Cash transfers and food consumption of the poor in Iran

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Very preliminary, not for quotation

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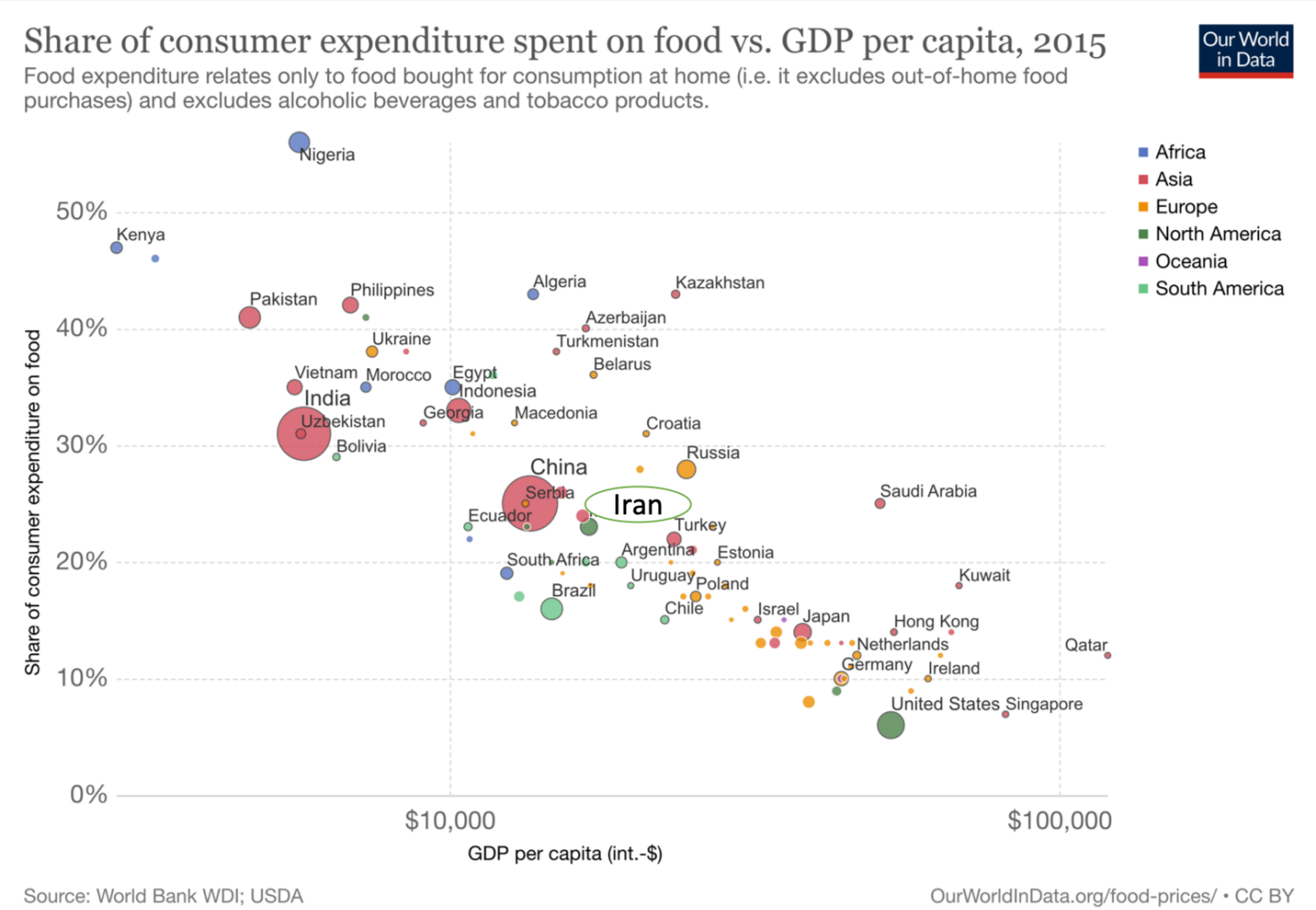
Purpose

- One of the key questions of developing countries has been to ask whether the income of the poor people should be raised by social programs and whether the effects are good or bad. (Banerjee 2016)
- Monthly transfers and income-based policies are more likely to improve food security of poor people and fight against undernourishment and malnutrition in developing countries (Banerjee 2016; Colen et al. 2018)

Literature

- Cash transfer and nutrition
  - Cash transfers increase food consumption (Hoddinott and Skoufias 2004; Asfaw et al. 2014)
- Income elasticises for beverages, meat and dairy are significantly higher than demand for other food groups, evidence from a meta-analysis across Africa (Colen et al. 2018)
- The elasticity for food expenditure is 1.19 with the monthly payment, but with a lump sum it goes down to 0.69 and more of the money used to invest in durable assets such as housing, evidence from an unconditional cash transfer in Kenya(Haushofer and Shapiro 2013)

Iran's share of food in total household expenditures (24%) is about average given income



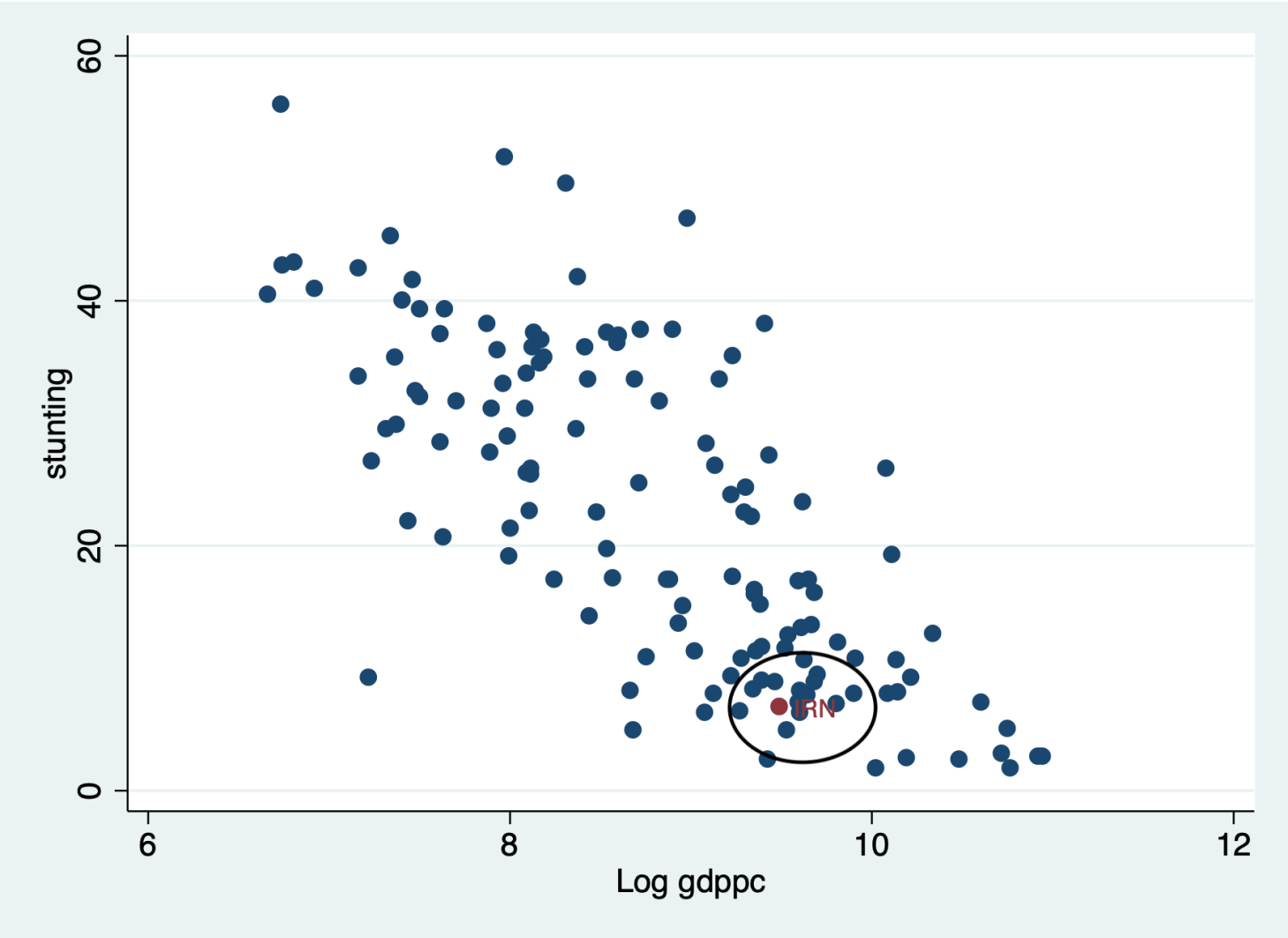
Iranian context: Nutrition

- Nutrition is a key determinant of health, human capital, and economic development (Shekar, Heaver, Lee, et al. 2006)
- Iran's intake of calories and protein are normal in a global context

Calories and protein intake in global perspective

Source: FAO.

Stunting is low by global standards



Source: WHO.

Conceptual framework

- Demand for food is income inelastic (Engel's law), but consumption of specific items (red meat, fresh fruits and vegetables) can increase with income, especially for the poor (Colen et al. 2018).
- Does additional income increase expenditures on nutritious goods? Or on temptation goods?
- Estimation of income effect from cross-section data is hazardous because of unobserved heterogeneity which may be correlated with the exogenous variables. Hence the need to use panel data.
- We treat cash transfers as an exogenous shock to household income
- Universal program do not allow for randomised treatment, hence the use of identification.

Estimation strategy

- We use two types of variation in the treatment: timing of participation and intensity of treatment
- Timing of treatment: about 30 percent of eventual recipients failed to complete the paper work for the program in time, due mostly to exogenous factors, and received transfers three months later than the rest. (Salehi-Isfahani and Mostafavi-Dehzooei 2018)
- Intensity of treatment: Equal payments had a larger impact on poorer households. (Salehi-Isfahani and Mostafavi-Dehzooei 2018)

Estimation strategy, timing of treatment

- Timing of treatment: about 30 percent of eventual recipients did not receive transfers in the first three months of the program.
- Binary treatment variable:
  - T=0, received cash transfers both in winter of 2010/11 and winter of 2011/12
  - T=1, did not receive transfer in winter of 2010/11, received in winter 2011/12
- The standard conditional DID model is:

$$y_{it} = \alpha_0 + \alpha_1 T_i + \alpha_2 Year_t + \delta(T \times Year)_{it} + \mathbf{x}'_{\mathbf{it}}\beta + \epsilon_{it} \qquad (1)$$

- δ measures program impact

Estimation strategy, intensity of treatment

- Intensity of treatment: Equal payments had a larger impact on poorer households.
- Fixed effects model:

$$\Delta y_{it} = \alpha \Delta CT_{it} + \Delta \mathbf{x}'_{it} \beta + \Delta \theta_t + \Delta u_{it}, \tag{2}$$

- ΔCT is intensity of treatment
- Intensity of treatment: ratio of transfers to household expenditures before the program started
- $\Delta \theta_t$ is the time effect, $\mathbf{x}$ are individual or family characteristics
- Individual time invariant effect omitted

Data

- Household Expenditure and Income Survey, Statistical Center of Iran
- Includes consumption at home and outside. About 3 percent of the protein and 1 percent of calories are consumed outside the home.
- Rotating panel, 2010-11
- Constructing the sample of panel households:

	Observations	%remained in panel
Original survey size	38285	
Designated as panel	26180	
Balanced panel	17234	65.83
Intact households	11631	44.43

Balanced panel vs. base sample

	Balanced panel	Base sample
Urban (%)	68.52	71.43
	(46.44)	(45.17)
Expenditures†	33.21	31.53
	(32.53)	(33.27)
Net income†	26.33	28.96
	(26.67)	(30.62)
Cash transfers	0.56	0.49
	(0.38)	(0.43)
Household size	4.28	4.53
	(1.59)	(1.86)
% female	50.45	49.40
	(50.00)	(50.00)
Age	30.96	31.21
	(20.29)	(19.69)
% literate	84.17	83.60
	(36.50)	(37.03)
Years of education	6.55	6.81
	(5.29)	(5.38)
Observations	37,751	152.291

Notes: † Million rials, per capita

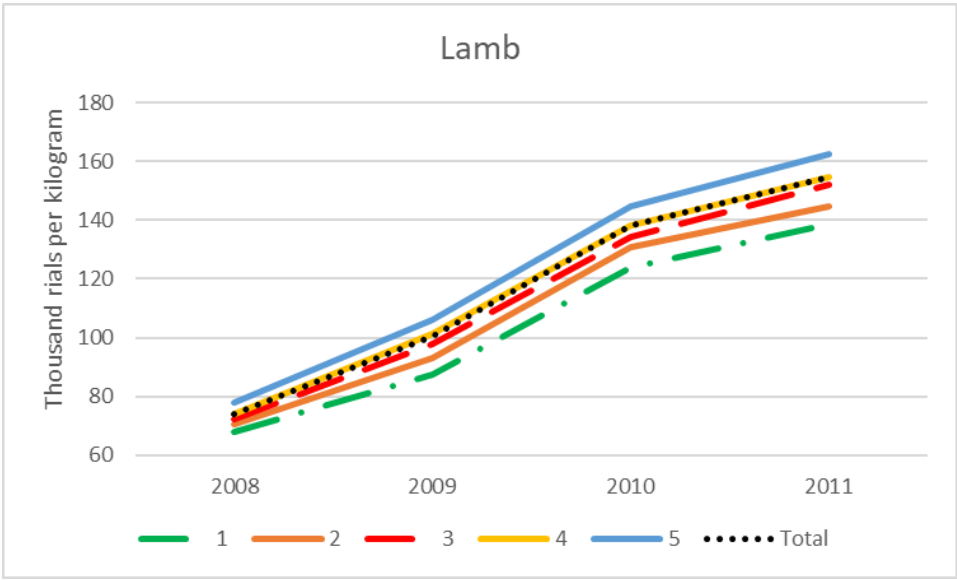
Consumption of basic food items by decile of per capita expenditures

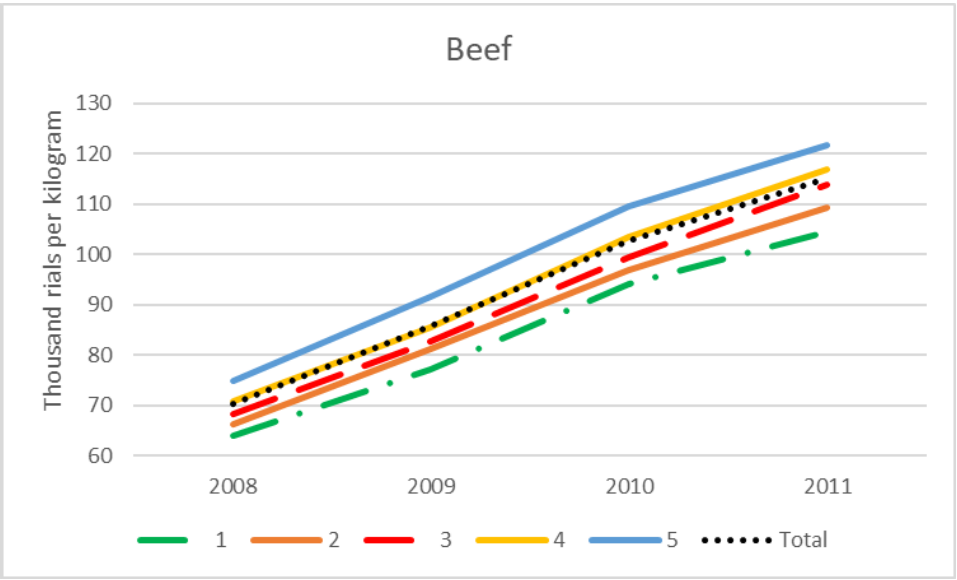
	Per capita consumption (Grams)											
	Red meat		Chicken		Dairy		Fruit		Rice		Bread	
Decile	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
1	90	229	738	1129	2228	2574	1903	3079	1629	2317	6745	6788
2	231	361	1122	1375	3584	3716	3349	4212	2071	2603	9026	8829
3	352	391	1294	1508	4168	4150	4584	4845	2488	2925	9259	9199
4	457	540	1478	1596	4696	4298	5075	5449	2682	3064	9815	9121
5	562	570	1556	1705	5353	4668	5791	5848	2858	3168	9643	9699
6	627	695	1729	1836	5491	4951	6867	6381	3365	3309	9700	9073
7	862	850	1795	1780	5947	5300	6897	6871	3190	3222	9532	9620
8	891	892	1983	1966	6371	5439	8720	8353	4228	3831	9774	9333
9	1076	990	2258	2184	7113	5737	9932	8237	4037	4163	9765	9290
10	1610	1235	3481	2366	8327	6962	12700	10005	5934	4217	9580	9541
Total	727	734	1898	1930	5723	5183	7084	6911	3510	3551	9797	9584

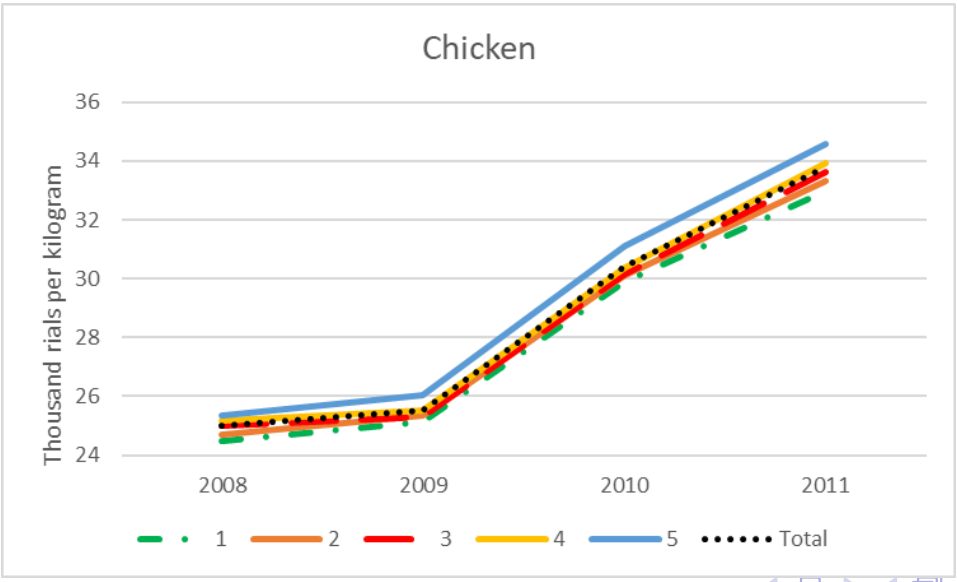
Distribution of calorie and protein intake by deciles of per capita expenditures

	Calorie		Protein (Grams)	
Decile	2010	2011	2010	2011
1	1972	2464	63	78
2	2624	2920	83	93
3	2892	2926	92	95
4	1986	3048	97	99
5	3128	3112	103	103
6	3246	3129	109	105
7	3223	3215	109	109
8	3654	3345	124	113
9	3674	3469	129	122
10	4626	3684	176	133
Total	3271	3163	111	107

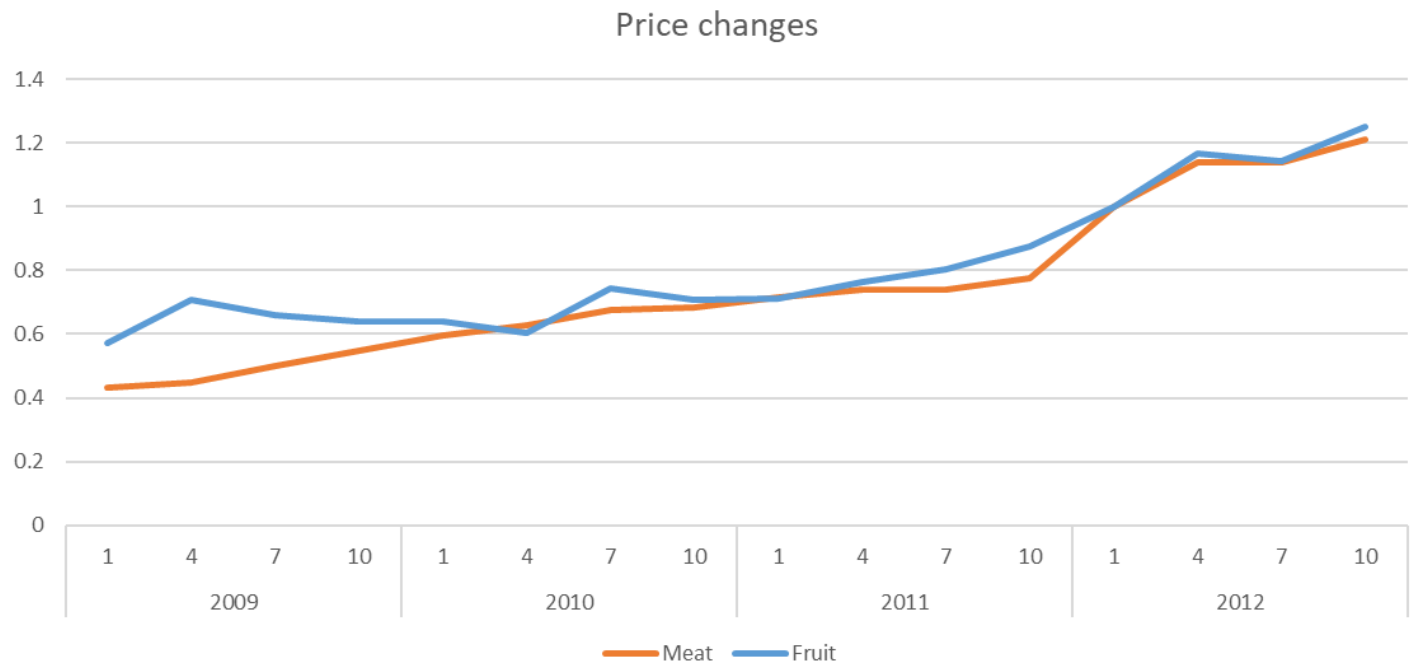
Price of main sources of protein by quintile







Price of meat and fruit



Fixed effects, impact on main expenditure categories

	(1) Food	(2) Education	(3) Durables	(4) Leisure
Intensity of treatment	0.025**	0.000	0.000	0.001*
	(0.009)	(0.001)	(0.006)	(0.000)
Urban	0.954	0.001	1.358**	0.041
	(0.625)	(0.141)	(0.462)	(0.047)
Household size	0.318	-0.045	-0.198	-0.005
	(0.209)	(0.046)	(0.153)	(0.014)
Age	-0.135	-0.045	0.007	-0.004
	(0.159)	(0.025)	(0.105)	(0.009)
Age squared	0.001	0.000	0.000	0.000
	(0.001)	(0.000)	(0.001)	(0.000)
Years of education	0.041	-0.022	0.139	-0.004
	(0.090)	(0.023)	(0.085)	(0.007)
Female	2.606**	0.221	-0.747	-0.105
	(0.956)	(0.229)	(0.566)	(0.056)
Observations	4369	4393	4393	4393
R^2	0.054	0.013	0.042	0.041

DID, impact on main expenditure categories

	(1) Food	(2) Durables	(3) Education	(4) Leisure
Treatment × Year	0.80	-0.57	-0.10	-0.12
	(1.02)	(0.84)	(0.20)	(0.07)
Treatment	-1.42	0.84	-0.08	0.12*
	(0.76)	(0.63)	(0.15)	(0.05)
Year	0.63	0.65	0.10	0.15**
	(0.48)	(0.40)	(0.09)	(0.03)
R^2	0.286	0.131	0.130	0.124
Observations	2921	2928	2928	2928

Note: DID estimates doe not reveal any significant impact of transfers on main expenditure categories. But only food shows a positive impact.

Table 1: Fixed effects estimates of impact on food consumption, bottom 40%

	(1) Redmeat	(2) Chicken	(3) Rice	(4) Fruit	(5) Dairy	(6) Bread
Intensity of treatment	0.33	1.82*	2.94	7.01*	3.28**	2.56
	(0.25)	(0.88)	(1.98)	(2.73)	(1.19)	(1.94)
Urban	-2.48	-12.18	-311.36	66.68	-397.03*	-626.08
	(25.30)	(70.80)	(259.33)	(319.85)	(185.32)	(348.54)
Household size	-15.77	-39.83*	-120.11*	-193.77**	1.68	24.37
	(8.22)	(18.16)	(57.69)	(57.58)	(63.41)	(85.52)
Age	-4.36	-24.36	-27.23	-56.87	-87.76*	-0.52
	(7.01)	(13.84)	(52.46)	(79.17)	(43.85)	(57.96)
Age squared	0.07	0.26*	0.34	0.68	0.72	-0.10
	(0.07)	(0.13)	(0.48)	(0.75)	(0.41)	(0.51)
Years of education	14.47**	13.91	75.11**	99.19	2.92	46.47
	(2.89)	(8.77)	(28.17)	(53.67)	(20.33)	(36.52)
Female	2.68	289.98**	441.97	1001.26	356.37	-104.25
	(44.24)	(107.01)	(233.37)	(673.43)	(330.94)	(405.75)
Observations	4369	4369	4369	4369	4369	4369
R^2	0.015	0.015	0.007	0.014	0.007	0.006

Notes for Table 1: Fixed effects estimates of impact on food consumption, bottom 40%

- The FE results indicate that transfers improved nutrition for the bottom 40%.
- Chicken, fresh fruit, and dairy show a significant positive impact from transfers.
- Red meat is generally income elastic but its sharp price increase may have cut demand for all income groups.
- Rice and bread are staples, not expected to exhibit a significant change from transfers.
- R^2's are low, indicating poor fit, which is not unusual for fixed effects estimation.

Table 2: DID estimates of impact on food consumption, bottom 40%

	(1) Red meat	(2) Chicken	(3) Diary	(4) Fruit	(5) Rice	(6) Bread
Treatment × Year	75.50	-59.23	104.13	652.46*	-543.99*	403.11
	(39.64)	(95.28)	(381.10)	(302.59)	(242.98)	(672.29)
Treatment	-15.32	136.35	-313.03	170.61	418.06*	-517.66
	(29.40)	(70.66)	(282.62)	(224.40)	(180.19)	(498.57)
Year	106.40**	232.25**	170.51	801.60**	535.56**	-339.48
	(18.66)	(44.86)	(179.44)	(142.47)	(114.41)	(316.55)
Urban	74.42**	26.30	-485.63**	232.64	-447.47**	2416.59**
	(17.89)	(43.01)	(172.02)	(136.58)	(109.68)	(303.46)
Household size	7.45	-99.40**	-53.81	-150.79**	55.06	-274.44**
	(5.61)	(13.49)	(53.97)	(42.85)	(34.41)	(95.21)
Age	5.27	22.56*	14.19	-61.67*	49.59*	35.48
	(3.74)	(8.99)	(35.97)	(28.56)	(22.93)	(63.45)
Years of education	18.06**	3.00	53.10*	33.56	3.90	33.80
	(2.69)	(6.46)	(25.85)	(20.53)	(16.48)	(45.61)
Female	-99.62**	-128.31	-953.89**	-1213.81**	-646.16**	-595.83
	(28.06)	(67.46)	(269.80)	(214.22)	(172.02)	(475.96)
R^2	0.149	0.102	0.087	0.113	0.088	0.250
Observations	2921	2921	2921	2921	2921	2921

Notes for Table 2: DID estimates of impact on food consumption, bottom 40%

- DID results are quite different from FE: only fresh fruit shows up with a positive and significant impact
- The year effect (coefficient of Year) indicates that consumption of most items increased between 2010 and 2011, but the difference in the increase for the treated and control groups was not significant (except for fresh fruit).

Table 3: Fixed effects estimates of program impact on calorie and protein intake, bottom 40%

	Calorie			Protein		
	(1) All	(2) Rural	(3) Urban	(4) All	(5) Rural	(6) Urban
Intensity of treatment	51.60**	64.45**	2.39	1.60*	2.02**	0.21
	(18.35)	(19.95)	(34.72)	(0.68)	(0.74)	(1.18)
Household size	-2970.26**	-3262.97**	-2150.67*	-83.97**	-93.49**	-55.44
	(649.85)	(924.85)	(883.13)	(23.85)	(33.11)	(33.20)
Age	-259.35	451.53	-1129.11	-3.31	24.26	-39.29
	(530.81)	(658.63)	(847.54)	(19.09)	(24.37)	(27.82)
Age squared	3.33	-3.07	11.41	0.07	-0.19	0.41
	(4.94)	(5.72)	(8.23)	(0.17)	(0.21)	(0.27)
Years of education	694.17*	821.74*	603.21	26.44**	27.88*	24.44
	(285.68)	(394.69)	(428.19)	(10.10)	(13.47)	(14.59)
Urban	-1027.69			-46.87		
	(2241.63)			(74.67)		
R^2	0.041	0.039	0.087	0.036	0.034	0.085
Observations	4369	3089	1280	4369	3089	1280

Notes for Table 3: Fixed effects estimates of program impact on calorie and protein intake, bottom 40%

- Turning to nutrient content of consumption, cash transfers appear to have increased the nutrition of the poor
- Dividing the bottom 40% into rural and urban populations, we not that these effects are only significant for the rural group.
- The rural population represent a larger share of the population in the bottom 40%. About 70% of our sample are rural residents, compared to 30% in the total population.

Table 4: DID estimates of program impact on calorie and protein intake, bottom 40%

	Calorie			Protein		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Rural	Urban	All	Rural	Urban
Treatment	2.63	-3.15	9.47	126.94	-91.86	410.95*
	(3.61)	(4.55)	(5.18)	(117.18)	(141.30)	(170.56)
Year	7.40**	6.37*	8.94	246.37**	181.10*	339.10*
	(2.77)	(2.67)	(4.64)	(89.74)	(86.49)	(145.39)
Treatment × year	-1.38	4.82	-9.50	-60.10	163.51	-358.29
	(4.51)	(5.03)	(7.56)	(145.08)	(164.74)	(232.06)
Household size	-1.37	-1.96*	-0.03	-49.92	-72.04*	5.76
	(0.75)	(0.87)	(1.25)	(25.57)	(29.04)	(41.79)
Years of education	-0.24	-0.44	-0.28	-4.25	-8.44	-3.45
	(0.37)	(0.39)	(0.50)	(12.28)	(11.71)	(18.20)
Female	-12.58**	-6.65	-24.46**	-335.96*	-91.62	-815.17**
	(4.69)	(5.95)	(6.40)	(143.35)	(171.99)	(227.33)
R^2	0.156	0.162	0.200	0.136	0.147	0.201
Observations	2914	2140	774	2914	2140	774

Notes for Table 4: DID estimates of program impact on calorie and protein intake, bottom 40%

- As before, DID results are not very informative.
- The estimates of impact are positive for the rural population but not significant.
- Calories and protein intakes were higher in 2001 compared to 2010.

Concluding remarks

- Cash transfers increased nutrition, not just food consumption
- The DID results are generally weak, indicating that the early and late receipt of the transfers did not play a large role in consumption.
- The FE results show more significant impacts. They indicate that transfers increased consumption of chicken, fresh fruit and dairy, suggesting that they improved nutrition for the bottom 40%.

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