

In-kind transfers as insurance

Evidence from India

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In-kind transfers in the developing world

- ▶ Recent push in the policy world in favor of cash transfers.
 - ▶ Main argument in favor of cash: gives households freedom to spend as they please.
- ▶ But most developing countries still rely heavily on in-kind transfers for poverty alleviation (Alderman, 2002).
- ▶ This paper considers one aspect of the cash vs kind debate: insurance against price risk.

Price risk in developing countries

- ▶ Transport costs, under-developed retail → markets in LDCs are very fragmented → high price variations across areas and within areas over time.
 - ▶ e.g. Atkin 2013, Atkin and Donaldson 2015, Allen 2014, Allen and Atkin 2016.
- ▶ Households may be subject to substantial price risk, unlikely to be insured.
 - ▶ Locally correlated risk hard to mitigate through informal insurance.
 - ▶ Formal insurance/price-indexed transfers very challenging to implement (Khera 2014).

Little literature on policy response to price risk (Gadenne, 2015).

This paper: in-kind as insurance

'Food entitlements have several advantages over cash transfers. (...) They are inflation-proof, unlike cash transfers that can be eroded by local price increases, even if they are indexed to the general price level' (Jean Dreze, op-ed, 2011)

- ▶ Key premise: in-kind transfers can be welfare improving with respect to cash in the presence of price risk.
- ▶ Our goals are to provide:
 - ▶ Conceptual framework to back up this premise.
 - ▶ Empirical evidence on price risk in India and correlations with 'welfare'.
 - ▶ Causal evidence on impact of in-kind transfers in the presence of price risk (not today).

Outline

Introduction

Conceptual framework

Empirical evidence

Next steps

Set-up

- ▶ There's one good A whose mean price is \bar{p}_A . Define good B as 'all other goods'.
- ▶ The prices of both goods vary across states of the world.
- ▶ Two policies: transfer K is an amount z of good A , transfer C is $\bar{p}_A z$ in cash.
- ▶ Assumptions:
 - ▶ Transfer K is infra-marginal (no efficiency cost).
 - ▶ Prices are exogenous (no general equilibrium effect).
 - ▶ No home production.

Welfare impact of cash versus kind (1)

- ▶ The welfare impact of the in-kind transfer on household i is:

$$W_{Ki} = W_{Ci} + s_{Ai}(r_i - \eta_{Ai})\sigma_A^2 + (1 - s_{Ai})(r_i - \eta_{Bi})\sigma_B\sigma_A\rho_{AB}$$
- ▶ W_{Ci} impact of cash transfer, σ_A the level of price risk (coefficient of variation of p_A) s_{Ai} budget share of good A , η_{Ai} income elasticity of demand, r_i risk aversion.
- ▶ As long as households are reasonably risk averse and demand is not too elastic, households prefer in-kind transfers.
- ▶ Intuition: the in-kind transfer gives households more in bad states of the world - when the price is high.

Welfare impact of cash versus kind (2)

- ▶ The welfare impact of the in-kind transfer on household i is:

$$W_{Ki} = W_{Ci} + s_{Ai}(r_i - \eta_{Ai})\sigma_A^2 + (1 - s_{Ai})(r_i - \eta_{Bi})\sigma_B\sigma_A\rho_{AB}$$

- ▶ The covariance of prices ρ_{AB} matters.
- ▶ If the price of A is negatively correlated with that of everything else and good A is only a small share of the budget households can prefer cash to in-kind.

Key take-aways

- ▶ In-kind and cash have different welfare impacts in the presence of price risk: insurance effect.
 - ▶ Empirically $r > 1$ is likely (Giuliano and Turnovsky 2003: 2-5 range), η in 0.02-0.1 range for India (Kumar et al, 2011) → insurance effect is positive at least for zero covariance.
- ▶ Insurance effect higher for households with higher risk aversion, budget shares and facing higher price risk.
- ▶ Covariance of prices can mitigate/exacerbate this effect.

Next slides: empirical evidence on price risk, price covariance and budget shares.

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Context: India, 2003-2012

- ▶ India has a large in-kind transfer scheme: public distribution system (PDS) sells quotas of wheat, rice, sugar and kerosene at a fixed subsidized price.
 - ▶ Costs 1% GDP, currently used by 70% of Indian households.
- ▶ Poor transport infrastructure, information friction, trade regulations, state entry taxes → substantial market fragmentation.

Data

- ▶ NSS surveys, consumption modules (years 2003 to 2012, rounds 59 to 68).
 - ▶ Surveys households' consumption over 4 quarters each round.
- ▶ Key features:
 - ▶ Asks about source of consumption: market, PDS or home production.
 - ▶ Asks about quantities and values consumed: use unit values as a proxy for prices.
- ▶ We look at variations in (deflated) market prices within markets (market=districtxsector) over time (period = quarter).
- ▶ Prices vary across households due to quality differences, quantity discounts... → compute mean in each marketxperiod.

Price risk for PDS goods

Table 1: Key statistics on market prices for the 4 PDS goods.

	Rice	Wheat	Sugar	Kerosene
Mean	10.08	9.07	15.09	14.35
Within market σ	0.14	0.12	0.17	0.19
Across market σ	0.2	0.25	0.06	0.19

550,898 households, 810 markets, 2003-2012. Unit values used as proxy for market price. Coefficient of variations σ are ratios of standard deviation to the mean. SD 'within' are variations in mean market prices within markets, SD 'across' are variations in mean market prices across markets.

Budget shares for PDS goods

Table 2: Budget shares by income level for the 4 PDS goods.

	Rice	Wheat	Sugar	Kerosene
Budget shares (in %)				
All	8.71 (6.96)	3.95 (4.28)	1.50 (0.98)	0.47 (0.67)
Below-median income	11.95 (8.42)	4.87 (5.50)	1.65 (1.15)	0.51 (0.80)
Above-median income	5.88 (4.64)	3.05 (3.01)	1.36 (0.90)	0.44 (0.75)

550,898 households, 2003-2012. Standard deviations in parentheses.

Correlations in market prices

Table 3: Within-market correlations in market prices.

	Rice	Wheat	Sugar	Kerosene
All households				
Rice	1.000			
Wheat	0.254 (0.269)	1.000		
Sugar	0.242 (0.264)	-0.017 (0.228)	1.000	
Kerosene	-0.016 (0.271)	0.119 (0.277)	0.007 (0.286)	1.000

550,898 households, 810 markets, 2003-2012. Unit values used as proxy for market price.

Prices and welfare: correlation with calories

- ▶ First pass on idea that price risk has a welfare cost: correlation between prices and calories consumed.
- ▶ Estimate correlation between average market(d) \times period(t) price on calories consumed by the household:

$$\log(C_{idt}) = \beta \log(P_{dt}) + \delta X_{idt} + \mu_d + \epsilon_{idt}$$

- ▶ Compute total calories consumed using NSS estimates for each food item.
- ▶ Controls include: household size, nb children, asset index, household expenditure as proxy for income, year FE.
- ▶ Consider each price separately then all together.

NB: these are correlations conditional on the existence of the PDS.

Price variation and welfare: calorie correlations

Table 4: Correlation between calories and market prices

	<i>Log calories</i>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rice log prices	-0.003 [0.030]			-0.020 [0.025]	-0.078*** [0.018]	-0.025** [0.012]	-0.035*** [0.013]
Wheat log prices		-0.125*** [0.022]		-0.104*** [0.019]	-0.113*** [0.014]	-0.045*** [0.010]	-0.046*** [0.010]
Sugar log prices			-0.110*** [0.012]	-0.097*** [0.012]	0.032** [0.014]	-0.002 [0.010]	-0.018 [0.018]
District-sector FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All prices	No	No	No	No	Yes	Yes	Yes
HH controls	No	No	No	No	No	Yes	Yes
Year FEs	No	No	No	No	No	No	Yes
Observations	550,898	550,898	550,898	550,898	550,898	550,898	550,898

HH controls include household size, expenditure, number of children, and an assets index. Standard errors are clustered at the market level.

Calorie correlations by subgroup

Table 5: Correlation between calories and market prices by subgroup for rice

	<i>Log calories</i>					
Sample:	Rural	Urban	Below- median expenditure	Above- median expenditure	Landless	Landowner
	(1)	(2)	(3)	(4)	(5)	(6)
Rice log prices	-0.029** [0.015]	0.011 [0.016]	-0.047*** [0.017]	0.019 [0.013]	-0.067*** [0.022]	-0.008 [0.012]
Observations	326,882	224,016	211,788	339,110	204,833	346,065

HH controls include household size, expenditure, number of children, and an assets index. All regressions are clustered at the market level.

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Next steps: empirical strategy

Question: what is the insurance value of in-kind transfers?

- ▶ Given the observed policy-driven variations in PDS prices and quantities (more on this next)...
- ▶ Our aim is to measure how in-kind transfers affect households' exposure to price risk.
 - ▶ Impact of policy change on welfare interacted with market-level price risk.
 - ▶ Direct impact of policy changes on price risk (general equilibrium effects?).

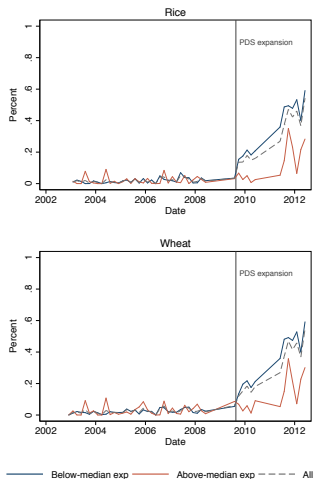
Next steps: policy variations of interest

States choose PDS quotas, ration prices, eligibility

- ▶ Changes in official PDS policies: see clear changes in PDS quantities and prices households access in survey data.
 - ▶ Bihar: in 2009 issues its own definition of BPL households, widens and clarifies eligibility.

Policy variations: Bihar

Percent of households buying grains from the PDS in Bihar



Nominal price of rice, 2-months trailing averages. Median expenditure defined at the all-India level.

Next steps: policy variations of interest

States choose PDS quotas, ration prices, eligibility

- ▶ Changes in official PDS policies: see clear changes in PDS quantities and prices households access in survey data.
 - ▶ Bihar: in 2009 issues its own definition of BPL households, widens and clarifies eligibility.
 - ▶ Andhra Pradesh: price of PDS rice lowered to 2 Rps/kg in 2008, to 1 Rps/kg in 2011.
- ▶ Changes in PDS quantities delivered to each district: collection of state-level data.

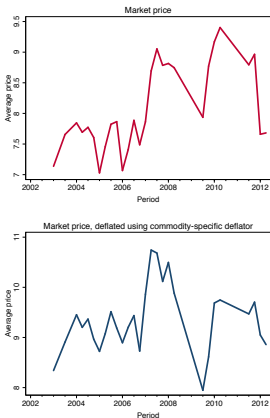
Next steps: factoring in corruption

- ▶ Previous figures show PDS prices in line with what they should be, and policy changes have bite.
- ▶ But substantial anecdotal evidence of corruption/leakages: black market sales.
- ▶ Corruption responses could mitigate insurance effect as potential black market profits are increasing with market prices.
 - ▶ Some evidence that PDS prices (quantities) are positively (negatively) correlated to market prices.
- ▶ How much does corruption erode insurance gains from in-kind transfers?

Conclusion: policy implications

- ▶ In-kind transfers are more costly than cash transfers (administrative/procurement/behavioral costs).
- ▶ Our aim is to provide evidence for/quantify their value as insurance against price risk.
- ▶ Better knowledge of trade-offs between cash & kind to inform policy reforms in India and elsewhere.
- ▶ Evidence on distribution of insurance gains across households and goods will inform optimal shape of in-kind transfers.

Evolution of market price of rice over time: an example



Note: Average market price of rice per quarter in the largest rural market (Paschim Medinipur, West Bengal).