

Local Economy-wide Impact Evaluation (LEWIE) and the Productive Impacts of Cash Transfers

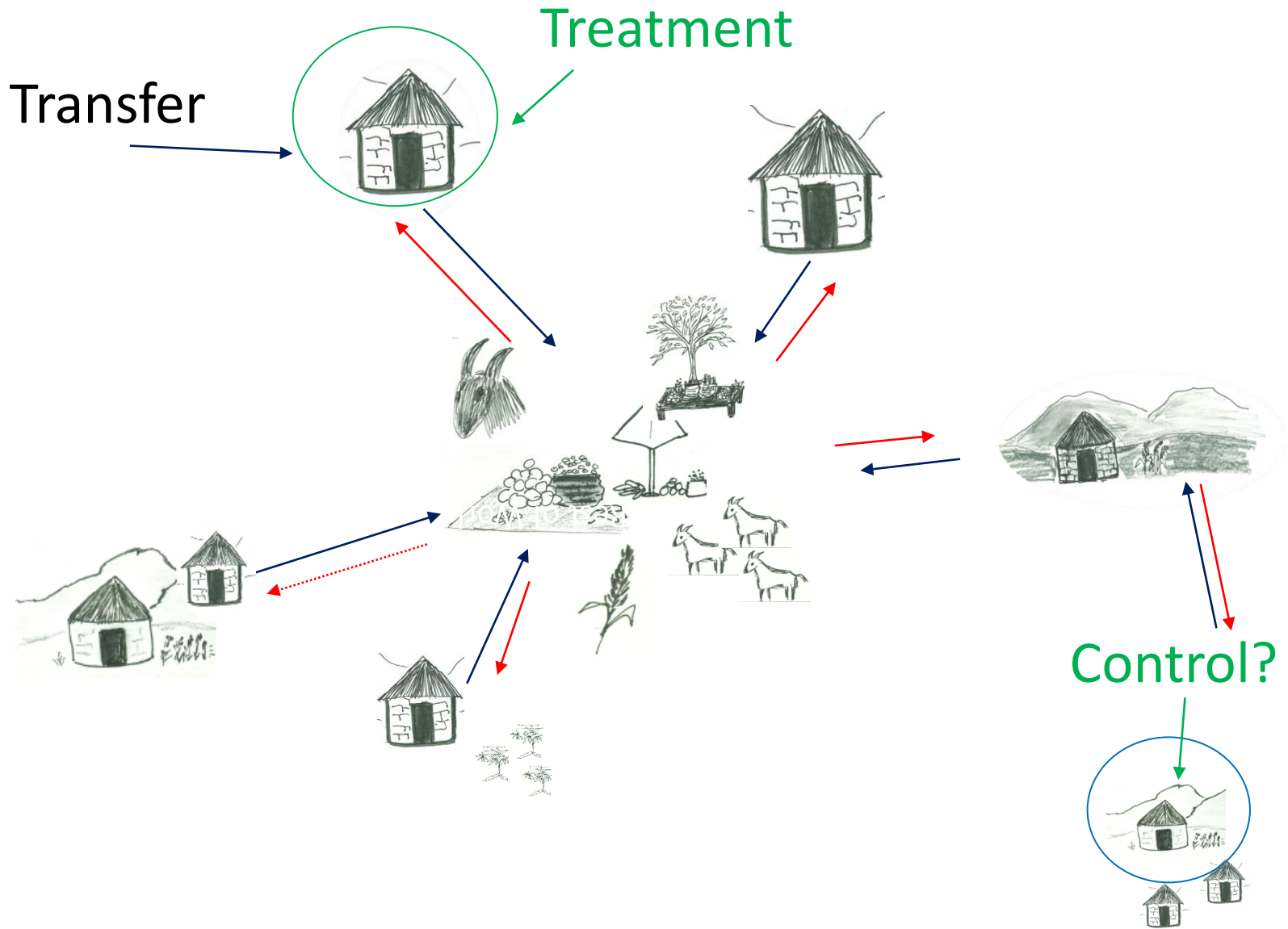
*Policy Dialogue and South-South Learning
Event on Recent Developments in the Role and
Design of Social Protection Programs, Brasilia,
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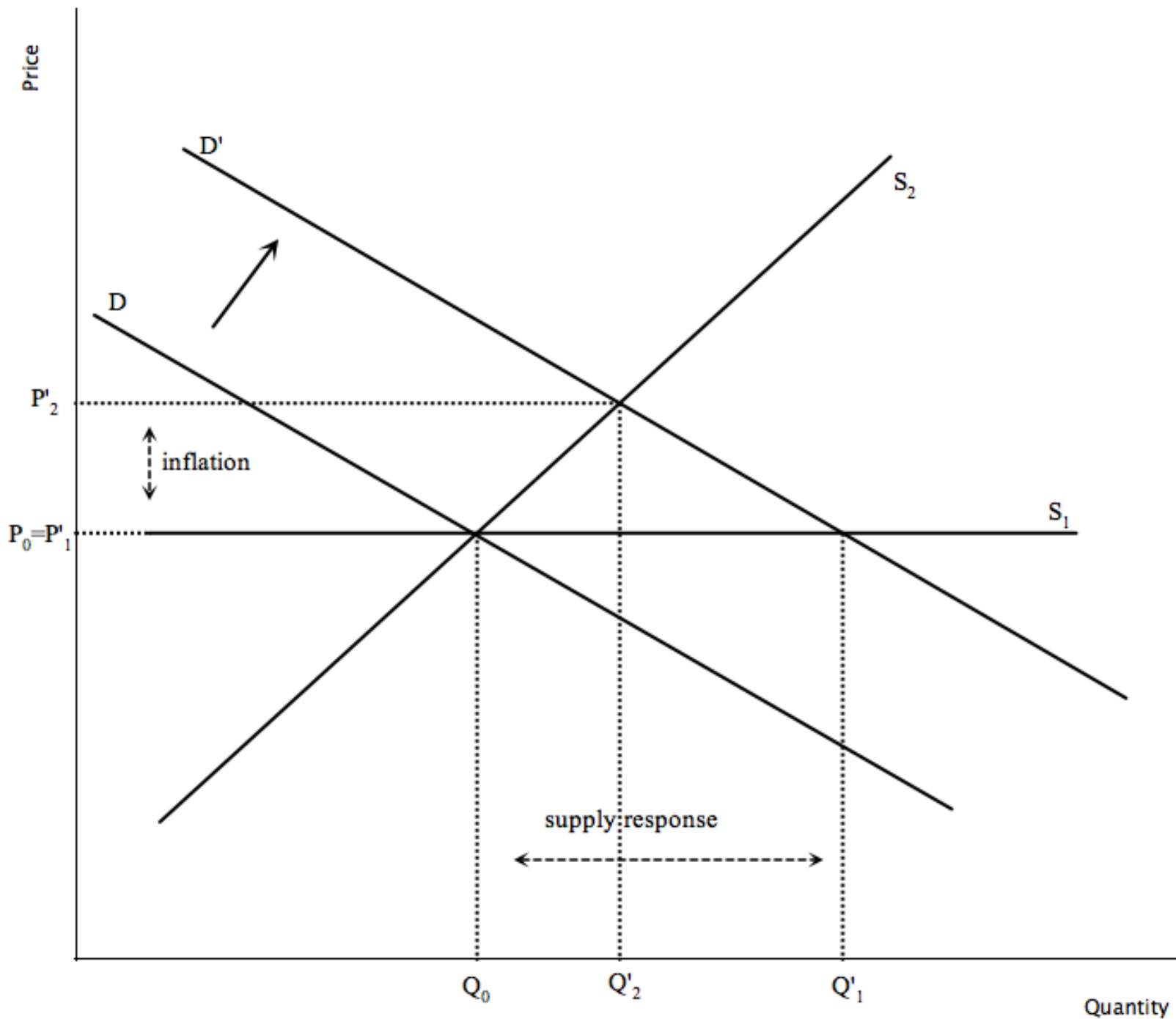
Protection to Production

- Can we design cash transfer (CT) programs that also impact productive activities?
 - Is there a supply response?
- CT programs target households least likely to invest in these activities
- Spillovers and GE effects can generate productive impacts in ineligible households
- Additional impact on program-area income is important to both ineligible constituents and to donors



Spillover Mechanism

- How does increase in demand translate into a supply response?



Spillover Mechanism

- How does increase in demand translate into a supply response?
 - Final price and increase in quantity depend on supply elasticity
 - Responsiveness of supply depends, in turn, on input supply constraints
- Space matters
 - Where are prices determined?

Simulating Impacts of the Lesotho
Child Grant Program (CGP) using
Local Economy-Wide Impact
Evaluation (LEWIE)

Lesotho CGP

- Goal is to improve the living standards of Orphans and Vulnerable Children
- 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 per household
 - Program total of 3 million loti per year

Methodology: What is LEWIE?

- LEWIE is a structural simulation model of a rural economy
 - Nests models of farm-households within a rural economy
- Calibrated directly from survey data
 - Bypasses building a social accounting matrix
- Incorporates confidence bounds
 - Parameters of the model are estimated econometrically

Household-farm economy

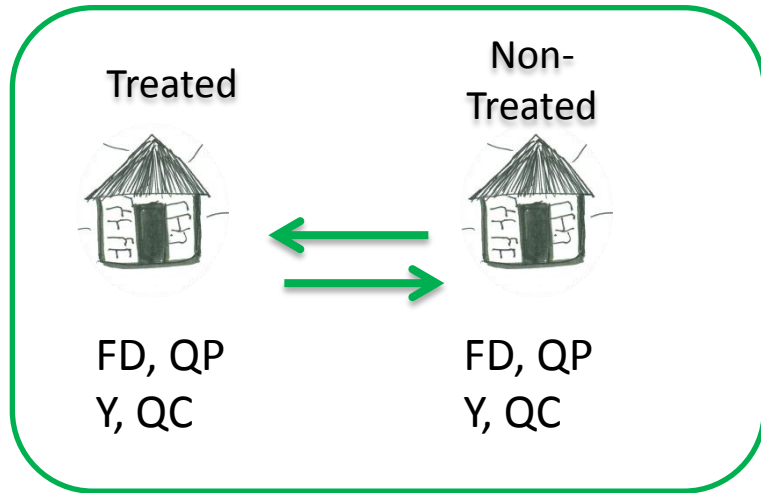
$$FD_{h, factor} = \frac{P_{h, good} \cdot QP_{h, good} \cdot \beta_{h, factor}}{P_{h, factor}}$$

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

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

$$Y_h = \sum_{Factors} Endow_{fac} \times W_{fac}$$

Village Economy



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

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

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

$$Y_h = \sum_{Factors} Endow_{fac} \times W_{fac}$$

- Market clearing constraint (for village)

$$\sum_h QP_{h, g} + \sum_h E_{h, f} \geq \sum_h MS_{h, gf} + \sum_h QC_{h, g} + \sum_h FD_{h, g, f}$$

Produced

Endowments

Mkt Surplus

Consumed

Used as Factors

Market Clearing Constraint and Price Determination

$$\sum_h QP_{h,g} + \sum_h E_{h,f} \geq \sum_h MS_{h,gf} + \sum_h QC_{h,g} + \sum_h FD_{h,g,f}$$

$$\sum_h MS_{h,gf} = \sum_h MS_{h,gf}^{Trad} + \sum_h MS_{h,gf}^{NonTradable}$$

Marketed surplus for non-tradable goods is 0

-The price of these goods is determined locally

Marketed surplus for tradable goods can be non-zero

-The price is determined elsewhere

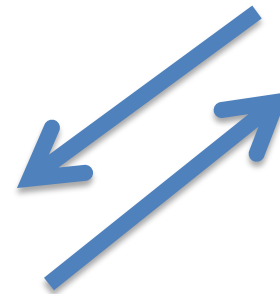
Full LEWIE



FD, QP Crops, livestock, FD, QP
Y, QC retail, services, labor



FD, QP Crops, livestock, FD, QP
Y, QC retail, services, labor



Rest of World

Manufactured goods,
purchased inputs

Effect of Lesotho CGP on Total Income

	Multiplier	Level Change
Total Income Y	<i>(loti/loti transferred)</i>	<i>(million loti)</i>
Nominal	2.23	7.38
(CI)	(2.08- 2.44)	(6.89 -8.06)

Getting confidence bounds on results

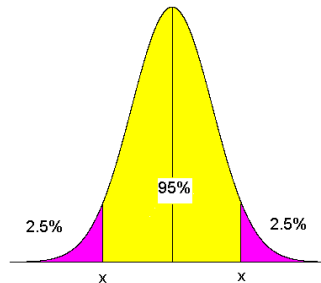
- Labor 0.2 +/- 0.01
- Capital 0.4 +/- 0.05
- Land 0.3 +/- 0.1
- Purchased 0.1 +/- 0.02

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

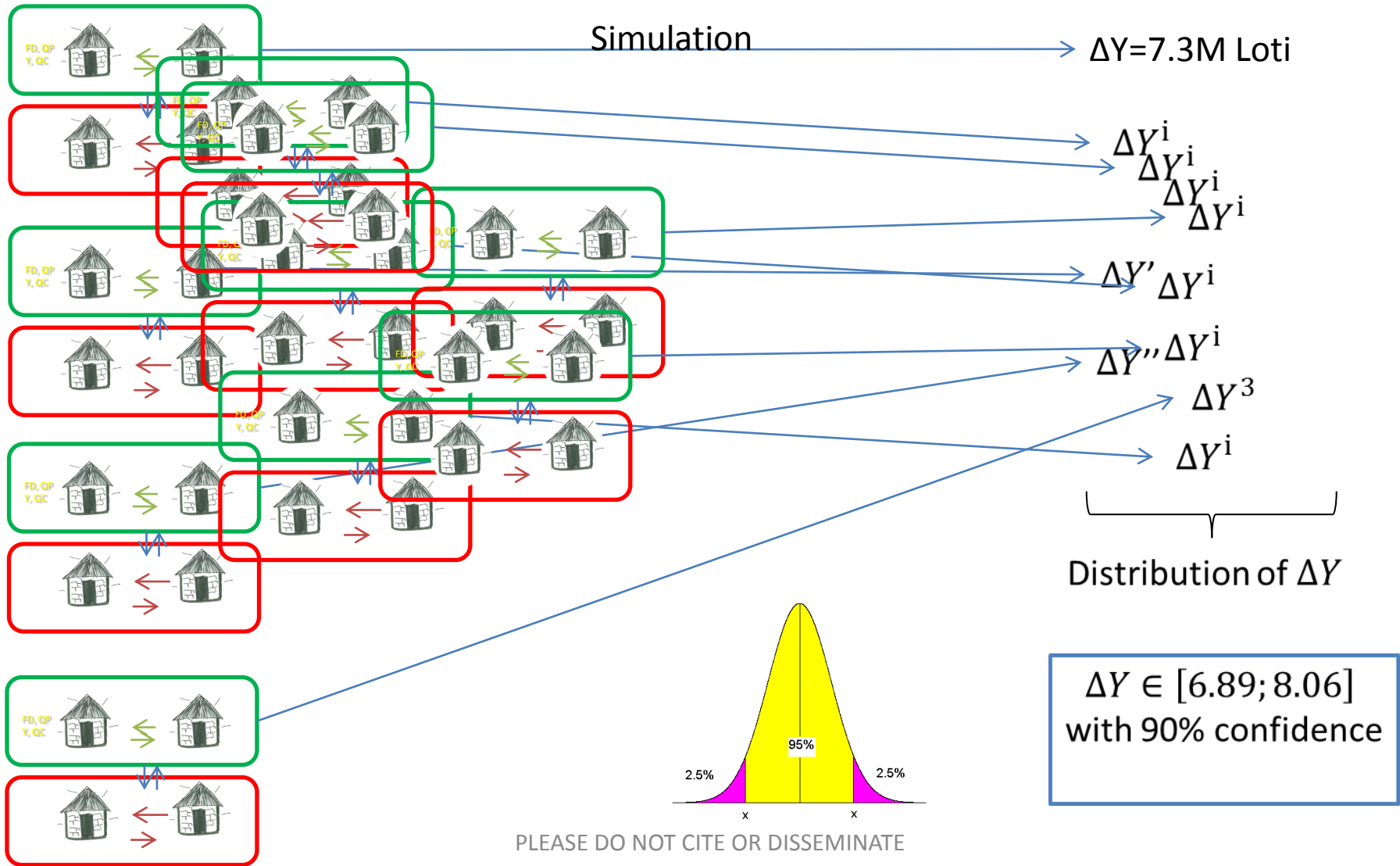
$QP \pm QP_{s.e.}$

4.5 +/- 0.5

And the same for all variables in the model



Getting confidence bounds on results



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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

Treated Household Income		Multiplier
	nominal	1.15
	cpi increase in %	1.96%
	real	1.03
Non-treated Household Income		Multiplier
	nominal	1.08
	cpi increase in %	1.88%
	real	0.33

Effects on Production

Production multiplier for:	Treated HH (24% pop)	Ineligible HH (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

Validation: Two Approaches

- Ex-ante: Sensitivity analysis
 - Parameters: monte carlo simulation to create confidence bands
 - Market Closure: test different scenarios

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)

Validation: Two Approaches

- Ex-ante: Sensitivity analysis
 - Parameters: monte carlo simulation to create confidence bands
 - Market Closure: test different scenarios
- Ex-post: Use experimental findings to:
 - Validate assumptions in model
 - Reparameterize model as needed
 - E.g.: Do transfers have different effects on expenditures than existing income sources?

Concluding Thoughts

- Simulations can provide a structural model of program impacts ex ante that can help policy design
- Can use simulations to evaluate impacts of alternative project interventions ex-ante
- Can use simulations to back up results from RCTs, and vice versa

Thank you