



IMPACTS OF THE 2016/17 FOOD INSECURITY RESPONSE PROGRAM ON MAIZE PRICES IN MALAWI

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Presentation outline

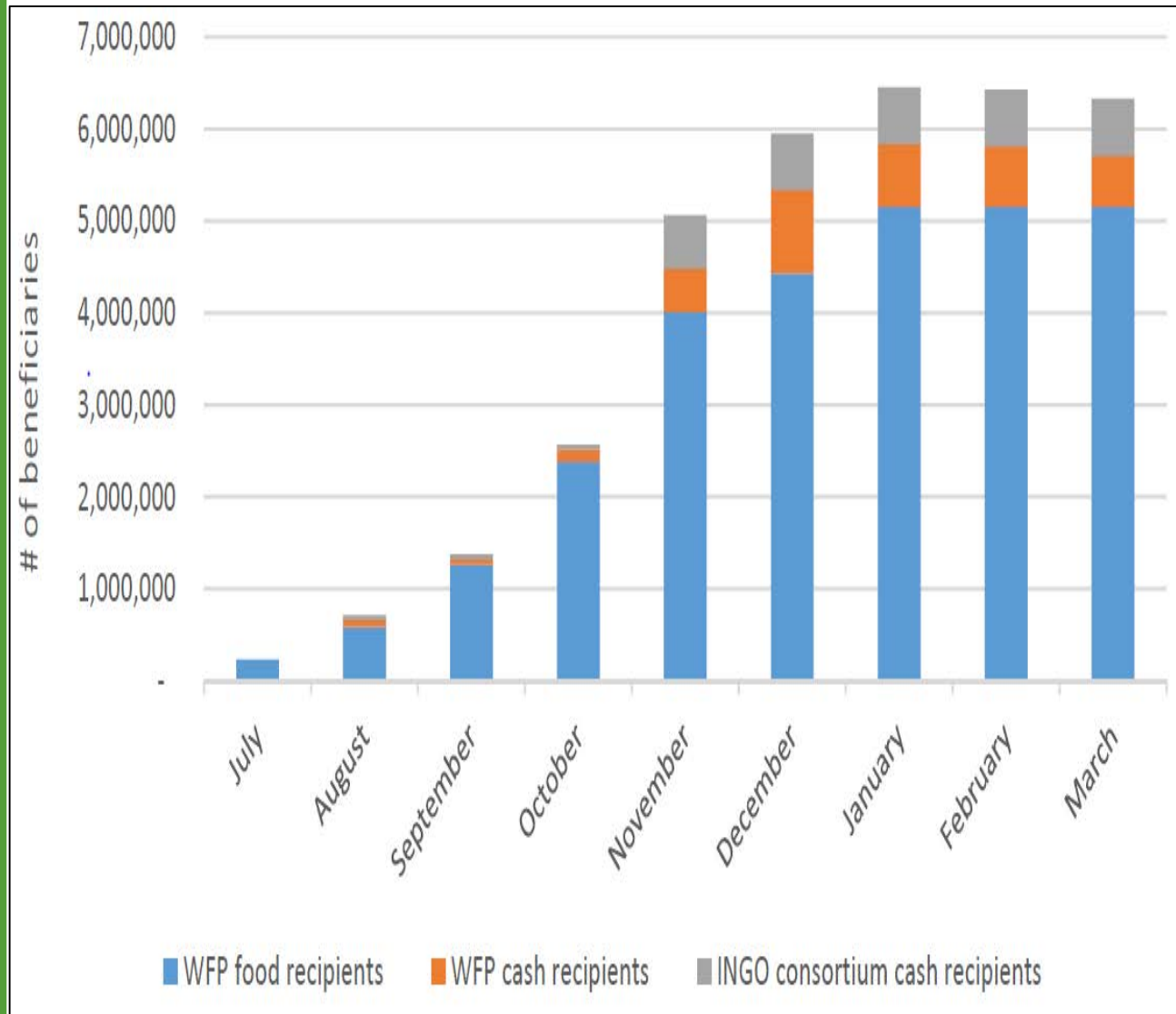
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- 1. Study context**
- 2. Research question**
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- 7. Impacts of FIRP on maize prices**
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Context (I)

- **FIRP was of unprecedented scale, and was dominated by in-kind food transfers.**
 - ✓ Initial MVAC assessment of May 2016 envisaged 6.5 million beneficiaries (of whom 4.7 million would receive in-kind food transfers and 1.8 million would receive cash transfers)
 - ✓ In October 2016, this was modified to 6.7 million beneficiaries (with in-kind food beneficiaries increased to 5.4 million and cash beneficiaries decreased to 1.4 million).
 - ✓ A hybrid modality involving maize vouchers plus a cash for the non-maize ration was introduced from December 2016 onwards.

Fig 1: Beneficiaries assisted per month during FIRP July 2016 to March 2017



Context (2)

- **Extrapolating from the 2016/17 Food Balance Sheet (FBS), we estimate that:**

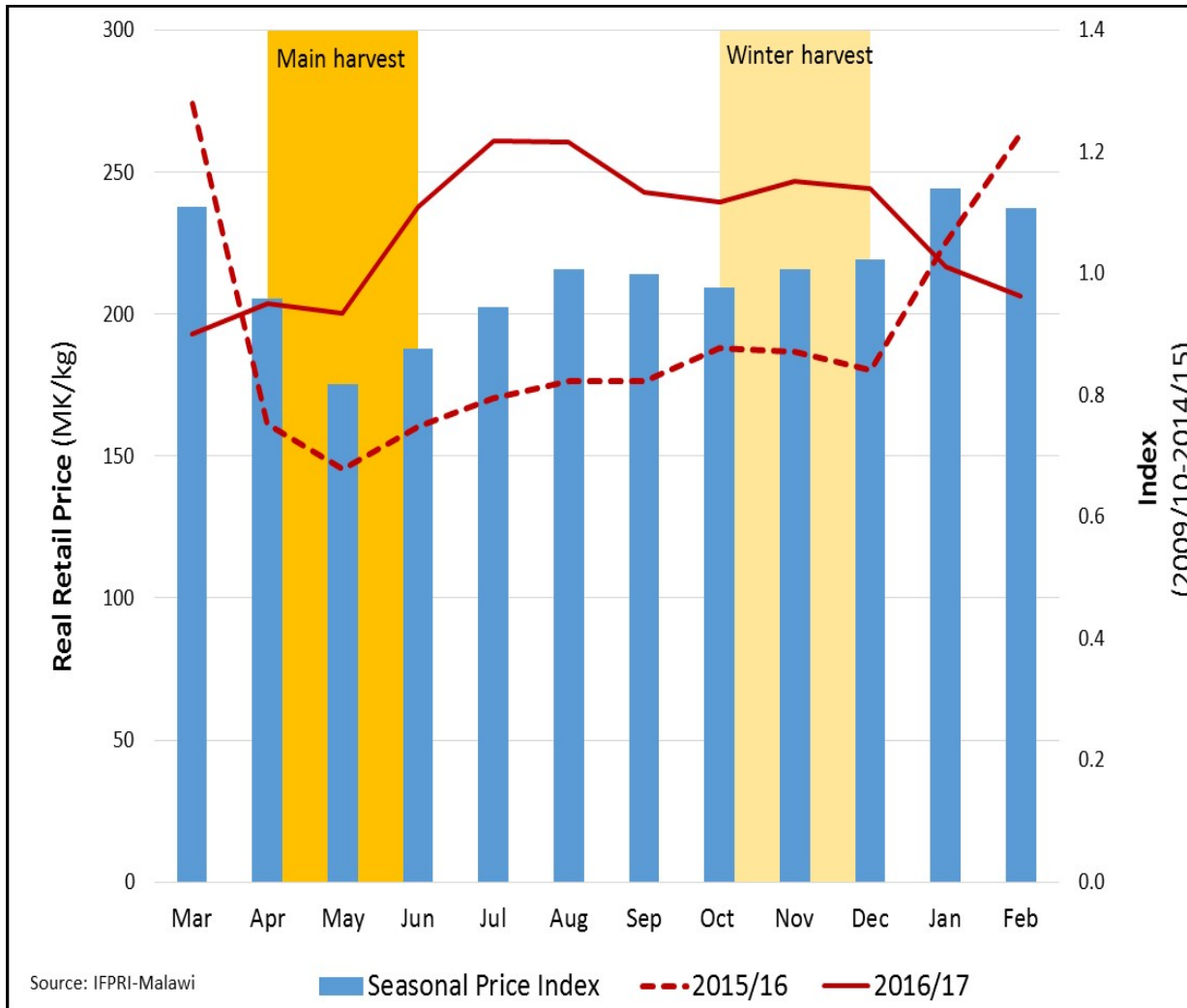
- ✓ in-kind food transfers (including vouchers) represented 9.3 to 10.3 % of Malawi's annual maize food use requirement.
- ✓ cash transfers (WFP + SCT Consortium) represented 2.8 to 3.1 % of Malawi's annual maize food use requirement.

National Food Balance Sheet: Projections using APES
Third Round June 2016

ITEM	MAIZE (upper)	MAIZE (lower)	SORGHUM/MILLET
A. DOMESTIC SUPPLY	2,078,828	2,078,828	68,222
NET PRODUCTION	2,063,828	2,063,828	68,222
Gross Production	2,369,493	2,369,493	77,702
Post-harvest losses (%)	12.9%	12.9%	12.2%
OPENING STOCKS (Carry Over Stocks)	15,000	15,000	0
On-farm stocks	0	0	0
SGR (physical stocks in silos)			0
ADMARC	15,000	15,000	0
Private traders			0
kilocalories/kg	3,560	3,560	3,430
B. TOTAL REQUIREMENT	3,205,135	2,937,784	89,567
Food Use	2,788,086	2,520,735	59,461
Seed Requirement	67049	67049	30106
SGR Replenishment	250,000	250,000	0
Feed and Industrial uses	100,000	100,000	0
C. DOMESTIC BALANCE	(1,126,307)	(858,956)	(21,344)

Context (3)

Fig. 2: Seasonal maize price patterns (2015/16 vs 2016/17)



- The figure compares monthly retail maize price patterns in real (inflation adjusted) terms during the 2016-17 response with those of the previous year and a seasonal price index based on preceding five years.
- Maize prices for 2016/17 reached their highest level of MK260/kg in July and August 2016, and then declined. This is contrary to the usual seasonal price pattern in which maize price peak during the lean season in January to March before the main maize harvest.
- The private sector's participation in the FIRP began mid-2016. Procurement by the private sector first drove the real maize prices up to uncharacteristic peak in July and August 2016 but later led to an unexpected decline as a result of stock accumulation coupled with continuing unofficial cross-border imports.

Research Question

- What impact(s), if any, did in-kind food transfers and cash transfers have on daily maize prices during the 2017 Food Insecurity Humanitarian response?
- The ‘conventional wisdom’ among development practitioners is that in-kind food transfers (“food aid”) may depress food prices, while cash transfers may ‘inflate’ them.
- However, many studies (using monthly or annual) price fail to find these impacts.



- **Three data sources (covering the period from Nov 2016 to March 2017) are used:**
 - ✓ **Daily retail maize price data** from **IFPRI's maize price monitoring** in 15 large (and accessible) markets covering six days in a week, excluding Sundays.
 - ✓ **In-kind food distribution data** from the World Food Programme (WFP) comprising distribution dates, locations, and volume of in-kind distribution in 11 districts that overlap with the markets covered by IFPRI'S price monitoring.
 - ✓ **Cash transfer distribution data** from WFP and the International NGO Cash Transfer Consortium, led by Save the Children. The data comprises the actual distribution dates, locations, and total values in 6 districts that overlap with the markets in IFPRI's price monitoring.

Data (2)

- Table I shows the amount of cash and food distributed by WFP and the INGO consortium in selected districts for the period from 1 November 2016 to 31 March 2017.
- Except for Mchinji (cash only) and Mzimba districts (food only), most district received a mixture of both food and cash.
- Chikwawa, Blantyre, Mulanje and Nsanje districts in southern Malawi received the substantial quantities of food aid, while Lilongwe, Dowa, Mchinji and Dedza districts in central Malawi received the largest amounts of cash transfers.

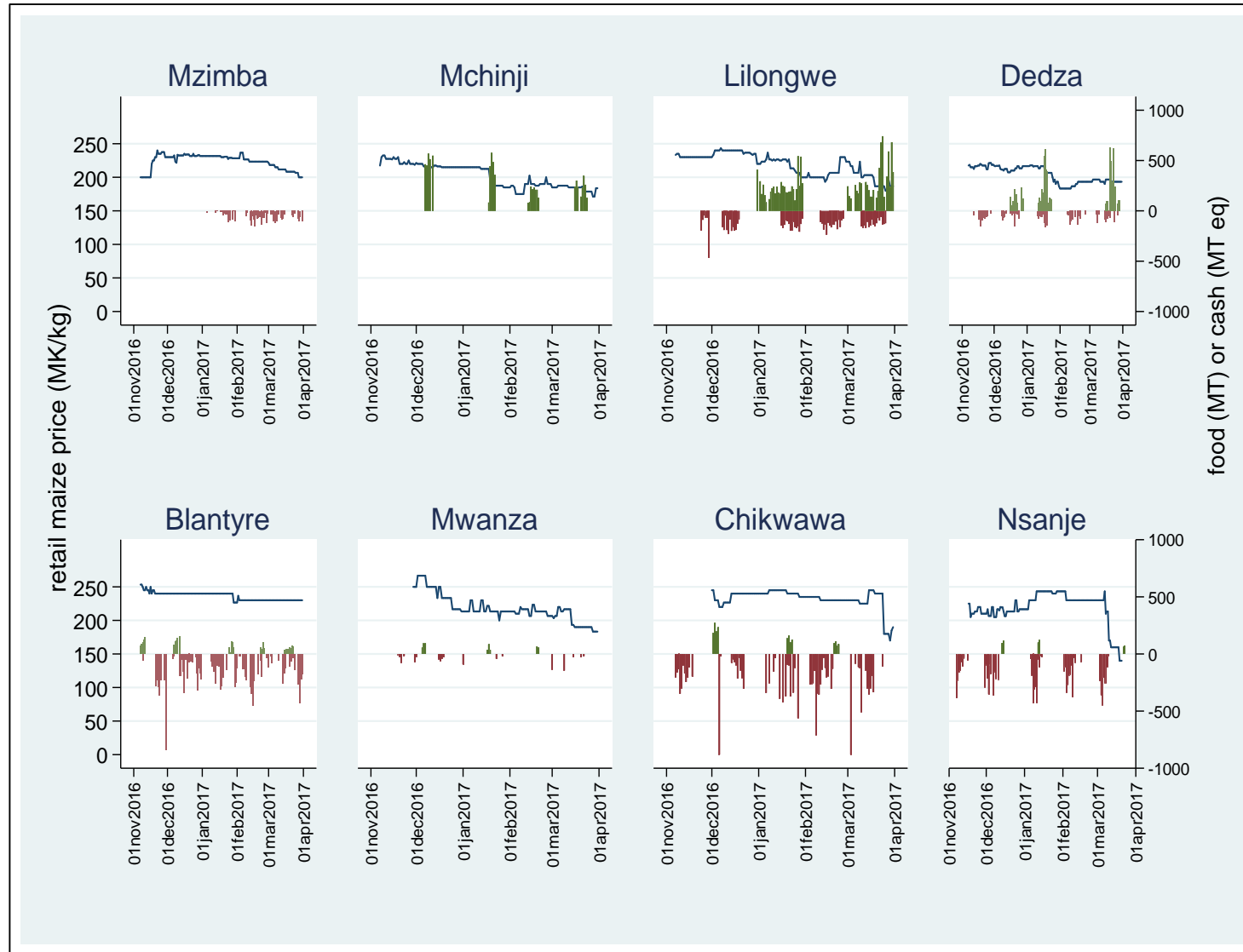
Table 1: Cash and Food Distributed by District, Nov 2016 to March 2017

District	Cash (MK million)	District	Food (MT)
Lilongwe	2,880	Chikwawa	18,703
Dowa	1,760	Blantyre	14,559
Mchinji	1,530	Lilongwe	9,382
Dedza	1,520	Mulanje	9,168
Mulanje	843	Nsanje	9,108
Blantyre	566	Dedza	3,934
Chikwawa	470	Dowa	3,723
Mwanza	169	Mzimba	3,239
Nsanje	169	Mwanza	1,037
Mzimba	-	Mchinji	-

Data (3)

- Downward trend in maize prices
- Brown downward bars show the quantities of maize distributed in each district daily.
- Green upward bars show cash transfers in the same districts on a daily basis, converted into MTs.
- Difficult to distinguish a clear pattern between maize prices and food and cash transfers in these districts.

Fig 3: Daily maize prices, cash and food distribution in selected markets November 2016 to March 2017



- **To quantify what impact food (including vouchers) and cash transfers had on maize prices in selected markets we follow a time series analysis conceptual framework:**
 - ✓ Augmented Dickey Fuller (ADF) and Kwiatkowski-Phillips-Schmidt (KPSS) tests for stationarity
 - ✓ Granger causality tests
 - ✓ Engle-Granger (EG) cointegration tests
 - ✓ Pesaran and Shin's Autoregressive Distributed Lag (ARDL) model:

$$P_t^m = \beta_0 + \sum_{i=1}^p \beta_i P_{t-i}^m + \sum_{i=0}^k \phi_i P_{t-i}^n + \sum_{i=0}^f \delta_i F_{t-i}^m + \sum_{i=0}^c \gamma_i C_{t-i}^m + \varepsilon_t$$

where P_t^m and P_t^n represent the price of maize in markets m and n at time t , F_t^m denotes in-kind food transfers and C_t^m denotes cash transfers in market m . To detect whether or food and cash transfers impact on maize prices in market m , Wald tests may then be conducted on the coefficients δ_i and γ_i .

Table 2: Univariate tests for stationarity

No.	Market	ADF test	Test statistic	KPSS test	Test statistic
1	Chikwawa	I(1)	-7.755***	I(1)	0.045***
2	Chimbiya	I(1)	-9.354***	I(1)	0.0803***
3	Lunzu	I(0)	-3.511**	I(1)	0.0453***
4	Mchinji	I(1)	-6.492***	I(1)	0.0584***
5	Mitundu	I(1)	-7.49***	I(1)	0.0406***
6	Mponela	I(1)	-7.951***	I(1)	0.0521***
7	Mulanje	I(1)	-8.294***	I(1)	0.0233***
8	Mwanza	I(1)	-6.808***	I(1)	0.0481***
9	Mzimba	I(1)	-8.611***	I(1)	0.0476***
10	Nsanje	I(1)	-4.413***	I(1)	0.15***

*** and ** indicate significance at 1% and 5% levels, respectively.

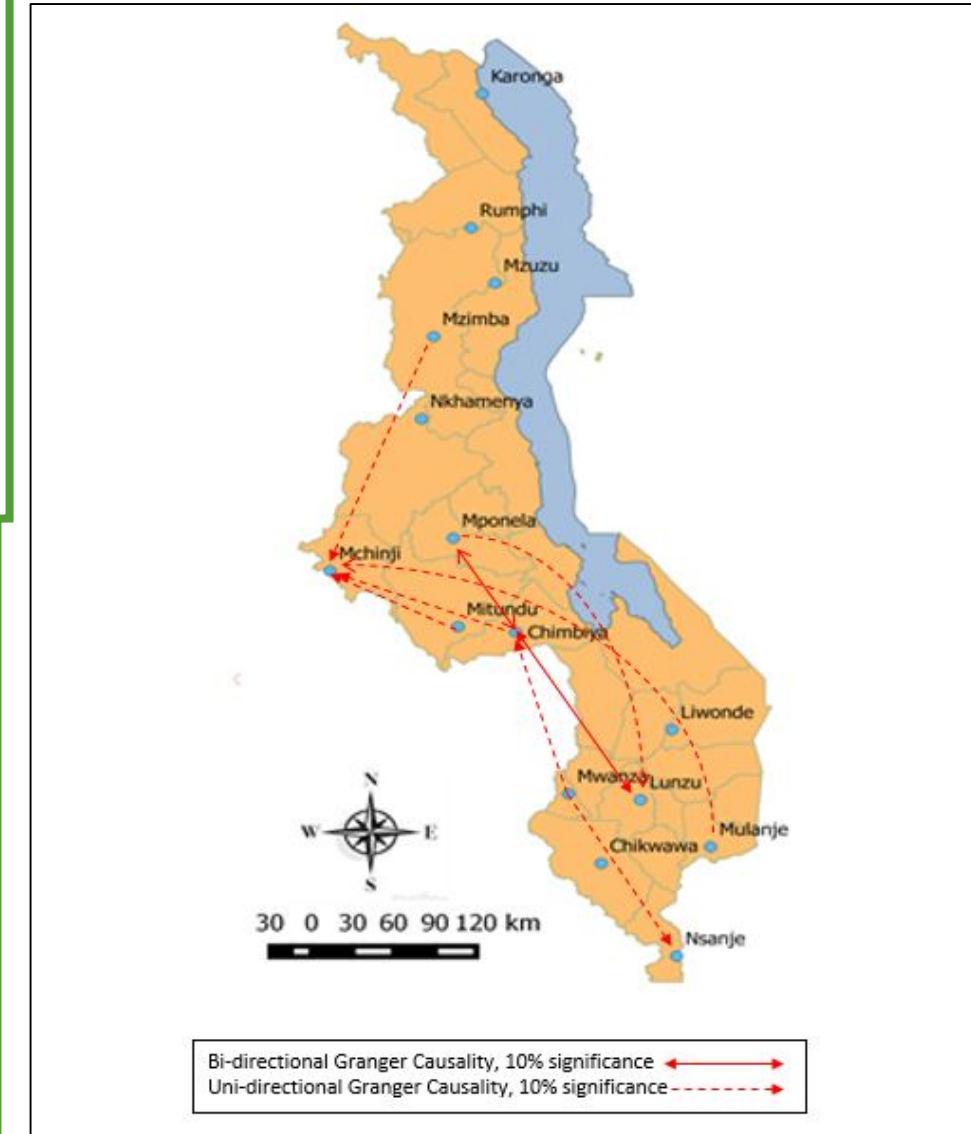
- All daily maize prices series are non-stationary (integrated or order I) with the possible exception of Lunzu
- Results of Phillips-Perron unit-root tests (not shown) gives similar results to the ADF test, while the modified augmented Dickey Fuller test (also not shown) agrees with the KPSS test.
- In-kind food and cash transfers are stationary
- This suggests an ARDL model is appropriate for modelling these time series and price relationships

Market Linkages

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- Additional tests for Granger 'causality' show that most of market pairs exhibit uni-directional linkages (except for two market pairs, namely Chimbiya- Mponela and Lunzu-Chimbiya, which exhibit bi-directional linkages).
- The direction of most linkages is from the center to the southern region.
- Although it is not a particularly large market, Chimbiya market (near Dedza) appears to occupy a strategic position in the price formation process.
- The border towns of Mchinji and Mwanza also play important roles in the formation of maize prices.

Figure 4: linkages between maize markets



Cointegration tests

- Engle-Granger cointegration tests were conducted on those pairs of markets where market linkages were suggested by the Granger Causality tests
- The results indicate there are only 7 pairs among the markets that are cointegrated (compared to 8 market pairs being linked in terms of Granger causality)

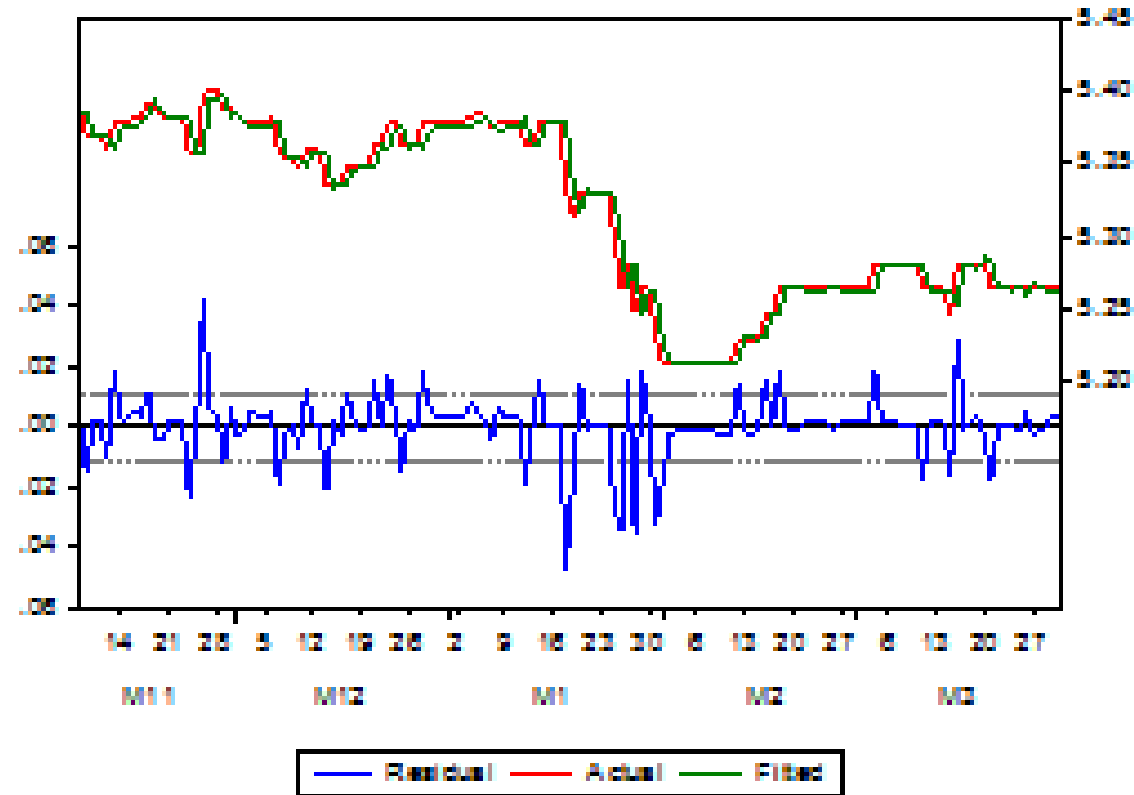
Table 3: ADF Cointegration Tests

No.	Market pair	Cointegration result
1	Mitundu-Mchinji	Series are cointegrated
2	Chimbiya-Mchinji	Series are cointegrated
3	Chimbiya-Mponela	Series are cointegrated
4	Mitundu-Mponela	Series are cointegrated
5	Chimbiya-Lunzu	Series are cointegrated
6	Nsanje-Chikwawa	Series are cointegrated
7	Chikwawa-Mulanje	Series are cointegrated
8	Chimbiya-Mitundu	Series are not cointegrated
9	Mchinji-Mzimba	Series are not cointegrated
10	Mponela-Mzimba	Series are not cointegrated
11	Chimbiya-Mzimba	Series are not cointegrated
12	Lunzu-Mwanza	Series are not cointegrated
13	Lunzu-Mulanje	Series are not cointegrated
14	Lunzu-Nsanje	Series are not cointegrated
15	Nsanje-Mwanza	Series are not cointegrated

Our ARDL models 'track' observed prices well

ARDL (1,0)

Chimbiya-Lunze



ARDL (4,2)

Nzangya-Lihakwara

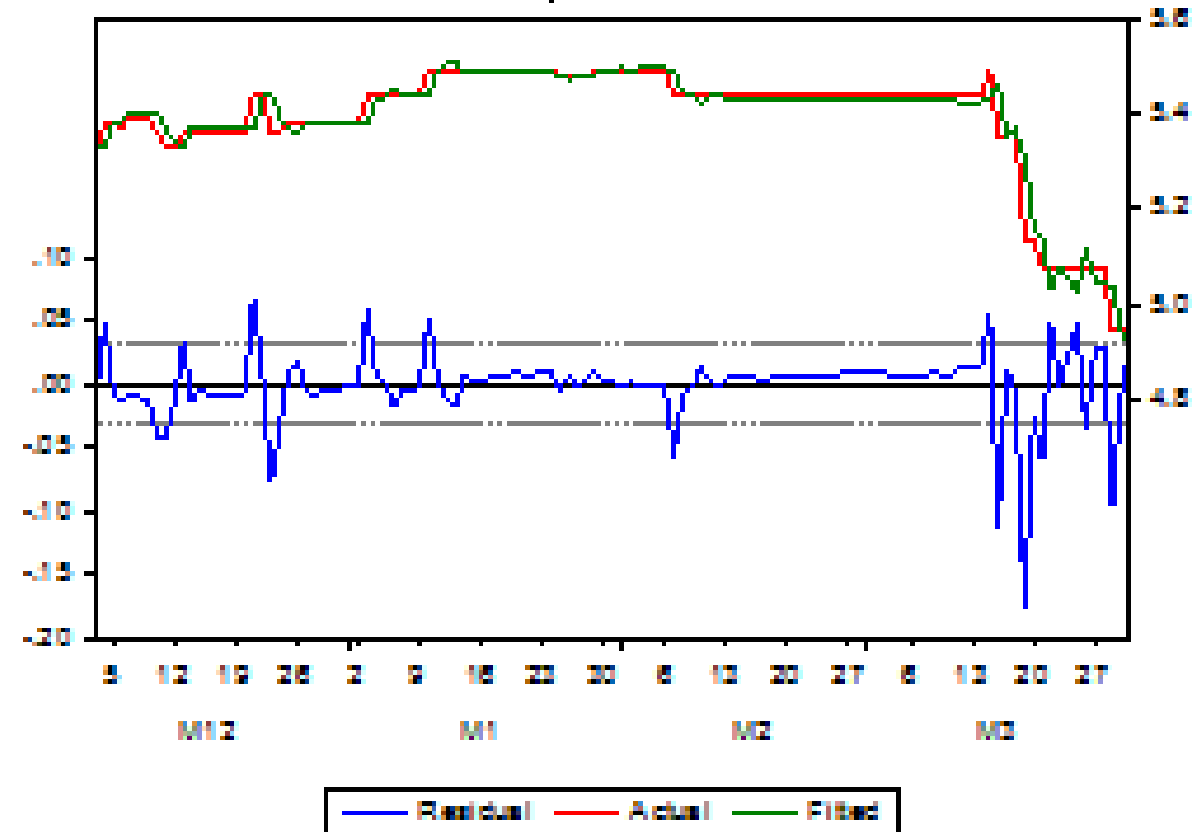


Table 4: Effects of food and cash transfers on daily maize prices

Market pair	Food		Cash		Wald F Stat
	(t)	(t-1)	(t)	(t-1)	
Chimbiya-Mchinji	-0.0002	0.0001	0.0002	0.0000	0.7371
Mitundu-Mchinji	-0.0007	0.0006	-0.0003	-0.0001	0.4909
Chimbiya-Mponela	0.0000	0.0001	0.0002	0.0001	3.1960***
Mitundu-Mponela	-0.0007	0.0005	0.0000	0.0003	1.7958
Chimbiya-Lunzu	0.0000	0.0002	0.0002	-0.0002	0.6868
Nsanje-Chikwawa	0.0000	0.0003	0.0006	-0.0004	0.2280
Chikwawa-Mulanje	0.0002	-0.0002	0.0001	-0.0007*	1.9206

* and *** respectively indicate significance at the 10% and 5% levels

- Table 4 shows that the volumes of cash and food distributed in the last two days had little percentage impact on daily maize prices.
- The impact of the food and cash transfers in this table are all very small, and not statistically significant from zero in most cases.
- These results are robust to several different specifications of the empirical model.
- Given the scale of 2016-17 humanitarian response in Malawi, this finding is surprising.

Conclusions

- While the estimated ARDL models track daily maize price rather well, we find almost no impact of food and cash transfers on maize prices during the peak of the Malawi's Food Insecurity Response Program in December 2016 to March 2017.
- What is particularly surprising, given that the volume of in-kind food transfers represented around 10 percent of maize consumption requirements, is that food transfers had negligible impacts on daily maize prices in all but one of the markets
- Some possible explanations:
 - ✓ MVAC in-kind beneficiaries—who derived 67 percent of their maize consumption needs from food transfers and another 19 percent from own production—had little need to rely on maize purchases.
 - ✓ In-kind maize transfers were provided along with other commodities, so little need for MVAC beneficiaries to sell some of the maize they received to their non-maize needs.
 - ✓ 'Sharing' of cash transfers between beneficiaries, of which there is anecdotal evidence, diluted the 'inflationary impact' of cash transfers
 - ✓ Those who received maize vouchers after January 2017, also received cash

Conclusions (con't)

- Put differently, recalling AK Sen's distinction between direct and trade-based entitlements during famines:

“most of the households who received in-kind food transfers had extremely limited purchasing power. Therefore food transfers enhanced their direct entitlements, thereby reducing hunger and saving lives, while having little impact on markets and trade-based entitlements (as so little of the in-kind maize distributed was sold)”



**Additional Slides
(not for presentation)**

Bivariate Correlation Coefficients for Market Pairs

Levels

	Chikwawa	Chimbiya	Lunzu	Mchinji	Mitundu	Mponela	Mulanje	Mwanza	Mzimba	Nsanje
Chikwawa	1									
Chimbiya	0.3196*	1								
Lunzu	0.3868*	0.8504*	1							
Mchinji	0.3947*	0.9084*	0.8581*	1						
Mitundu	0.3983*	0.7917*	0.7474*	0.8387*	1					
Mponela	0.2410*	0.8985*	0.8347*	0.8934*	0.8281*	1				
Mulanje	0.5766*	0.5530*	0.7268*	0.6800*	0.6730*	0.5575*	1			
Mwanza	0.2528*	0.5566*	0.5921*	0.7169*	0.7620*	0.7008*	0.6720*	1		
Mzimba	0.6043*	0.2598*	0.1510	0.2479*	0.4419*	0.5603*	0.9504*	0.6409*	1	
Nsanje	0.6029*	-0.0225	0.0864	0.0580	0.2753*	-0.0537	0.5672*	0.2745*	0.4943*	1

First Differences

	Chikwawa	Chimbiya	Lunzu	Mchinji	Mitundu	Mponela	Mulanje	Mwanza	Mzimba	Nsanje
Chikwawa	1									
Chimbiya	-0.0796	1								
Lunzu	-0.0036	-0.0546	1							
Mchinji	0.0520	0.1057	0.1077	1						
Mitundu	-0.0174	-0.0032	0.0417	-0.0942	1					
Mponela	-0.0263	0.1133	0.0213	0.0224	0.0595	1				
Mulanje	-0.0083	0.0256	-0.0090	-0.0962	-0.1660	0.0007	1			
Mwanza	-0.0267	0.0316	-0.0044	0.0922	0.1014	-0.1244	0.1165	1		
Mzimba	0.0468	0.0295	-0.2210*	-0.0005	-0.0273	0.0707	0.1471	0.1723	1	
Nsanje	0.1329	-0.1224	0.0163	-0.0472	0.1626	0.0056	-0.0148	0.0129	-0.0409	1

ARDL Bounds tests

	Chimbiya- Mchinji	Mitundu- Mchinji	Chimbiya- Mponela	Mitundu- Mponela	Chimbiya- Lunzu	Nsanje- Chikwawa	Chikwawa- Mulanje
F-Stat	8.91	3.60	4.63	14.74	1.08	2.24	6.74
Observations	141	143	126	127	144	119	113
I(0) bound							
10%	4.05	3.02	4.04	4.04	3.02	4.05	4.04
5%	4.68	3.62	4.94	4.94	3.62	4.68	4.94
I(1) bound							
10%	4.49	3.51	4.78	4.78	3.51	4.49	4.78
5%	5.15	4.16	5.73	5.73	4.16	5.15	5.73
Long-run relationship	Yes	?	?	Yes	No	No	Yes