4.80)

Effect on Household Incomes

Household A Income	Multiplier
nominal	1.15
cpi increase in %	1.96%
real	1.03
Household C income	
nominal	1.08
cpi increase in %	1.88%
real	0.33

$$\frac{0.33}{0.33 + 1.03} = 24\%$$

Effects on Production

Production multiplier for:	HH A (24% pop)	HH C (76% pop)
Crop	0.03	0.15
Livestock	0.02	0.26
Retail	0.07	0.52
Services	0	0.08
Other Production	0	0
TOTAL	**0.13**	**1.01**

$$\frac{1.01}{0.13 + 1.01} = 89\%$$

Importance of market structures

	Sim. 1	Sim. 2	Sim. 3
Elasticity of labor supply	100	1.00	1.00
Liquidity constraint on purchased inputs	off	off	on
Total Income multipliers			
Real	1.36	1.14	1.02
(CI)	(1.25- 1.45)	(1.08- 1.20)	(0.94- 1.09)

Example of an answer to “why”, more than just “whether”

CONCLUSIONS

Results Summary

- Spending by treated households creates multipliers in the economy, including for the ineligible
- For the CGP, indirect ("household C") effects are equivalent to:
    - 24% of real income impact
    - 88% of productive impact
- Indirect effects are dramatically reduced if factor supply is constrained

Questions About Impact Evaluation

- How do we measure the full impact of cash transfers (which include impacts on the non-treated groups)?
- How do we estimate the average effect of treatments on the treated (if market linkages spread impacts across groups and locales)?
- The invariance assumption

Good News (and a Caveat)

- The impacts of social cash transfers are likely to significantly exceed the ATT, and possibly the cost of the transfers
- …but local supply constraints may dampen these impacts considerably

$\Rightarrow$Interventions to increase the supply response in treated and especially non-treated households might be needed

Concluding Thoughts: Simulation vs. Experiments

- Experiments have become the favored method of impact evaluation
- In future: Simulation methods will be increasingly important element of impact evaluations
- The two approached are not substitutes, they are complements.

The Simulation-Experiment Ideal

- Use simulations to evaluate impacts of alternative project interventions ex-ante
  - Parameterize with data from baseline surveys
- Carry out randomized experiments using most promising program designs
- Use results of experiments ex-post to verify and (if needed) reparameterize simulation model
- Use simulation model to provide a structural interpretation of experiment results (i.e., to answer the "Why?" question)
  - …and improve policy design

Kenya

Table 1. Household Groups by Eligibility and Village-type

	Treatment Village	Control Village
OVC, Eligible	A. Treatment	B. Control
OVC, Ineligible	C	D
No OVC, Ineligible	E	F

Table 2. Comparison of Average Per-capita Expenditures

Household Group	Region 1	Region 2	Significance Level for Difference
A	33342	30286	***
B	31570	24485	
C	28855	25145	*
D	29924	23332	*
E,F	75080	37136	***

Difference significant at *10% (**5%) (***1%) level

Table 3. Number of Households for Each Type in the LEWIE Evaluation

Household Group	Region 1		Region 2	
	Treatment Village	Control Village	Treatment Village	Control Village
OVC, Eligible	A. 1940	B. 2791	A. 591	B. 397
OVC, Ineligible	C. 3993	D. 3823	C. 465	D. 654
No OVC, Ineligible	E. 19434	F. 22525	E. 5569	F. 5644
Total Transfer in Ksh	34,920,000		10,638,000	

Table 4. Accounts in the LEWIE Model

Households	
A	OVC Eligible, Treated Villages
B	OVC Eligible, Control Villages
C	Meet OVC but not Poverty Criteria, Treated Villages
D	Meet OVC but not Poverty Criteria, Treated Villages
E	CT-OVC Ineligible, Treated Villages
F	CT-OVC Ineligible, Control Villages
Activities	
crop	Crops
live	Livestock
ret	Retail
ser	Services
prod	Other Production
Commodities	
crop	Crops
live	Livestock
ret	Retail
ser	Services
prod	Other Production
outside	Purchased Outside Village in Project Area
Factors	
HL	Hired Labor
FL	Family Labor
LAND	Land
K	Capital
PURCH	Intermediate Inputs
ROW	Rest of Kenya

Table 5a. Top Panel of LEWIE Input Spreadsheet

Variable	Commodity	Factor	Households					
			A	B	C	D	E	F
FD	crop	HL	540.12	432.48	359.21	422.53	2905.07	2462.35
FD	crop	FL	3425.84	2743.09	2278.36	1224.53	18426.06	7136.20
FD	crop	LAND	3416.54	2735.64	2272.17	3024.30	18376.04	17624.69
FD	crop	K	654.76	524.27	435.45	2631.65	3521.68	15336.44
FD	crop	PURCH	167.20	133.88	111.20	371.12	899.30	2162.76
beta	crop	HL	0.0658	0.0658	0.0658	0.0658	0.0658	0.0658
beta	crop	FL	0.4176	0.4176	0.4176	0.4176	0.4176	0.4176
beta	crop	LAND	0.4164	0.4164	0.4164	0.4164	0.4164	0.4164
beta	crop	K	0.0798	0.0798	0.0798	0.0798	0.0798	0.0798
beta	crop	PURCH	0.0204	0.0204	0.0204	0.0204	0.0204	0.0204
se	crop	HL	0.0618	0.0618	0.0618	0.0618	0.0618	0.0618
se	crop	FL	0.1348	0.1348	0.1348	0.1348	0.1348	0.1348
se	crop	LAND	0.1016	0.1016	0.1016	0.1016	0.1016	0.1016
se	crop	PURCH	0.0506	0.0506	0.0506	0.0506	0.0506	0.0506
acobb	crop		5.9109	5.9109	5.9109	5.9109	5.9109	5.9109
acobbse	crop		0.9004	0.9004	0.9004	0.9004	0.9004	0.9004
alpha	crop		0.1376	0.0476	0.0100	0.0100	0.0100	0.0100
alphase	crop		0.0271	0.0296	0.0050	0.0251	0.0081	0.0081

Table 5b. Bottom Panel of LEWIE Input Spreadsheet

Variable	Commodity	Factor	Households					
			A	B	C	D	E	F
endow		HL	4200.281	8237.004	9567.677	13456.48	263382.2	266929.3
endow		FL						
endow		LAND						
endow		K						
ZOIENDOW		HL	1547.52	507.9417	1492.701	2099.411	35309.85	35785.39
ROCENDOW		HL	3367.345	1738.033	4387.182	6170.36	343800.8	348430.9
ROWendow		HL	0	104.2125	2.560085	3.600636	840.2975	851.6141
transfout	alpha		0.015069	0.025204			0.01071	0.01071
transfoutse	se		0.001964	0.007696			0.004308	0.004308
transfin	alpha		0.005659	0.000544			0.042099	0.042099
transfinse	se		0.001647	0.003955			0.01476	0.01476
sav	alpha		0.016942	0	0	0.001869		
savse	se		0.005599	0.002203	0.000359	0.001735		
EXPZOI			0.007882	0.013826	0.074009	0.08087	0.060809	0.060809
EXPROCO			0.033107	0.124134	0.028759	0.010901	0.114634	0.114634
NONSCtransfers			4780.388	3477.373	1041.244	1464.459	11617.06	11773.51
Remits			1611.745	2340.315	2478.069	3485.284	24032.04	24355.69
NumberHH			591	397	465	654	5569	5644

Table 7a. Average Budget Shares, Treated and Control Households – Region 1

Account	INST A	INST B	INST C	INST D	INST E	INST F
COMM crop	0.02	0.01	0.19	0.08	0.00	0.00
COMM live	0.02	0.02	0.04	0.03	0.01	0.01
COMM ret	0.58	0.63	0.41	0.57	0.43	0.43
COMM ser	0.11	0.10	0.09	0.07	0.21	0.21
COMM prod	0.02	0.01	0.02	0.03	0.05	0.05
ROW	0.24	0.22	0.25	0.23	0.31	0.31

Table 7b. Average Budget Shares, Treated and Control Households – Region 2

Account		INST A	INST B	INST C	INST D	INST E	INST F
COMM	crop	0.14	0.05	0.01	0.01	0.01	0.01
COMM	live	0.01	0.02	0.01	0.01	0.06	0.06
COMM	ret	0.56	0.71	0.88	0.91	0.70	0.70
COMM	ser	0.21	0.06	0.06	0.05	0.06	0.06
COMM	prod	0.02	0.01	0.01	0.01	0.05	0.05
ROW		0.07	0.15	0.03	0.01	0.13	0.13

Table 4. A Nested SAM for the Project Region

SAM Account			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Total Income
			ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	COMM	COMM	COMM	COMM	COMM	COMM	FACT	FACT	FACT	FACT	FACT	INST	INST	INST	INST	ROW	
			A	A	A	A	A	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D																	
			crop	live	ret	ser	prod	crop	live	ret	ser	prod	crop	live	ret	ser	prod	crop	live	ret	ser	prod	crop	live	ret	ser	prod	OUTSIDE	HL	FL	LAND	K	PURCH	A	B	C	D		
ACT	A	crop																					3.453																3.453
ACT	A	live																						3.848															3.848
ACT	A	ret																							6.297														6.297
ACT	A	ser																								0.347													0.347
ACT	A	prod																									0.603												0.603
ACT	B	crop																					3.010																3.010
ACT	B	live																						1.949															1.949
ACT	B	ret																							2.407														2.407
ACT	B	ser																								0.409													0.409
ACT	B	prod																									0.723												0.723
ACT	C	crop																					15.673																15.673
ACT	C	live																						40.252															40.252
ACT	C	ret																							55.265														55.265
ACT	C	ser																								15.118													15.118
ACT	C	prod																									2.621												2.621
ACT	D	crop																					18.385																18.385
ACT	D	live																						25.808															25.808
ACT	D	ret																							49.818														49.818
ACT	D	ser																								13.462													13.462
ACT	D	prod																									2.104												2.104
COMM		crop																																3.453	3.010	15.673	18.385		40.522
COMM		live																																3.848	1.949	40.252	25.808		71.857
COMM		ret			0.177	0.091	0.076			0.068	0.107	0.091			1.556	3.945	0.330			1.403	3.513	0.265												5.013	4.506	35.376	39.972	17.299	113.787
COMM		ser			0.189	0.001	0.022			0.072	0.002	0.027			1.660	0.056	0.097			1.496	0.050	0.078												0.591	0.524	5.874	7.158	11.441	29.337
COMM		prod																																0.267	0.220	2.479	1.655	1.430	6.052
COMM		OUTSIDE			4.498	0.055	0.355			1.719	0.065	0.426			39.475	2.389	1.542			35.584	2.127	1.238																	89.472
FACT		HL	0.259	0.056	0.233	0.051	0.038	0.226	0.029	0.089	0.060	0.046	1.176	0.589	2.045	2.211	0.165	1.379	0.378	1.843	1.969	0.133																12.972	25.943
FACT		FL	0.829	1.653	0.174	0.043	0.033	0.723	0.837	0.066	0.051	0.039	3.764	17.290	1.523	1.892	0.141	4.416	11.086	1.373	1.685	0.114																	47.732
FACT		LAND	0.778	0.937				0.679	0.475				3.534	9.806				4.145	6.288																					26.641
FACT		K	0.974	1.152	1.026	0.106	0.080	0.849	0.584	0.392	0.125	0.095	4.421	12.054	9.006	4.626	0.346	5.186	7.729	8.119	4.119	0.278																	61.267
FACT		PURCH	0.612	0.049				0.534	0.025				2.779	0.512				3.260	0.329																					8.099
INST		A																											1.659	3.498	1.716	3.338						5.229	15.440
INST		B																											1.953	3.069	1.154	2.046						4.081	12.302
INST		C																											11.312	23.844	13.340	30.453						53.516	132.465
INST		D																											11.019	17.320	10.432	25.430						57.462	121.664
ROW																												89.472		0.000			8.099	2.268	2.093	32.811	28.686		163.430
Total Expenditures			3.453	3.848	6.297	0.347	0.603	3.010	1.949	2.407	0.409	0.723	15.673	40.252	55.265	15.118	2.621	18.385	25.808	49.818	13.462	2.104	40.522	71.857	113.787	29.337	6.052	89.472	25.943	47.732	26.641	61.267	8.099	15.440	12.302	132.465	121.664	163.430	

Table 8a. The Supply of Goods and Services by Household Group – Region 1

Sam Account			COMM crop	COMM live	COMM ret	COMM ser	COMM prod
ACT	A	crop	0.01				
ACT	A	live		0.02			
ACT	A	ret			0.00		
ACT	A	ser				0.00	
ACT	A	prod					0.00
ACT	B	crop	0.01				
ACT	B	live		0.04			
ACT	B	ret			0.00		
ACT	B	ser				0.02	
ACT	B	prod					0.00
ACT	C	crop	0.68				
ACT	C	live		0.22			
ACT	C	ret			0.01		
ACT	C	ser				0.32	
ACT	C	prod					0.00
ACT	D	crop	0.30				
ACT	D	live		0.13			
ACT	D	ret			0.04		
ACT	D	ser				0.30	
ACT	D	prod					0.01
ACT	E	live		0.27			
ACT	E	ret			0.44		
ACT	E	ser				0.16	
ACT	E	prod					0.08
ACT	F	live		0.32			
ACT	F	ret			0.51		
ACT	F	ser				0.19	
ACT	F	prod					0.91

Table 8a. The Supply of Goods and Services by Household Group – Region 2

Sam Account			COMM crop	COMM live	COMM ret	COMM ser	COMM prod
ACT	A	crop	0.18				
ACT	A	live		0.00			
ACT	A	ret			0.01		
ACT	A	ser				0.00	
ACT	A	prod					0.00
ACT	B	crop	0.04				
ACT	B	live		0.01			
ACT	B	ret			0.00		
ACT	C	crop	0.05				
ACT	C	live		0.01			
ACT	C	ret			0.06		
ACT	C	ser				0.21	
ACT	D	crop	0.07				
ACT	D	live		0.02			
ACT	D	ret			0.28		
ACT	D	ser				0.29	
ACT	E	crop	0.32				
ACT	E	live		0.47			
ACT	E	ret			0.15		
ACT	E	ser				0.25	
ACT	E	prod					0.09
ACT	F	crop	0.34				
ACT	F	live		0.49			
ACT	F	ret			0.51		
ACT	F	ser				0.25	
ACT	F	prod					0.91

Table 9. Input Shares of Output Value by Sector, Household Group C – Region 1

Account		ACT C crop	ACT C live	ACT C ret	ACT C ser	ACT C prod
COMM	ret			0.11	0.20	0.08
COMM	ser			0.02	0.03	0.04
COMM	prod			0.01	0.01	0.04
COMM	OUTSIDE			0.72	0.45	0.50
FACT	HL	0.06	0.07	0.03	0.03	0.01
FACT	FL	0.16	0.09	0.08	0.04	0.30
FACT	LAND	0.39	0.25			
FACT	K	0.34	0.49	0.03	0.23	0.03
FACT	PURCH	0.05	0.11			

Table 10. Simulated Impacts of the CT-OVC Pilot Using the GE-LEWIE Model (Simulation 1)

	Assumptions			
Recipient household	A only			
Elasticity of hired/family labor supply	100			
Liquidity constraint on/off	off			
Village Markets	crop, live, ret, ser, FL, HL			
Zoi-wide Markets	(none)			
Integrated Markets	prod, outside, purchased inputs			
Amount transferred	34M(Reg. 1) and 10M(Reg. 2)			
iterations	250			
REGION	REGION 1		REGION 2	
	Multiplier	Level change*	Multiplier	Level Change*
Total Income				
Nominal	1.34	46.86	1.81	19.23
(CI)	(1.32- 1.37)	(46.49 -47.87)	(1.75- 1.88)	(18.60 -19.96)
Real	1.08	37.87	1.23	13.05
(CI)	(1.07- 1.10)	(37.78 -37.52)	(1.15- 1.30)	(12.24 -13.78)
Household Income				
A nominal	1	35.05	1.05	11.12
cpi increase in %	0.09%	0.09%	1.24%	1.24%
real	1	34.89	0.98	10.43
C nominal	0.12	4.23	0.23	2.48
cpi increase in %	0.23%	0.23%	0.46%	0.46%
real	0.05	1.91	0.16	1.75
E nominal	0.22	7.57	0.53	5.63
cpi increase in %	0.07%	0.07%	0.47%	0.47%
real	0.03	1.06	0.08	0.87
Production Effects (in Loti)				
crop	0.01	0.42	0.08	0.89
live	0.01	0.27	0.02	0.17
ret	0.8	27.83	0.98	10.39
ser	0.1	3.58	0.16	1.67
prod	-0.01	-0.31	-0.09	-0.94
*Millions of Ksh				

Table 11. Production Impacts by Household Group and Sector

Sector and Household		Region 1				Region 2			
		mean	stdev	pct5	pct95	mean	stdev	pct5	pct95
crop	A	0	0	0	0	0.03	0.01	0.02	0.03
	C	0.01	0.002	0.010	0.010	0.01	0.003	0.004	0.007
	E	0	0	0	0	0.05	0.02	0.03	0.07
live	A	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0
	E	0.004	0.001	0.003	0.005	0.02	0.01	0.02	0.02
ret	A	0	0	0	0	0.02	0.01	0.01	0.04
	C	0.02	0.01	0.01	0.04	0.28	0.08	0.16	0.41
	E	0.77	0.02	0.74	0.80	0.68	0.09	0.69	0.70
ser	A	0	0	0	0	0	0	0	0
	C	0.07	0.01	0.05	0.06	0.07	0.02	0.09	0.06
	E	0.03	0.01	0.04	0.03	0.09	0.02	0.06	0.12
prod	A	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0
	E	-0.01	0.003	-0.010	-0.010	-0.08	0.04	-0.08	-0.09

Table 12. Sensitivity of Results to Simulation Assumptions

Recipient household		A only		A only		A only
Elasticity of hired/family labor supply		100		1.00		1.00
Liquidity constraint on/off		off		off		on
Village Markets				crop, live, ret, ser, FL, HL		
Zoi-wide Markets				(none)		
Integrated Markets				prod, outside, purchased inputs		
Amount transferred				34M(Reg. 1) and 10M(Reg. 2)		
iterations				250		
		Simulation 1		Simulation 2		Simulation 3
		Region 1	Region 2	Region 1	Region 2	Region 1	Region 2
Total Income multipliers							
	Nominal	1.34	1.81	1.43	1.9	1.43	1.9
	(CI)	(1.32- 1.37)	(1.75- 1.88)	(1.42- 1.43)	(1.94- 1.91)	(1.39- 1.50)	(1.78- 2.05)
	Real	1.08	1.23	1.02	0.94	1.01	0.93
	(CI)	(1.07- 1.10)	(1.15- 1.30)	(1.00- 1.01)	(0.96- 0.92)	(1.01- 1.00)	(0.90- 0.91)
Wage effects							
	Hired Labor	0.00%	0.01%	0.25%	0.68%	0.25%	0.68%
	Family Labor	0.01%	0.03%	0.35%	1.67%	0.35%	1.67%
Household Income multiplier							
A	nominal	1	1.05	1	1.05	1	1.05
	cpi increase in %	0.09%	1.24%	0.14%	1.62%	0.14%	1.68%
	real	1	0.98	1	0.96	1	0.96
C	nominal	0.12	0.23	0.14	0.26	0.14	0.26
	cpi increase in %	0.23%	0.46%	0.30%	0.81%	0.32%	0.81%
	real	0.05	0.16	0.06	0.14	0.05	0.14
E	nominal	0.22	0.53	0.28	0.59	0.28	0.59
	cpi increase in %	0.07%	0.47%	0.12%	0.80%	0.12%	0.81%
	real	0.03	0.08	-0.04	-0.16	-0.04	-0.17
Production Multipliers							
	crop	0.01	0.08	0.01	0.07	0.01	0.06
	live	0.01	0.02	0.01	0	0	0
	ret	0.8	0.98	0.75	0.73	0.75	0.73
	ser	0.1	0.16	0.07	0.13	0.07	0.13
	prod	-0.01	-0.09	-0.1	-0.43	-0.1	-0.43

Table 13. Simulation 1 with Capital Accommodation

Recipient household	A only			
Elasticity of hired/family labor supply	100.00			
Liquidity constraint on/off	off			
Village Markets	crop, live, ret, ser, FL, HL			
Zoi-wide Markets	(none)			
Integrated Markets	prod, outside, purchased inputs			
Amount transferred	34M(Reg. 1) and 10M(Reg. 2)			
*1940	250			
Additional simulations	**Capital increases**			
	Simulation 1		Simulation 4	
	Region 1	Region 2	Region 1	Region 2
Total Income multipliers				
Nominal	1.34	1.81	1.21	1.66
(CI)	(1.32- 1.37)	(1.75- 1.88)	(1.20- 1.23)	(1.60- 1.73)
Real	1.08	1.23	1.18	1.57
(CI)	(1.07- 1.10)	(1.15- 1.30)	(1.17- 1.19)	(1.51- 1.63)
Wage effects				
Hired Labor	0.00%	0.01%	0.00%	0.01%
Family Labor	0.01%	0.03%	0.00%	0.03%
Rent Effects (range)	0.66%	3.44%	0.01%	-0.02%
	(0.61%- 0.72%)	(3.01%- 3.90%)	(-0.03%- 0.06%)	(-0.40%- 0.32%)
Household Income multiplier				
A nominal	1	1.05	1	1.04
cpi increase in %	0.09%	1.24%	0.03%	0.64%
real	1	0.98	1	1.01
C nominal	0.12	0.23	0.06	0.18
cpi increase in %	0.23%	0.46%	0.12%	0.09%
real	0.05	0.16	0.03	0.16
E nominal	0.22	0.53	0.15	0.44
cpi increase in %	0.07%	0.47%	0.00%	0.05%
real	0.03	0.08	0.15	0.4
Production Multipliers				
crop	0.01	0.08	0.01	0.09
live	0.01	0.02	0.01	0.09
ret	0.8	0.98	0.79	1.09
ser	0.1	0.16	0.19	0.3
prod	-0.01	-0.09	0.01	0.05

THANK YOU