Food Security and Infant Mortality

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Food Security

- Food security is one of the most obvious problems in poor countries, especially in Sub-Saharan Africa
- Approximately 30% of the world suffers from malnutrition today (WDI)

Food Aid

- The primary policy response has been to alleviate hunger through food aid

- Two types
  - Relief: works well but is <10% of total (Lavy, 1992)
  - Donor-driven aid is given to poor countries. But doesn't respond to changes in contemporaneous needs: received a lot of criticism.

Donor Driven Aid

- Program Aid
  - Majority of aid
  - Delivered to government
  - Can be monetized
  - Expenditure at discretion of recipient government
- Project Aid
  - Food for field-based projects in areas with chronic hunger
  - Delivered typically through government or NGO (e.g. FFW)
  - Can be monetized.

Does Donor Driven FA Alleviate Hunger?

- Doesn't improve malnutrition
  - Misallocated
  - Recipient countries don't use aid for health (e.g. sell for guns instead)
  - Recipient countries don't have capacity for delivery
  - Doesn't suit domestic taste
- Distorts incentives for domestic producers (Pedersen, 1996; Kirwan and McMillan, 2007).
- We only look at the first problem: do donor-driven food aid achieve its primary objective by alleviating hunger?

Infant Mortality

- In our sample of Sub-Saharan Africa (SSA) and Latin American Countries (LAC) countries, infant mortality is 88 per 1,000 on average during 1976-2006
- One of the most consistently and best measured indicators of health across countries
- Sensitive to nutrition
- Food aid can improve infant health directly
- But mostly through improving adult health (e.g. better *in-utero* health, better care, breast milk)

Infant Mortality and Beyond

- Infant mortality should also be interpreted as the long term health risk of survivors
- The same malnutrition that increases infant mortality will also increase long term health risks of survivors (Bozzoli, Deaton and Quintana-Domeque, 2008)
- Reduction in mortality may lead to large economic grains (Murphy and Topel, 2003)

Studies of Food Aid Impact

- The evaluation of food assistance programs is "woefully incomplete, excessively focused on univariate analysis and on individual case studies" (Pillai, 2000; Barret, 2006).

Main Empirical Difficulty

- Reverse causality and OVB
- Food aid recipients are countries that have many other problems
- OLS correlation will show that food aid is negatively correlated with outcomes
- There are studies that show a positive effect of food aid on decreasing infant mortality and increasing domestic production (Levihnson and McMillan, 2007; Quisumbing, 2003; Yamano, Alderman and Christiaensen, 2005).
- This studies are probably biased downwards.
- Adding country FE partly addresses this problem, but is probably still biased downwards because countries will receive more aid when they are worse off Barret and Hoddinott (2005)

Our Strategy

- Estimate the causal effect of donor-driven food aid on infant mortality
- Use U.S. production shocks as IV
- The U.S. provides +50% of total food aid.
- Part of PL480 which is meant to subsidize U.S. producers (mainly wheat)
- When there is a production shock (caused by weather) in the U.S., food aid will increase for developing countries.

Data

- FAO: Food Aid, Food Production
- CME (WHO): Infant Mortality
- WDI: Infant and Child Mortality, roads
- Polity IV
- Besley and Persson: Bureaucratic Capacity = % of income tax revenue in GDP

U.S. Production and Food Aid
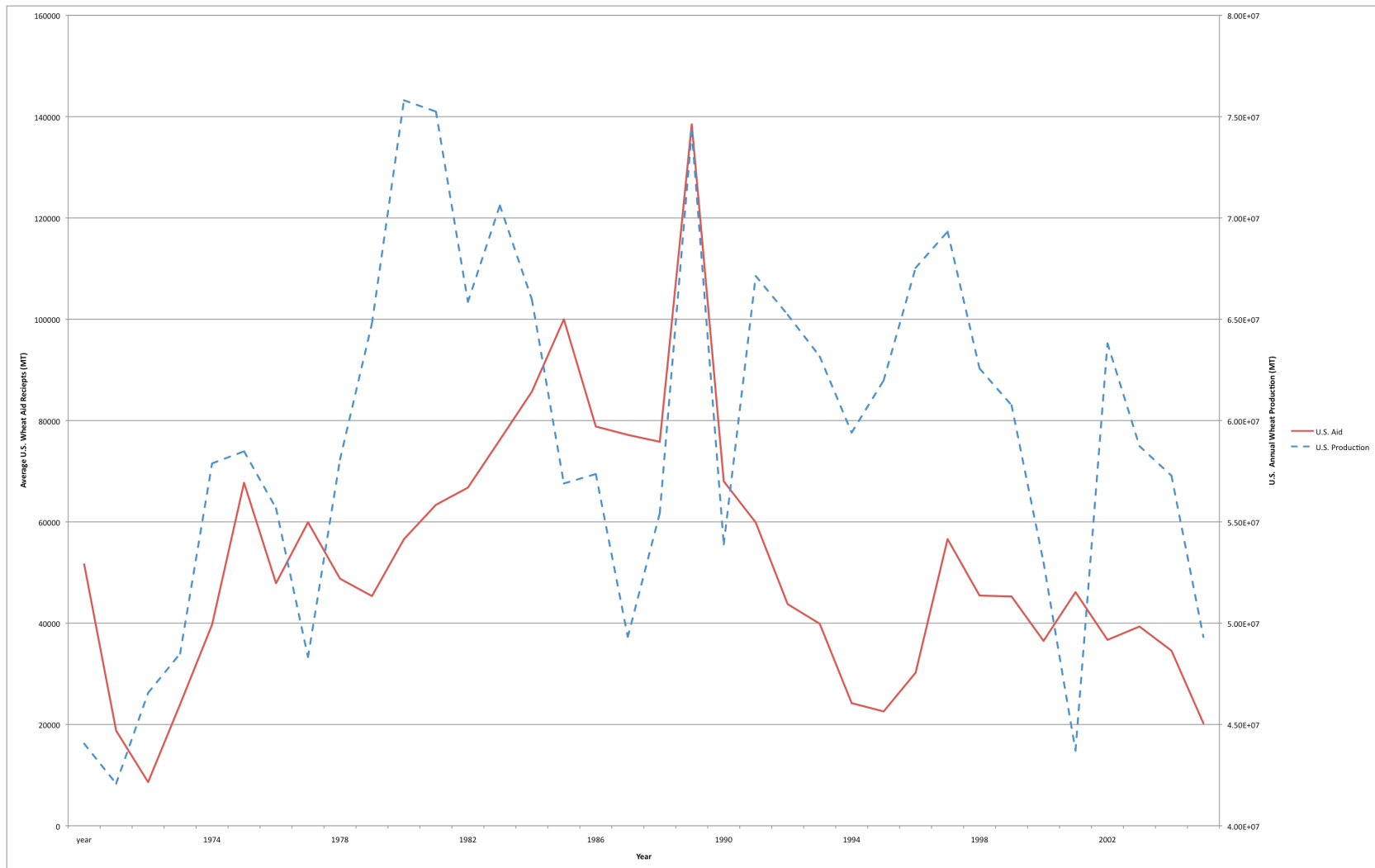
- We collected data on weather shocks in the U.S.
- Showed that 80-90% of production can be explained by weather

1ˢᵗ Stage

	(1) SSA	(2) LAC	(3) EAP	(4) OTHER	(5) ECA	(6) SSA+LAC	(7) SSA+LAC	(8) SSA+LAC	(9) Lagged Ln U.S. Crop Aid SSA+LAC	(10) Ln U.S. Crop Aid SSA+LAC	(11) Ln U.S Total Aid (USD 96) SSA+LAC	(12) Ln ODA (USD 96) Ln ODA
				Dependent Variables: Ln Aid Receipts								
				Ln U.S. Crop Aid								
Mean Dependent Variable	**8.46**	**9.26**	**10.45**	**10.79**	**10.29**	**8.78**			**8.80**	**8.78**	**2.64**	**3.98**
Ln US Crop Prod	1.531	1.062	-1.014	-1.291	0.727	1.720	1.582	1.506	0.277	1.379	1.367	0.320
	(0.554)	(0.672)	(1.249)	(0.541)	(1.314)	(0.616)	(0.498)	(0.549)	(0.724)	(0.683)	(0.647)	(0.203)
Lagged GDP Growth						-1.421						
						(0.708)						
Ln US Crop Prod 1 Yr Later										0.235	0.532	0.254
										(0.834)	(0.583)	(0.267)
Ln US Crop Prod 2 Yrs Later										0.0198	0.176	0.381
										(0.821)	(0.667)	(0.206)
Controls												
Year Trend	N	N	N	N	N	Y	N	N	N	N	N	N
Country Specific Year Trend	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Number of Conflicts	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y
Observations	616	443	75	243	84	1145	1389	1165	1057	1165	974	1058
R-squared	0.619	0.528	0.407	0.686	0.397	0.548	0.610	0.600	0.610	0.601	0.784	0.817

All regressions control for country fixed effects.

Standard errors are clustered at the year level.

RF Effect of U.S. Production Shocks on Infant Mortality

	Dependent Variables: Mortalit Rate (Deaths per 1,000 Births)										
	Infant Mortality			WDI Infant Mortality			WDI Child Mortality			Infant Mortality	
	SSA+LAC									SSA	LAC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Mean of Dependent Variable	**88.46**			**82.6**			**127.53**			**82.6**	
Ln US Crop Prod	-9.169	-10.25	-9.103	-19.46	-23.09	-17.07	-33.99	-43.62	-31.66	-9.084	-6.031
	(3.679)	(2.576)	(2.490)	(13.20)	(11.24)	(7.575)	(23.02)	(21.38)	(13.27)	(2.390)	(2.070)
Controls											
Lagged Annual GDP Growth	Y	N	N	Y	N	N	Y	N	N	N	N
Year Trend	Y	N	N	Y	N	N	Y	N	N	N	N
Country Specific Year Trends	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y
Number of Conflicts	N	N	Y	N	N	Y	N	N	Y	N	N
Observations	1145	1389	1165	158	176	136	158	176	136	616	443
R-squared	0.949	0.988	0.990	0.971	0.993	0.996	0.976	0.994	0.997	0.987	0.988

All regressions control for country fixed effects.

Standard errors are clustered at the year level.

Sample contains countries in SSA and LAC.

The Effect of Food Aid on Infant Mortality

	Dependent Variables: Mortality Rate (Deaths per 1,000 Live Births)									
	\multicolumn{6}{c}{Infant Mortality}					WDI Infant Mortality		WDI Child Mortality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	SSA + LAC	SSA + LAC	SSA	SSA	LAC	LAC	SSA + LAC	SSA + LAC	SSA + LAC	SSA + LAC
Mean of Dep. Varial	\multicolumn{6}{c}{88.46}					82.6		127.53	
A. OLS										
Ln U.S. Crop Aid	-0.611	-0.685	-0.607	-0.642	-0.592	-0.479	-0.675	-1.227	-0.923	-1.730
	(0.123)	(0.108)	(0.161)	(0.157)	(0.128)	(0.120)	(0.922)	(0.495)	(1.611)	(0.895)
Controls										
Number of Conflicts	N	Y	N	Y	N	Y	N	Y	N	Y
Observations	1389	1165	683	616	460	443	176	136	176	136
R-squared	0.988	0.990	0.987	0.986	0.987	0.988	0.993	0.996	0.994	0.996
B. 2SLS										
Ln U.S. Crop Aid	-6.478	-6.045	-5.551	-5.932	-4.902	-5.679	-4.490	-3.165	-8.483	-5.869
	(1.264)	(1.370)	(1.305)	(1.513)	(1.765)	(3.269)	(3.441)	(1.434)	(6.533)	(2.514)
Controls										
Number of Conflicts	N	Y	N	Y	N	Y	N	Y	N	Y
Observations	1389	1165	683	616	460	443	176	136	176	136
R-squared	0.950	0.958	0.963	0.957	0.940	0.922	0.987	0.995	0.987	0.995

All regressions control for country fixed effects and country specific time trends.
Standard errors are clustered at the year level.

Main Results

- Increasing U.S. Food by 1 Std Deviation will Decrease Infant Mortality by ~13 per 1,000

- This is equivalent to the average decrease during 1982-1996

Determinants of Aid Effectiveness

- Estimate interaction effects
- Roads don't matter
- Corruption, political instability and wars seem to hinder aid effectiveness (estimates imprecise)
- Democratic government (Polity2>0) and administrative capacity (Besley and Persson, 2009) matters a lot
- All of the benefits are received by countries with above sample mean measures of democracy and administrative capacity

Preliminary Conclusions

- Food aid has a large and immediate benefit in decreasing infant mortality

- Political will and administrative capacity of the recipient government determines effectiveness of aid

In progress

- Collect more data
- Predict U.S. production with weather shocks
- Control and interact with recipient weather conditions
- Distinguish between NGO implemented vs government implemented aid
- Democracy, mechanisms? Election years?
- Do cost-benefit analysis?
- Suggests are most welcome!
- Thank you!