Food vs. Food Stamps

Evidence from an At-Scale Experiment in Indonesia

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How to deliver food assistance

- Worldwide, food programs are part of government's tool box to address poverty

- **In-kind programs**: Deliver actual food to beneficiaries.
  - Examples: India Public Distribution System, Egypt Baladi Bread program, USDA "Farmers to Families Food Box"

- **Voucher-based programs**: Vouchers used to purchase food on private market.
  - Examples: Egypt Tamween Ration Cards, Sri Lanka Samurdhi program, US "Food stamps" (SNAP).

How to think about these differences?

- Starting from price-theory, economists usually consider three things:
    - **Consumption decisions**: Vouchers are more flexible; in-kind may constrain consumption choices (Hidrobo et al 2014; Cunha et al 2014; Aker, 2017; Gentilini 2016)
    - **Price effects**: In isolated areas, in-kind is a positive supply shock which may reduce prices (Coate et al 1994; Cunha et al 2019).
    - **Self-targeting**: If in-kind food is inferior, it may improve targeting through self-selection (Nichols and Zeckhauser 1982; Currie and Gahvari 2008; Lieber and Lockwood 2019)

However...

- In low-capacity settings, differences in the ability to administer programs may also be first order.
  - Maybe easier for government to refill electronic vouchers each month rather than moving millions of tons of rice around
- More control over administration
  - Food is divisible, but debit cards are not
  - Possible differences in leakage

Study a shift from in-kind to electronic food vouchers

- Starting in 2018, Indonesia instituted a large scale, multi year reform
  - **Existing in-kind program**: 10kg/month of free government-provided rice.
  - **New voucher-program**: digital voucher redeemable for rice or eggs at private agents throughout the country
  - Eligibility rules do not change

- Randomization at scale
  - Switch entire districts (avg. pop. ~500,000) from in-kind to voucher program.
  - 105 districts phased in from 2018 – 2019.
    - 3.4 million benefiary households
    - 53 million people potentially affected
  - Scale allows us to measure GE effects and administration in a real world setting

Data and research questions

- Data
  - Wrote module integrated into 3 waves of the national sample survey of Indonesia
  - Merged with administrative program data

- Use this to evaluate the effect of program type on aid received, poverty, consumption patterns, food prices, and overall program leakages

Summary of results

- Substantial changes in the allocation of aid:
  - Vouchers provided concentrated assistance to targeted households, who received 45 percent more assistance in voucher areas than in in-kind districts.
  - This is not driven by a reduction of program leakage.
  - Instead, we find that in the in-kind areas, food is spread to many households (particularly ineligible households) whereas vouchers were not.
  - Households who actually received a voucher received 84% more in subsidy than those who received the in-kind aid.
  - Despite the fact that food was higher quality, it was better targeted to the poor. Thus, the administrative benefits of the vouchers swamp the self-targeting benefits of food aid.

- Large reduction in poverty:
  - For households in the bottom 15 percent by baseline, poverty fell by about 20 percent.

Summary of results

- Change in type of food consumed:
  - Vouchers also allowed households to purchase higher quality rice.
  - Leads to net increase consumption of egg-based proteins, but not of other types of food.
  - Suggests some stickiness of voucher options.

- No observable general equilibrium effect on average rice prices. Modest increase in remote villages.

- Voucher-based aid cost only 25-50% as much to deliver as in-kind assistance.

- In short, the results suggest that the change from in-kind to vouchers led to substantial impacts through the way it changed how programs were implemented on the ground.

Outline

- Setting, Experimental Design, and Data

- Findings
  - Social assistance: how much is received and by whom?
  - Poverty
  - Consumption decisions
  - Effects on rice prices
  - Leakage
  - Program costs

- Conclusion

Setting, Experimental Design, and Data

Food assistance in Indonesia

- Indonesia's Rastra Program:
  - ~US$1.5 billion
  - Begun in 1999 during Asian Financial Crisis, with slight modifications over the years

- Program Design Features:
  - Delivers 10kg of free rice per month to ~15 million households.
  - Value ~Rp. 100,000 (US$8) / month, depending on market price of rice (~Rp 9,700 in our period)
  - About 6.5 percent of poverty line for family of 4

Traditional Rastra Distribution

In-kind program

- Eligibility:
  - In principle determined through proxy-means test, with list distributed to villages through Ministry of Social Affairs (Alatas et al, 2012)
  - Villages allowed to make some changes to the list though village meeting

- Administration:
  - Rice procured by government logistics agency (BULOG), delivered to village, often in 50kg sacks
  - Village government then subdivides and distributes it to beneficiaries
  - Rice often shared widely (Banerjee et al 2018); leakage problems (Olken 2006)

Government-Provided Rice

Voucher-based program (BPNT)

- Largest social assistance reform in 20 years
  - Monthly voucher of Rp. 110,000 / month
  - Redeemable for rice or eggs
  - Saveable in principle, though not encouraged
  - Same eligibility in principle as Rastra

- Administration
  - Debit card issued to female adult in household (mostly by banks)
  - Redeemable for purchase (not cash) at a network of bank agents

Voucher cards and system

Distribution process for voucher program

- Redeemed at a vast network of bank agents, both existing and newly expanded
- Minimum: 1 agent per 250 beneficiaries, min. 2 agents per village
  - By March 2019: 8,852 agents in treatment areas. 1 agent per 135 beneficiaries on average
- Small neighborhood shops
  - 99% of distribution sites are private bank agents (12% in in-kind program)
  - Agents themselves can buy rice and eggs from open market, though some pressure to buy from logistics agency


Example of agent

Experimental design

- Roll out
  - Program began as a pilot in 44 cities in 2017
  - Initial roll out included some purposely chosen districts (e.g. East Java), but 105 districts where government proposed randomizing timing.

- Randomized phase in 2018-2019 in 105 districts.
  - 42 districts randomly chosen for treatment, 63 districts control
  - Treatment districts randomized into three waves: May 2018, October 2018, November 2018

- Stratification
  - Government wanted to come as close as possible to 10m beneficiaries total
  - Stratified most districts by geography
  - 20 small districts put in special stratum, randomized order, and treated until 8.3 million beneficiaries total treated. Use strata fixed effects in all analysis.

- Control districts treated beginning in June 2019

## Experimental design

Map

Voucher (BPNT)
In-Kind (Rastra)
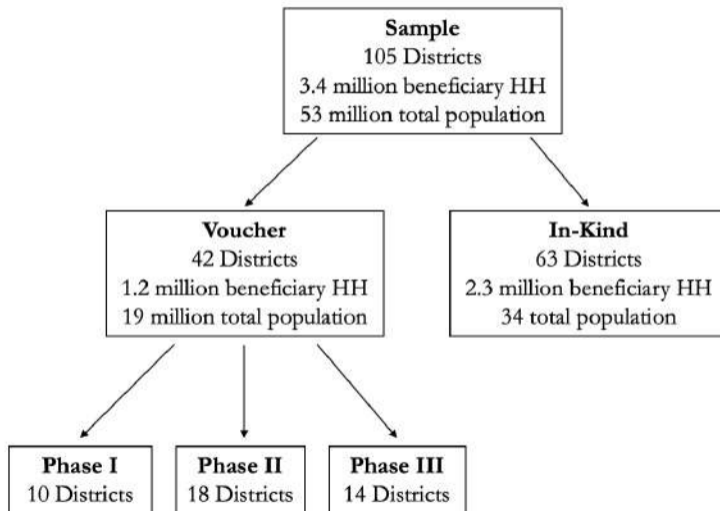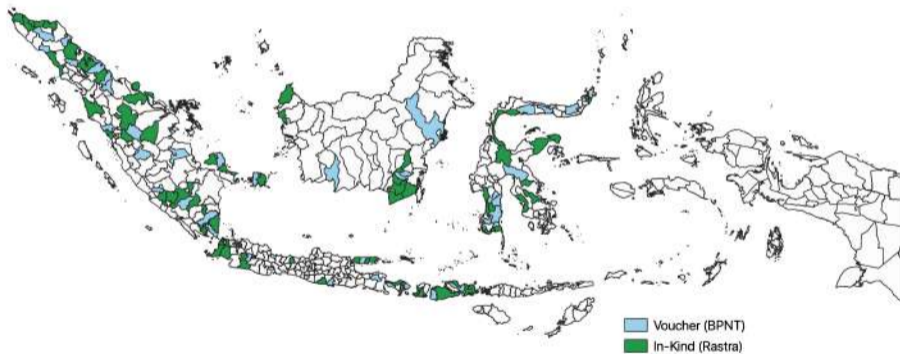
Data

- Outcome data - SUSENAS
  - Working with the Government of Indonesia, we designed a special module for the SUSENAS, the Indonesian national sample survey, repeated cross-section of 250,000 households annually
  - Includes data on receipt of both types of transfers (amount of subsidized rice/eggs, prices/quantities, quality of rice), as well as detailed consumption questions
  - Waves in March 2018 (baseline), September 2018 (smaller midline), March 2019 (endline)

- Targeting database (UDB)
  - Data collected in 2015 for ~25 million poor and near poor households, used for targeting
  - Includes data on household composition, assets, and a proxy-means test score ('PMT')
  - Merge to SUSENAS using national identity number

- Other data
  - 2018 village census - provides village level control variables

Timeline
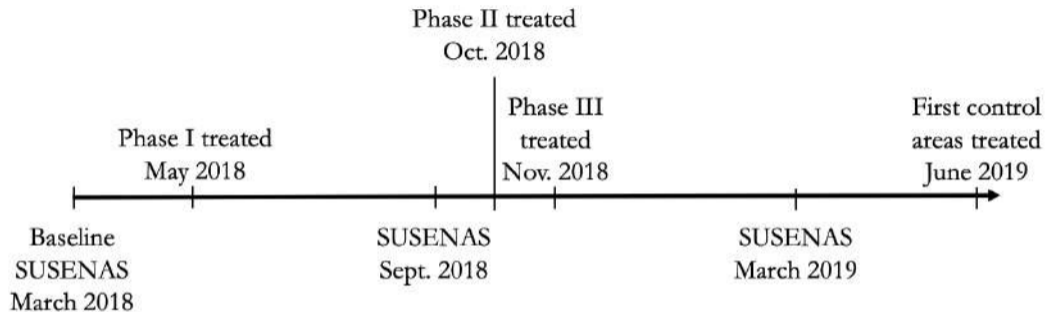
Specification

$$y_{huds} = \beta_0 + \beta_1 VOUCHER_{ds} + \boldsymbol{X}'_{huds}\boldsymbol{\gamma} + \alpha_s + \epsilon_{huds}$$

- α_s are stratum dummies
- X_{huds} are control variables selected using double LASSO (Belloni et al 2014)
    - Baseline household covariates merged in from targeting database
    - Village level covariates merged in from village census
    - District level covariates from baseline SUSENAS, averaged at district*urban/rural level
- Standard errors clustered by district; also report randomization inference p-values
- Focus on March 2019 SUSENAS, when all districts treated; pooled and September results similar and in appendix

Specification

$$y_{huds} = \beta_0 + \beta_1 VOUCHER_{ds} + \boldsymbol{X}'_{huds}\boldsymbol{\gamma} + \alpha_s + \epsilon_{huds}$$

- Pre-specified that we would split households based on baseline pre-period PMT score
    - PMT percentile score $<= 30$: approximate target group (program targeted bottom 30 percent)
    - PMT score > 30 or no baseline PMT score: wealthier population
- Also examine those near poverty line (PMT $<= 15$)

Findings

- Social assistance: How much is received, and by whom?

- Impacts on poverty

- Consumption decisions

- General equilibrium effects on prices

- Leakage

Assistance

- Who receives assistance? And how much?

- Outcomes:
  - Total amount of subsidy received (extensive + intensive margin combined).
  - Whether you receive assistance

- Conditional on receipt
  - How much is received?
  - Quality of rice

Findings: Increase in assistance to eligible households

	Total Subsidy (rp)			Receive Subsidy			Recipients Only	
							Total Subsidy (rp)	Rice Quality
	All (1)	PMT <= 30 (2)	PMT > 30 (3)	All (4)	PMT <= 30 (5)	PMT > 30 (6)	All (7)	All (8)
Voucher	1304.749 (617.738) [0.087]	13234.952 (1915.934) [0.000]	-2598.768 (564.894) [0.001]	-0.134 (0.019) [0.000]	-0.105 (0.021) [0.000]	-0.145 (0.020) [0.000]	30957.183 (3164.224) [0.000]	0.203 (0.020) [0.000]
Observations	66494	16327	49566	66496	16329	49566	19355	19260
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lasso-selected Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	14456.314	29200.535	9161.727	0.393	0.669	0.293	36918.120	0.630

- 45% increase in subsidy for PMT <= 30 group
- 28% decrease in subsidy for PMT > 30 group

Findings: Reduction in subsidy received

| | Total Subsidy (rp) | | | Receive Subsidy | | | Recipients Only | |
| | | | | | | | Total Subsidy (rp) | Rice Quality |
	All (1)	PMT <= 30 (2)	PMT > 30 (3)	All (4)	PMT <= 30 (5)	PMT > 30 (6)	All (7)	All (8)
Voucher	1304.749 (617.738) [0.087]	13234.952 (1915.934) [0.000]	-2598.768 (564.894) [0.001]	-0.134 (0.019) [0.000]	-0.105 (0.021) [0.000]	-0.145 (0.020) [0.000]	30957.183 (3164.224) [0.000]	0.203 (0.020) [0.000]
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DV Mean (Control)	14456.314	29200.535	9161.727	0.393	0.669	0.293	36918.120	0.630

- Households in PMT <= 30 group were 16% less likely to receive any subsidy at all
- Households in PMT > 30 group were 49% less likely

Subsidy received by baseline PMT score

Total received
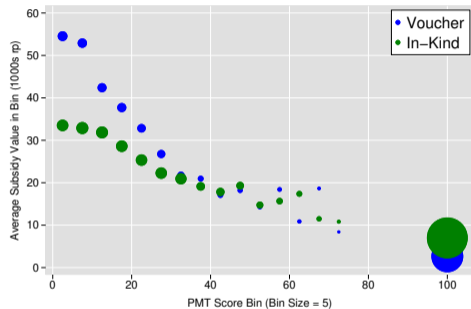
Any receipt
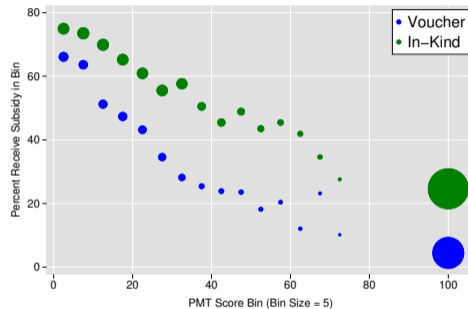
- Concentration of benefits among the very poor using PMT score
- Similar results using consumption, instead of PMT score (Figure) (Table)
- Households <= 30 that received program were ~19% poorer than those that did not
    - Suggests that local deviations from PMT in allocation slots goes in the direction of including poor households

Findings: Aid more concentrated

| | | Total Subsidy (rp) | | | Receive Subsidy | | Recipients Only | |
| | | | | | | | Total Subsidy (rp) | Rice Quality |
	All (1)	PMT <= 30 (2)	PMT > 30 (3)	All (4)	PMT <= 30 (5)	PMT > 30 (6)	All (7)	All (8)
Voucher	1304.749	13234.952	-2598.768	-0.134	-0.105	-0.145	30957.183	0.203
	(617.738)	(1915.934)	(564.894)	(0.019)	(0.021)	(0.020)	(3164.224)	(0.020)
	[0.087]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	66494	16327	49566	66496	16329	49566	19355	19260
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	14456.314	29200.535	9161.727	0.393	0.669	0.293	36918.120	0.630

- Concentration of benefits among those who receive: receive 84% more in subsidy
  - True for all beneficiaries. (Detail)

Bifurcation in outcomes
HH with PMT <= 30
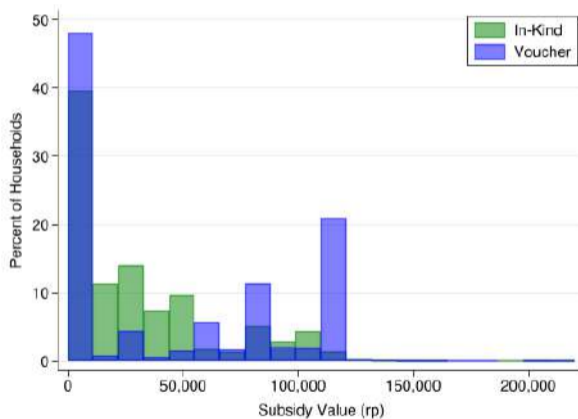
- Much more likely to receive full amount

Bifurcation in outcomes
HH with PMT $<= 30$, conditional on receipt
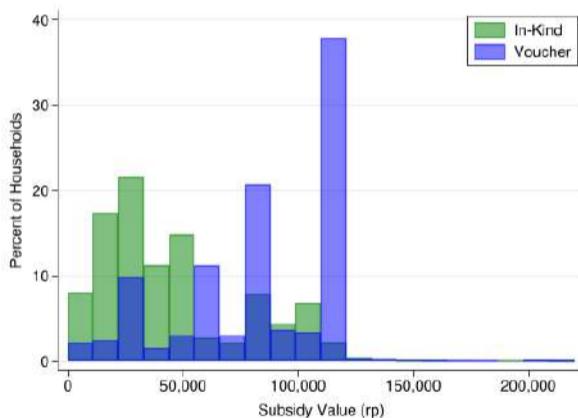
- Conditional on receiving assistance, much more likely to receive full amount

No observable effect on protests and local leader turnover

	Protest	Corruption	New Village Head
Voucher	0.003	-0.000	0.012
	(0.003)	(0.001)	(0.020)
	[0.351]	[0.895]	[0.510]
Observations	20818	20818	20387
Stratum FE	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes
DV Mean (Control)	0.009	0.004	0.228

Findings: Rice quality improves

	Total Subsidy (rp)			Receive Subsidy			Recipients Only	
							Total Subsidy (rp)	Rice Quality
	All (1)	PMT <= 30 (2)	PMT > 30 (3)	All (4)	PMT <= 30 (5)	PMT > 30 (6)	All (7)	All (8)
Voucher	1304.749	13234.952	-2598.768	-0.134	-0.105	-0.145	30957.183	0.203
	(617.738)	(1915.934)	(564.894)	(0.019)	(0.021)	(0.020)	(3164.224)	(0.020)
	[0.087]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	66494	16327	49566	66496	16329	49566	19355	19260
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	14456.314	29200.535	9161.727	0.393	0.669	0.293	36918.120	0.630

- Rastra rice is notoriously bad, and this could have self-targeting properties (especially compared to the voucher, which everyone may want)
  - We find the opposite: not only do voucher households receive more, it is of higher quality

How does concentration of aid affect actual poverty levels?

- Government defines poverty line based on per-capita consumption
  - Average of Rp. 425,000 / month / capita (US$1/day), approx. 10th percentile
  - Program 7% of poverty line, but can have a meaningful impact for those households close to poverty line

- Therefore examine impacts on total consumption and poverty

Poverty vs. baseline PMT score
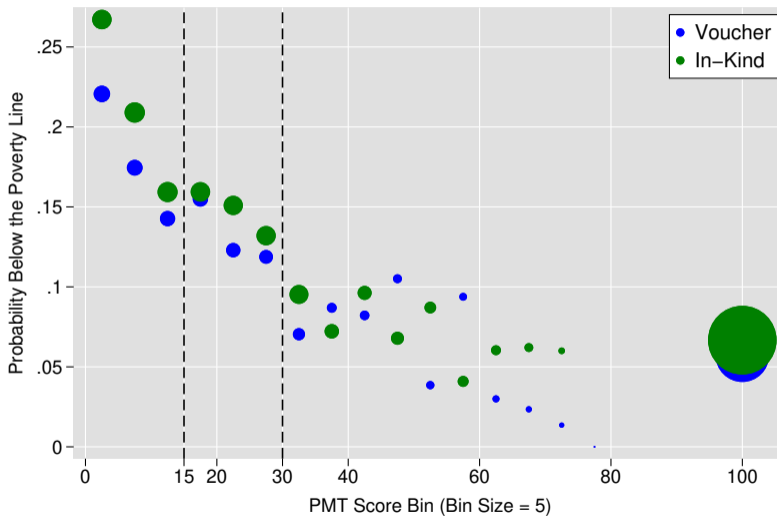
Reduction in poverty

	All (1)	PMT $<=$ 30 (2)	PMT $<=$ 25 (3)	PMT $<=$ 20 (4)	PMT $<=$ 15 (5)	PMT $<=$ 10 (6)	PMT $<=$ 5 (7)
Voucher	-0.010 (0.008) [0.199]	-0.023 (0.015) [0.134]	-0.025 (0.016) [0.166]	-0.034 (0.017) [0.078]	-0.043 (0.018) [0.028]	-0.052 (0.020) [0.020]	-0.065 (0.024) [0.012]
Observations	66496	16329	13707	11072	8307	5529	2788
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	0.098	0.180	0.189	0.198	0.210	0.237	0.267

- For PMT $<=$ 15 (i.e. near or $<$ poverty line) – poverty falls by 4.3pp (20%)
- Effects on total consumption consistent; similar results for other welfare metrics (Table)

Results thus far

- Vouchers led to a very different allocation of aid
    - Substantially less inclusion error – probability those above PMT score > 30 receive aid falls by about half
    - Exclusion error also increases – probability those with PMT score $<= 30$ receive aid also falls, but only by 16% (those excluded are the richer of the poor)
    - Those who do receive aid receive much more
    - Quality increases substantially

- But, on net:
    - This leads to a substantial concentration of resources among the very poor.... which in turn reduces total poverty.
    - Administrative improvements from vouchers matter more than self-selection effects from providing low quality rice

We can then ask...

- Do vouchers change food behaviors?
- How does the shift affect equilibrium food prices?
- Is this being driven by overall reductions in leakages?
- What are the relative costs of both programs?

Vouchers and consumption patterns

- Vouchers allow more flexibility for respondents
  - Rice and eggs, in whatever proportions respondents want, compared to fixed government bundle of rice

- Should this matter?
  - If beneficiaries are consuming more than 10kg rice / month anyway, should not matter for total consumption
  - But, may be stickiness

Almost everyone consumes > 10kg rice / month

All HH in in-kind areas
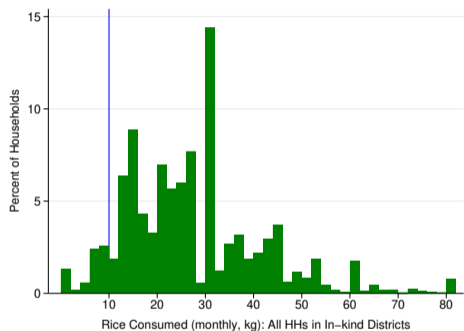
HH in in-kind areas with PMT $<= 30$
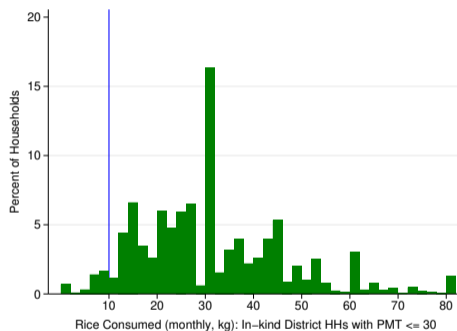
- For HH with PMT $<= 30$, only 3.3% of HH consumer < 10kg rice / month.
- Even poorest of poor (PMT < 5) consume 35 kg of rice / month.
- So should not expect mechanical consumption effects, as virtually all households are unconstrained, even under the in-kind program

Impacts on consumption of subsidized food

Panel A: Subsidized Food Consumption	Subsidized Rice (kg)			Subsidized Egg Protein (g)		
	All (1)	PMT <= 30 (2)	PMT > 30 (3)	All (4)	PMT <= 30 (5)	PMT > 30 (6)
Voucher	-0.300 (0.066) [0.002]	0.062 (0.205) [0.773]	-0.425 (0.059) [0.000]	10.932 (1.534) [0.000]	32.719 (4.648) [0.000]	3.362 (0.463) [0.000]
Observations	66495	16328	49566	66423	16270	49552
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	1.494	2.987	0.957	0.140	0.484	0.015

- No change in subsidized rice
- Substantial increase in subsidized egg protein consumed

Impacts on total consumption

Panel B: Total Food Consumption

	Total Rice (kg)			Total Egg Protein (g)		
	All (1)	PMT <= 30 (2)	PMT > 30 (3)	All (4)	PMT <= 30 (5)	PMT > 30 (6)
Voucher	-0.077 (0.305) [0.838]	-0.397 (0.471) [0.501]	0.074 (0.294) [0.852]	2.658 (3.592) [0.486]	9.519 (4.764) [0.090]	-0.562 (4.037) [0.902]
Observations	66229	16293	49335	66216	16291	49324
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	27.742	31.643	26.302	227.323	214.040	231.896

- This translates into increases in total egg protein consumed increases. About 1/3 of subsidized eggs is a net increase. Stronger effects for the poor. (Table) (Distribution)

Impacts on total consumption

	Sugar (oz) (1)	Cooking Oil (l) (2)	Beef (kg) (3)	Chicken (kg) (4)	Milk (rp) (5)	Corn (kg) (6)	Salt (g) (7)	Liquor (l) (8)	Cigarettes (rp) (9)
Voucher	0.022	0.002	-0.003	-0.020	-177.160	0.041	-6.936	-0.003	298.558
	(0.145)	(0.017)	(0.002)	(0.011)	(380.599)	(0.018)	(3.454)	(0.004)	(523.391)
	[0.884]	[0.903]	[0.207]	[0.144]	[0.720]	[0.061]	[0.088]	[0.638]	[0.586]
Observations	16293	16292	16288	16292	16291	16288	16293	16271	16292
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	5.930	0.814	0.012	0.299	6199.458	0.348	106.643	0.019	17084.338

- No other consumption changes
- Suggests flexibility + labeling. May affect *real* consumption decisions

Prices

- What happens to the rice market as a whole?
    - In-kind program: government logistics agency buys domestic rice at fixed price (Rp. 8,600; slightly below consumer price) and then uses it for the program
    - Rice is in-part bought within district to some extent, but government also moves rice around both within and across districts to make sure it is distributed to beneficiaries
    - Very active market in trading rice in Indonesia.... single most important commodity in the country

- Switch from food to vouchers may affect rice market in aggregate (Cunha et al 2019)... or not. If so, where would we expect to see it?
    - Subsidized rice large share of rice consumed
    - In isolated areas where markets are not thick

No observable impact on average rice prices

| | Main Effect Only (1) | Above Med. Supply Shock (2) | Above 75th Pct. Supply Shock (3) | Measures of Isolation | | | |
				Non-asphalt Road (4)	Road Not Always Passable (5)	Above Med. Time to District Capital (6)	Above 75th Pct. Time to District Capital (7)
Voucher	140.536 (135.230) [0.296]	77.643 (180.112) [0.673]	69.657 (138.748) [0.623]	127.417 (145.451) [0.363]	135.296 (136.243) [0.322]	58.970 (150.040) [0.689]	56.963 (142.097) [0.655]
Voucher × [Variable]		180.141 (267.890) [0.541]	554.537 (487.630) [0.145]	71.061 (128.233) [0.579]	181.389 (179.736) [0.355]	155.648 (119.427) [0.226]	338.125 (140.447) [0.029]
Observations	32343	32343	32343	32334	32334	32334	32334
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main Effect Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	9478.508	9478.508	9478.508	9478.508	9478.508	9478.508	9478.508
[Variable] Mean		0.540	0.238	0.137	0.035	0.489	0.236

No observable price effect by size of supply shock

| | Main Effect Only (1) | Above Med. Supply Shock (2) | Above 75th Pct. Supply Shock (3) | Measures of Isolation | | | |
				Non-asphalt Road (4)	Road Not Always Passable (5)	Above Med. Time to District Capital (6)	Above 75th Pct. Time to District Capital (7)
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[Variable] Mean		0.540	0.238	0.137	0.035	0.489	0.236

- Examine heterogeneity by whether the district is above the median/75th percentile in terms of the share of subsidized rice consumption as a fraction of total rice consumed
- No observable impact, but larger in magnitude for those above 75th percentile

Little to no price effects in remote areas

	Main Effect Only (1)	Above Med. Supply Shock (2)	Above 75th Pct. Supply Shock (3)	Non-asphalt Road (4)	Road Not Always Passable (5)	Above Med. Time to District Capital (6)	Above 75th Pct. Time to District Capital (7)
						Measures of Isolation	
Voucher	140.536	77.643	69.657	127.417	135.296	58.970	56.963
	(135.230)	(180.112)	(138.748)	(145.451)	(136.243)	(150.040)	(142.097)
	[0.296]	[0.673]	[0.623]	[0.363]	[0.322]	[0.689]	[0.655]
Voucher × [Variable]		180.141	554.537	71.061	181.389	155.648	338.125
		(267.890)	(487.630)	(128.233)	(179.736)	(119.427)	(140.447)
		[0.541]	[0.145]	[0.579]	[0.355]	[0.226]	[0.029]
Observations	32343	32343	32343	32334	32334	32334	32334
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main Effect Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	9478.508	9478.508	9478.508	9478.508	9478.508	9478.508	9478.508
[Variable] Mean		0.540	0.238	0.137	0.035	0.489	0.236

- Examining whether your village lacks an asphalt road or whether the road is not always passable, we find a small, but positive and insignificant effect
- Above median time to district capital villages: positive but small (1.6%) and insignificant. Above the 75th percentile: 3.6% increase (p-value of 0.029).
  - Not enough to negate the benefits gained from the program: households purchase about 19.5kg/month of rice from the private market: this implies a Rph 6591 increase in rice spending compared to the 13,234 increase in benefits received by likely eligible households.

Prices, by travel time to district capital
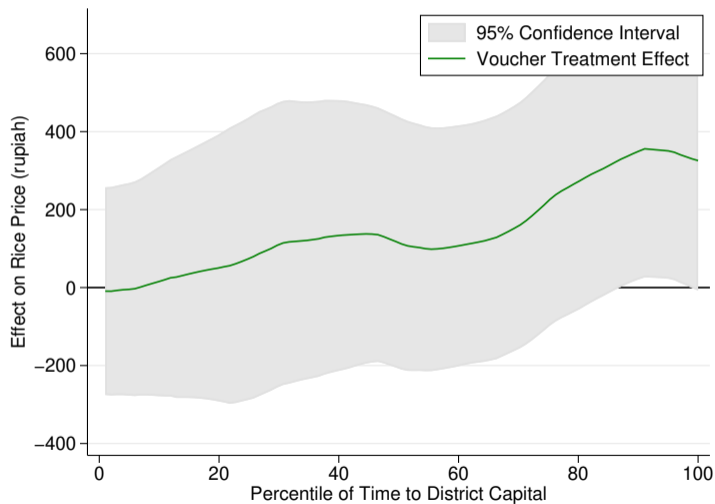
Leakage

- Is this a change in corruption, i.e. the overall amount that reaches citizens?

- Banerjee et al (2018): "Tangible Information and Citizen Empowerment"
    - Randomized trial studies introduction of identification cards in Rastra at village level
    - Identification cards reduce leakage by 33 - 58 percent

- Could this be what's happening here?

- Estimate leakage as share of intended subsidy (from admin data) actually received based on HH survey
    - Estimated using different price variables and adjusting for rice quality

Leakage

	Subsidy Received / Intended Subsidy (1)	Subsidy Received (Market Prices) / Intended Subsidy (2)	Subsidy Received (Quality-Adjusted) / Intended Subsidy (3)
Voucher	-0.020	-0.059	-0.032
	(0.031)	(0.029)	(0.032)
	[0.533]	[0.055]	[0.351]
Observations	105	105	105
Stratum FE	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes
DV Mean (Control)	0.587	0.586	0.587

- No systematic change in leakage (Details)

Costs

- Are these programs differentially costly to administer?

- Consider administrative costs of both programs
  - In-kind: mostly costs of storing and transporting rice
  - Voucher: mostly costs of renting EDC machines for agents, printing and distributing cards

- Costs not high even for in-kind:
  - In-kind costs about 4.1% of aid delivered
  - Voucher is cheaper: costs 2.1% of aid delivered if you include all EDC machines; only 0.7% if do not include costs of EDC machines for existing agents

- Details

Conclusion

- Examined "at-scale" transition from in-kind food assistance to vouchers

- Key effect comes from improved administration
  - Voucher households are much more likely to get the 'full' amount of transfer, rather than have it be spread to those who should be ineligible
  - This leads to the poor getting substantially more assistance, and a reduction in poverty
  - Quality of rice improves and households have more choice
  - Program is cheaper to administer
  - Administration benefits thus outweigh self-targeting in this context

- Type of voucher matters.
  - Find stickiness and increase in egg consumption, even though no mechanical reason for this to happen

Subsidy by baseline poverty

	PMT > 30 (1)	PMT <= 30 (2)	PMT <= 25 (3)	PMT <= 20 (4)	PMT <= 15 (5)	PMT <= 10 (6)	PMT <= 5 (7)
Voucher	-2598.768	13234.952	14334.674	15659.489	17332.398	19803.957	19400.529
	(564.894)	(1915.934)	(2121.507)	(2268.394)	(2513.651)	(2760.619)	(3603.554)
	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
N	49566	16327	13705	11070	8305	5528	2788
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	9162	29201	30525	31741	32736	33185	33513

Recipient outcomes by baseline poverty

	PMT > 30 (1)	PMT <= 30 (2)	PMT <= 25 (3)	PMT <= 20 (4)	PMT <= 15 (5)	PMT <= 10 (6)	PMT <= 5 (7)
Panel A: Total Subsidy							
Voucher	28800.126	32652.711	31998.378	32082.856	32534.959	32378.285	32575.512
	(3683.851)	(3053.076)	(3335.427)	(3522.212)	(3910.914)	(4234.021)	(5109.684)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	9131	9862	8634	7230	5642	3874	1975
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	31243.307	43899.509	44481.664	45061.521	45402.485	44736.016	44722.672
Panel B: Rice Quality							
Voucher	0.189	0.209	0.213	0.227	0.228	0.211	0.207
	(0.025)	(0.019)	(0.019)	(0.018)	(0.018)	(0.020)	(0.024)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	9108	9790	8570	7181	5596	3842	1957
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	0.614	0.649	0.649	0.652	0.652	0.659	0.660

Consumption by baseline poverty

	PMT > 30	PMT <= 30	PMT <= 25	PMT <= 20	PMT <= 15	PMT <= 10	PMT <= 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Log Per Capita Consumption							
Voucher	0.007	0.005	0.006	0.013	0.030	0.038	0.054
	(0.017)	(0.016)	(0.019)	(0.019)	(0.020)	(0.022)	(0.024)
	[0.664]	[0.758]	[0.773]	[0.523]	[0.166]	[0.104]	[0.034]
Observations	49566	16329	13707	11072	8307	5529	2788
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	13.765	13.391	13.371	13.353	13.327	13.292	13.248
Panel B: Per Capita Consumption (rp)							
Voucher	14183.682	-2559.178	6118.680	9306.161	21423.936	21629.454	28989.661
	(18316.990)	(15351.067)	(14958.885)	(14914.466)	(15292.427)	(17040.968)	(16441.619)
	[0.479]	[0.881]	[0.675]	[0.538]	[0.178]	[0.223]	[0.109]
Observations	49538	16329	13707	11072	8307	5529	2788
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	1136251	742584	727377	713850	694961	674623	646553
Panel C: CRRA Utility (Relative Risk Aversion Coefficient of 3)							
Voucher	0.030	0.063	0.072	0.103	0.151	0.197	0.227
	(0.043)	(0.070)	(0.076)	(0.079)	(0.081)	(0.092)	(0.112)
	[0.404]	[0.387]	[0.386]	[0.239]	[0.105]	[0.060]	[0.030]
Observations	49566	16324	13702	11067	8303	5526	2785
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	-1.006	-1.795	-1.860	-1.916	-2.004	-2.161	-2.327

Rice consumption by baseline poverty

	PMT > 30 (1)	PMT <= 30 (2)	PMT <= 25 (3)	PMT <= 20 (4)	PMT <= 15 (5)	PMT <= 10 (6)	PMT <= 5 (7)
Panel A: Subsidized Rice (kg)							
Voucher	-0.425	0.062	0.079	0.113	0.182	0.322	0.174
	(0.059)	(0.205)	(0.227)	(0.247)	(0.286)	(0.313)	(0.411)
	[0.000]	[0.773]	[0.746]	[0.690]	[0.582]	[0.408]	[0.722]
Observations	49566	16328	13706	11071	8306	5529	2788
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	0.957	2.987	3.124	3.250	3.357	3.396	3.446
Panel B: Total Rice (kg)							
Voucher	0.074	-0.397	-0.236	-0.393	-0.396	-0.581	-1.231
	(0.294)	(0.471)	(0.486)	(0.531)	(0.551)	(0.587)	(0.812)
	[0.852]	[0.501]	[0.706]	[0.549]	[0.601]	[0.469]	[0.274]
Observations	49335	16293	13680	11050	8293	5520	2785
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	26.302	31.643	31.932	32.322	32.932	33.938	35.769

Egg protein consumption by baseline poverty

	PMT > 30 (1)	PMT <= 30 (2)	PMT <= 25 (3)	PMT <= 20 (4)	PMT <= 15 (5)	PMT <= 10 (6)	PMT <= 5 (7)
Panel A: Subsidized Egg Protein (g)							
Voucher	3.362	32.719	35.442	39.039	37.959	39.869	42.353
	(0.463)	(4.648)	(5.122)	(5.876)	(6.301)	(6.958)	(8.160)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	49552	16270	13655	11030	8271	5503	2774
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	0.015	0.484	0.506	0.567	0.528	0.634	0.524
Panel B: Total Egg Protein (g)							
Voucher	-0.562	9.519	10.167	11.774	14.736	17.844	25.548
	(4.037)	(4.764)	(5.184)	(5.797)	(6.187)	(7.615)	(9.157)
	[0.902]	[0.090]	[0.091]	[0.080]	[0.050]	[0.056]	[0.035]
Observations	49324	16291	13678	11048	8292	5520	2785
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	231.896	214.040	214.640	215.116	215.049	215.213	222.012

Impacts on other types of food

	Sugar (oz) (1)	Cooking Oil (l) (2)	Beef (kg) (3)	Chicken (kg) (4)	Milk (rp) (5)	Corn (kg) (6)	Salt (g) (7)	Liquor (l) (8)	Cigarettes (rp) (9)
Voucher	0.022	0.002	-0.003	-0.020	-177.160	0.041	-6.936	-0.003	298.558
	(0.145)	(0.017)	(0.002)	(0.011)	(380.599)	(0.018)	(3.454)	(0.004)	(523.391)
	[0.884]	[0.903]	[0.207]	[0.144]	[0.720]	[0.061]	[0.088]	[0.638]	[0.586]
Observations	16293	16292	16288	16292	16291	16288	16293	16271	16292
Stratum FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Lasso	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean (Control)	5.930	0.814	0.012	0.299	6199.458	0.348	106.643	0.019	17084.338

Total subsidy by consumption percentile
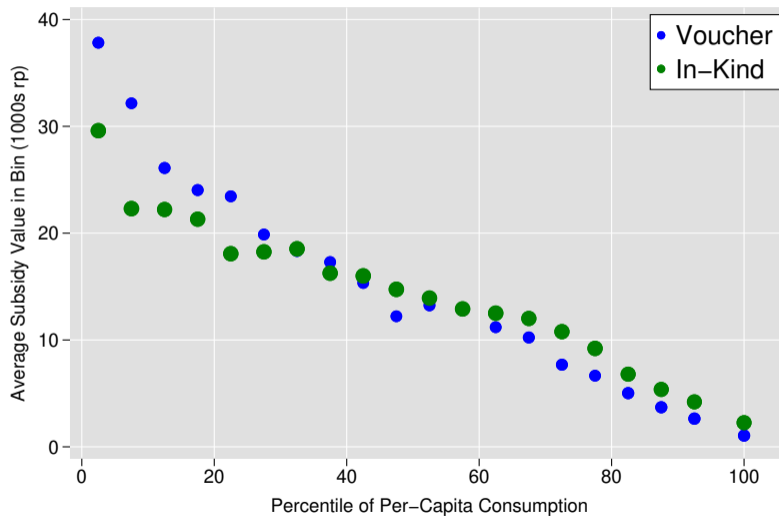
Consumption by BPNT receipt

	Per-Capita Consumption Minus Subsidy			Total Per-Capita Consumption		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All						
Receive BPNT	-497415.3	-435521.9	-211337.8	-472847.5	-410540.5	-186209.8
	(23628.3)	(27180.7)	(16929.8)	(23442.9)	(26654.3)	(16470.4)
Observations	25918	25918	25918	25918	25918	25918
DV Mean (Non-BPNT HHs)	1149537	1149537	1149537	1149783	1149783	1149783
District FE	No	Yes	Yes	No	Yes	Yes
PMT Score FE	No	No	Yes	No	No	Yes
Panel B: PMT <= 30						
Receive BPNT	-169492.5	-169746.9	-156905.9	-146347.2	-145898.0	-132667.0
	(16060.9)	(15881.2)	(16225.1)	(15892.6)	(15532.2)	(15899.1)
Observations	6402	6402	6402	6402	6402	6402
DV Mean (Non-BPNT HHs)	790535	790535	790535	791415	791415	791415
District FE	No	Yes	Yes	No	Yes	Yes
PMT Score FE	No	No	Yes	No	No	Yes

Costs

Panel A: In-kind Program

Item	Details	Total annual costs
Program Benefits	5.6 million beneficiaries × Rp. 100,000 per beneficiary per month	Rp. 6.72 trillion
Annual BULOG operating costs	Rp. 120.2 billion	Rp. 120.2 billion
Local operating costs	5.6 million beneficiaries × 10/kg month × 12 months × Rp. 233 / kg	Rp. 156.6 billion
Total operating costs		Rp. 276.6 billion
Costs as a share of benefits		4.1%

*Panel B: Voucher Program, assuming all agent costs charged to program*

Item	Details	Total annual costs
Program Benefits	10 million beneficiaries × Rp. 110,000 per beneficiary per month	Rp. 13.2 trillion
Card-printing	10 million beneficiaries × Rp. 12,500, assumed to last 3 years	Rp. 41.6 billion
Agents EDC machine (online)	59,315 total agents × 61% online × 12 months × Rp. 130,000 / month	Rp. 56.1 billion
Agents EDC machine (offline capable)	59,315 total agents × 39% online × 12 months × Rp. 671,000 / month	Rp. 187.7 billion
Total operating costs		Rp. 285.5 billion
Costs as a share of benefits		2.1%

Panel C: Voucher Program, assuming 77% of agents were pre-existing, so charging only 23% of agent costs charged to program
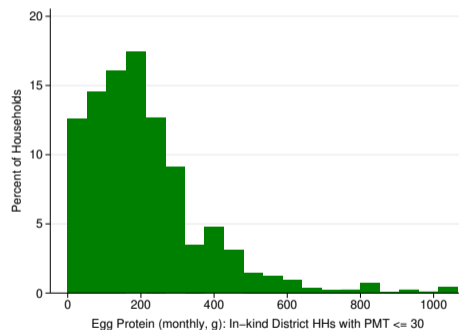
Item	Details	Total annual costs
Program Benefits	10 million beneficiaries × Rp. 110,000 per beneficiary per month	Rp. 13.2 trillion
Card-printing	10 million beneficiaries × Rp. 12,500, assumed to last 3 years	Rp. 41.6 billion
Agents EDC machine (online)	59,315 total agents × 61% online × 12 months × 23% × Rp. 130,000 / month	Rp. 12.9 billion
Agents EDC machine (offline capable)	59,315 total agents × 39% online × 12 months × 23% × Rp. 671,000 / month	Rp. 43.2 billion
Total operating costs		Rp. 97.7 billion
Operating costs as a share of benefits		0.7%

Distribution of egg consumption

All HH in in-kind areas

Egg Protein (monthly, g): All HHs in In–kind Districts

HH in in-kind areas with PMT $<=$ 30
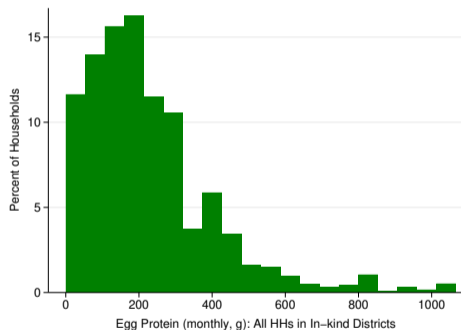
Egg Protein (monthly, g): In–kind District HHs with PMT <= 30

Description of Leakage Variables

- To compute the intended subsidy in an in-kind district, we multiply the number of beneficiaries in the district by the 10kg rice disbursement and the official procurement price of Rastra rice
- in the voucher districts, we multiply the number of BPNT beneficiaries in the district by the disbursement amount (Rph 110,000).
- We calculate subsidy received in three ways:
    - in Column 1, it is the sum of the value of any program received
    - in Column 2, we adjust the voucher disbursement by the market price of rice in the area
    - in Column 3, we adjust the voucher disbursement by the market price of higher quality rice