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Cash Transfers, Food Consumption, and Nutrition of the Poor in Iran

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Abstract

How the poor spend their cash transfers and whether such transfers enable them to improve their nutrition are important questions for policy and research. In this paper, we provide evidence from a large-scale unconditional cash transfer program in Iran starting in 2011. The government made monthly payments for which all citizens were eligible as compensation for the removal of energy subsidies. We use panel data to estimate the casual effects of these transfers on consumption of the poor, with special focus on food and nutrition. To identify the causal impact, we use the variation in the timing of transfers and the size of the income shock measured by the ratio of cash transfers to a family's previous year expenditures. We find evidence that cash transfers increased the share of food in the consumption of the poor and their intake of foods rich in protein and vitamins.

Contents

1 Introduction

Cash transfer programs have proven effective as instruments of poverty reduction in a large variety of settings. Unsurprisingly, there is little dispute that giving money directly to the poor improves their nutrition, education, and overall welfare. What is in dispute is whether transfers have to be conditional on specific types of good behavior, like sending children to school or investing in child nutrition, to be effective (Rawlings and Rubio 2005; Skoufias and Maro 2008). Conditional transfers entail administrative costs of monitoring, which can be saved if unconditional transfers are equally effective in serving the welfare objectives of the donors or policy makers (Benhassine et al. 2015). Recently, evidence has accumulated that this is indeed the case, that the poor often spend their cash to enhance their family's welfare (Haushofer and Shapiro 2013; Aguero, Carter, and Woolard 2006). In particular, the fear that the poor may spend transfers on luxury or temptation goods has not been supported by evidence (Evans and Popova 2017).

In this paper we report on the impact of a large cash transfer program in Iran, which was both unconditional and universal, on consumption of the poor. More specifically, we ask if the transfers increased expenditures on food and improved nutrition in poor households. Iran's program started in January 2011, depositing cash transfers worth about $90 PPP per person per month in dedicated bank accounts of millions of households (for detailed descriptions of the program see Guillaume, Zytek, and Farzin (2011), Salehi-Isfahani (2016)). This amounted to 26 percent of the median income and 39 percent of the mean income of the bottom 40 percent of the population. The program was funded by the removal of energy subsidies worth about $70 billion, or 25 percent of the GDP. The impact of Iran's program on consumption of the poor is particularly interesting because, besides serving about 70 million individuals, it was not specifically "labeled" as a poverty reduction program and did not carry implicit messages urging improved nutrition that may have affected the poor's behavior similarly to a conditional program (Benhassine et al. 2015). Much of the previous evidence on the impact of unconditional transfers has come from smaller programs targeting specific groups and often with such implicit messages urging good behavior.

We use a panel of households whose detailed expenditures were recorded in Iranian years 2010/2011 and 2011/2012.[1] We take advantage of two features of the program to obtain causal estimate of the impact, following Salehi-Isfahani and Mostafavi-Dehzooei (2018) who estimated the impact of this program on labor supply. First, the program did not reach everyone at the same time. When the first payments were made about a third of the eventual recipients had not registered for the program and had to wait three months before getting their first transfer (although they received the transfers retroactively). Assuming that credit markets are imperfect, the behavior of late recipients compared to early recipients allows for difference-in-differences estimation of impact. Second, although transfers were uniform, individuals with lower incomes received a larger income shock and can therefore be said to have been treated more intensively. We measure the intensity of treatment as the ratio of transfers in 2011 to total expenditure in the preceding year, before the program started, and use fixed effects to estimate its effect on consumption. To minimize the impact of differences in the consumption habits of the rich and the poor, we limit the sample to households in the bottom 40 percent of the income distribution.

Our findings indicate that the poor spent the cash wisely. Transfers increased the food expenditures of the poor, both in absolute terms and as a proportion of total expenditures. They also increased their intake of calories, protein, and micro nutrients. These findings address an important question in development policy, namely the extent to which income assistance promotes better nutrition (Subramanian and Deaton 1996). Concern that unconditional transfers are not always used for expenditures with the highest impact on social welfare is an important reason for resorting to more interventionist programs. In particular, fears that the male heads of household may spend untied additional cash on alcohol, tobacco and other "temptation goods" is a source of concern (Devereux 2002). Our findings confirm the results of a meta analysis by Evans and Popova (2017) that show cash transfers do not increase expenditures on temptation goods.

Our analysis is partial equilibrium in that we ignore the effects of the

[1] Iranian calendar years run from 21 March to 20 March. Unless noted otherwise, in this paper we refers to 2010/2011 as 2010 and so on.

cash transfers and higher energy prices that funded the transfers on household incomes. However, the panel nature of our data eliminates some of these influences that are shared between all households. We assume that these effects do not change the trend in the outcome variables we study, though they clearly affect their level. While the level effects are eliminated in the fixed-effects estimation, changes in trends are not and can bias our results. We return to this questions below.

The paper's plan is as follows. The next section describes the cash transfer program in more detail. Section 3 offers descriptive analysis of consumption patterns in Iran, and section 4 describes our data. Section 5 explains our methodology and section 6 presents the results. Section 8 concludes.

2 The program

The 2010 Targeted Subsidy Program (TSP), was initially designed to replace all energy subsidies with direct cash to consumers. Cash transfers were intended as compensation for for the removal of all energy subsidies, which amounted to a heft $70 billion (about 25 percent of the GDP). Although transfers were quite generous (26 percent of the median income in 2011), since the government owned all supplies of energy, the program was conceived as revenue neutral. However, in the event, this amount exceeded the government's earnings from higher energy prices by a considerable margin, fueling inflation and reducing the value of the payments in subsequent years. In 2019, the average subsidy was only three percent of the median individual income.

Initially, the government intended to compensate lower income households, but the difficulty of assessing household incomes in the absence of data on personal incomes collected for tax purposes, soon led the government to compensate all households. In the event, about 30 percent of the households were unable to fulfill the registration requirements to receive the transfer (present their birth certificates and open a dedicated bank account) cards to were asked to open a special bank account into which cash transfers would be deposited, but the amount of deposit was not known until a few weeks before the start of the program on December 19, 2010, when in a surprise television appearance president Ahmadinejad announced that prices for bread and energy products

would increase by next morning, and simultaneously released the cash it had deposited in dedicated household bank accounts.[2] Given the size of the price hikes, ranging from 100 percent for bread and 300-800 percent for energy, the transfers were critical in preventing a large negative income shock to households, and may have forestalled potential social unrest that often follows much less severe energy price adjustments (Harris 2010; Bacon and Kojima 2006; Beaton and Lontoh 2010).

Not surprisingly, this program has been very popular with the poor and so has continued, though the real value of the transfers have shrunk by more than two-thirds. Growth of household incomes during 2010-2011 was strongly pro-poor, as the growth incidence curve in Figure 1 demonstrates.[3] All income deciles below the median experienced growth of income at a time when energy prices increased several fold and international sanctions against Iran tightened. Without cash transfers poverty would have risen sharply (Salehi-Isfahani, Belhaj-Hassine, and Assaad 2014). In November 2019, following another price hike, this time for gasoline only, there was much social unrest, which prompted the government to nearly double the amount of cash transfers.

As noted earlier, two features of the cash transfer program are important for our identification strategy. First, about 30 percent of households failed to complete their application at a local bank to open an account and registration closed before everyone could register. Registration opened again for everyone to register, but the first payments to this group was delayed by three months (winter 2011). Nearly everyone was able to register by spring 2011. The paperwork was not always easy to prepare. For example, women who claimed to be household heads had to provide proof of divorce or their husband's death. To the extent that late participation depends on observable characteristics, such as female head, we condition the DID estimation on them.

Second, because transfers were uniform irrespective of income, households with different incomes received substantially different income shocks. The poorer the household, the larger the size of the shock measured by the ratio of total cash transfers received to total expenditures in 2010 (Iranian year 1389

[2]For a more detailed description of the program and its implementation, see Guillaume et al. (2011), Tabatabai (2011), Salehi-Isfahani (2016), and Salehi-Isfahani et al. (2015).

[3]The curve is plotted using the gicurve program in STATA.

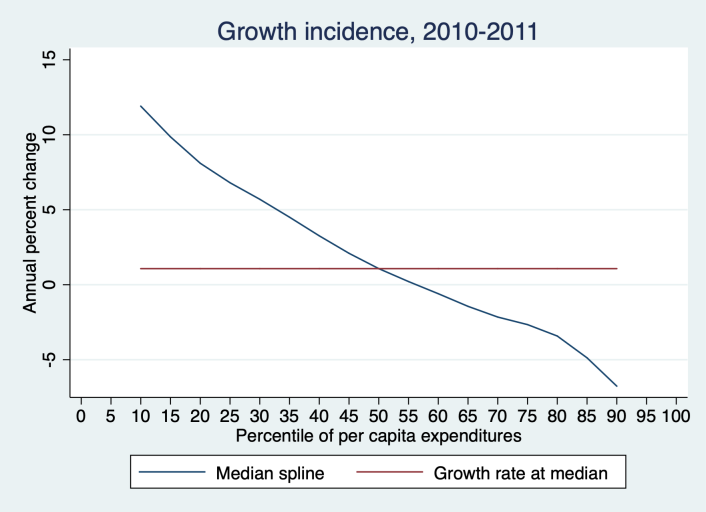


Figure 1: Incidence of income growth
Notes. The curve was estimated using the stata program gicurve and percentiles of expenditures in 2010.

which extends from 21 March 2009 to 20 March 2010). Salehi-Isfahani and Mostafavi-Dehzooei (2018) exploit these variations to identify the impact of transfer on labor supply of Iranian workers following the cash transfer program.

3 Descriptive analysis

3.1 Consumption patterns in Iran

To understand the role of cash transfers in nutrition in Iran, it is important to note that as a middle income country Iran's does not have an acute problem with hunger and malnutrition. According to the FAO, Iran has successfully achieved the MDG goals for hunger and undernourishment (McGuire 2015). Consistent with its middle-income status, in Iran food expenditures do not dominate household expenditures. In 2011, food accounted for 30% of total expenditures for all households and 38% for the bottom 40 percent. Figures 2 and 3 show the share of food in total household expenditures and the amount of calorie and protein intake per person in a global context. In both graphs, given its per capita GDP, Iran appears in the normal range for food expenditures and intake of calories and protein.

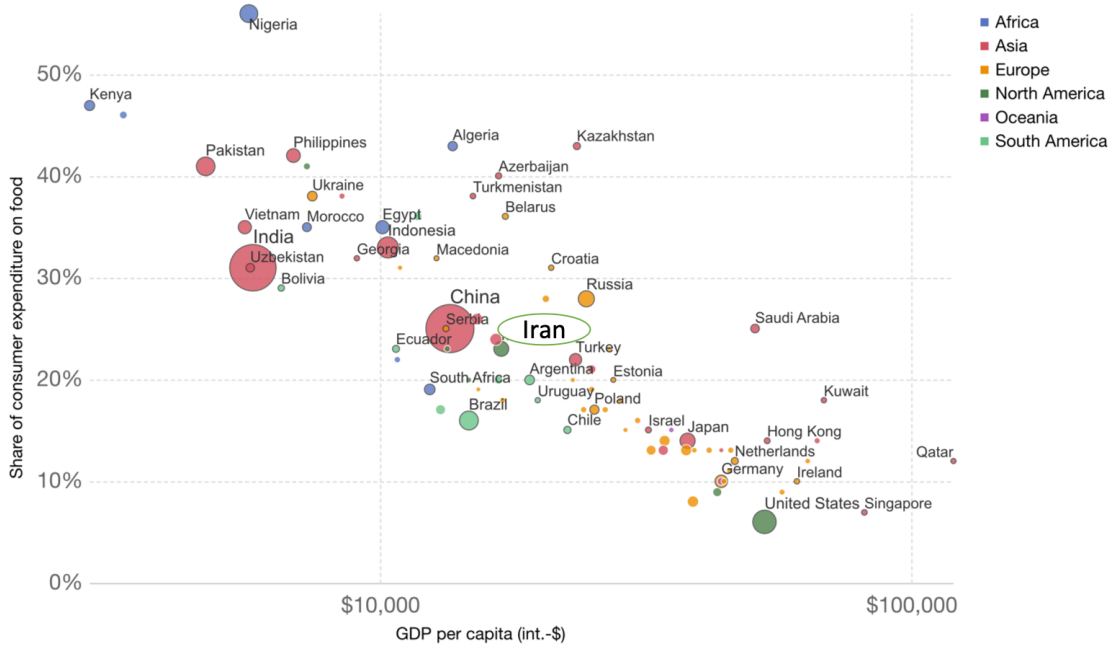


Figure 2: Share of food in total household expenditures by country

Notes: The share of consumer expenditures spent on food vs. GDP per capita, 2015. Food expenditure relates only to food bought for consumption at home (i.e. it excludes out-of-home food purchases) and excludes alcoholic beverages and tobacco products.

Source: World Development Indicators, World Bank; USDA;URL:ourworldindata.org.

Figure 3: Calories and protein intake in global perspective
Notes:
Source: FAO.

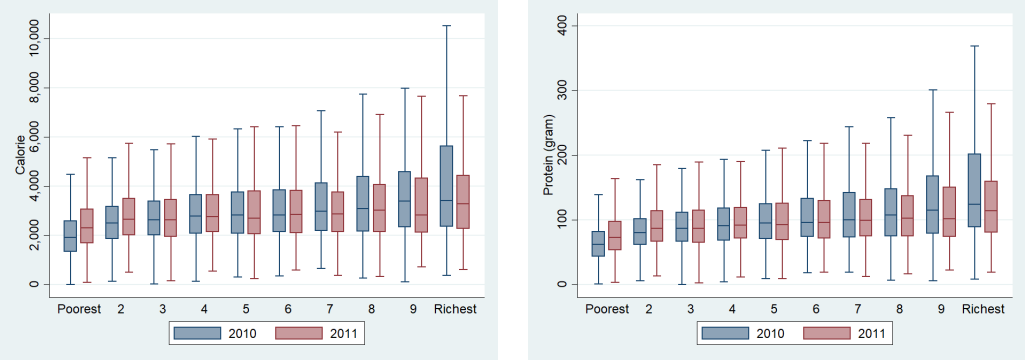
The relationship between calorie intake and per capita expenditures (pce) also informs about the food status of Iran. This relationship is only significant for the lowest two deciles. The elasticity of calories with respect to pce is 0.36, which is consistent with Iran's middle-income status, and is lower than values estimated for the poor in India (Subramanian and Deaton 1996). It drops by half for the second decile and ceases to be significantly estimated for higher income groups (See Table 16 in the appendix). These estimate are in line with what we know for developing economies (Clements and Si 2018). They also decline over time as the economy grows and with higher quintiles of income.

For the lowest quintile of pce the elasticity is greater than 1 (1.188) in 1990, when Iran's economy was at a low point having just emerged from destructive war with Iraq. As the coefficients of the interaction terms between log pce and quintile of pce indicate, this elasticity drop to 0.574 (1.188-0.614) for the top quintile. Over time, we notice a substantial drop in the income elasticity for the poor, which narrows the gap between income groups. In 2018, the elasticity for the poorest quintile was 0.858, compared to 0.532 for the top

quintile (0.858-0.326).

Next we turn to Table 1, which shows per capita consumption of the most important food items expressed in grams by decile of pce for 2010 and 2011. Notice that individuals in the lower decile increased their consumption in all categories by weight. The poorest decile consumed nearly three times as much red meat in 2011 compared to 2010, and 1.5 times fresh fruits and vegetables, which are considered luxury items. Chicken increased but by less (50%) while dairy and bread, which are staples, did not increase by much. The smallest changes are observed for bread, whose price doubled but most households were able to keep its decline to a minimum. Among the "luxury" food items, the richer deciles cut back on read meat and fresh fruit. The price of all these items were increasing as a result of the inflation unleashed by the energy price hike as well as rising values of foreign currencies that were pushing up some commodities, like fresh fruit that could be exported.

The observation in Table 1 that the poor increased their consumption of all items faster than the rich may be explained by differences in changes in income due to sanctions (a macro shock), as well differences in the quality of food they consume.



(a) Calorie (b) Protein

Figure 4: Calorie and protein intake by decile
Notes: Deciles of per capita expenditures in 2010. Calorie is per person per day and protein is in grams per person per day.

Table 1: Per capita consumption of key food items (in grams) by deciles of expenditure

	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

Notes: All values in grams per person per month. Decile is based on per capita expenditures in 2010.
Source: HEIS 2010-2011

Table 2: Shares of expenditures on food items in 2011

Decile	Meat	Dairy	Fruit	Grain	Other	Total
1	15.9	10.7	18.2	35.3	19.9	100
2	18.7	11.0	19.2	32.5	18.6	100
3	19.9	11.4	20.2	30.5	17.9	100
4	21.0	11.0	20.9	29.6	17.6	100
5	22.2	10.9	21.6	28.1	17.1	100
6	23.0	10.8	22.1	26.9	17.2	100
7	23.9	10.8	23.0	25.9	16.5	100
8	25.1	10.6	23.3	24.9	16.0	100
9	26.2	10.9	24.1	23.3	15.5	100
10	27.0	11.4	24.9	21.9	14.8	100

Notes: Source: HEIS 2010-2011

3.2 Social transfers

As a revolutionary state, the Islamic Republic of Iran has a fairly extensive social transfer system (Harris 2017) that operates independently of the cash transfer program. A government welfare agency and a large semi-public charity (Komite Emdad) account of the bulk of official transfers to the poor. Together

they cover about 10 percent of the poorest individuals (about 8 million).

In 2011, cash transfers were larger than all other transfers households received from all sources, public and private, as shown in Table 3, which compares the per capita assistance received by the bottom 40 percent of the population from public institutions and private sources and compares these with the cash transfers using the survey data for the first 9 months of 2010 and 2011 (the program was not in effect during these months in 2010. Average levels of assistance from the program for the bottom 40 percent is about 10 times transfers from other sources.

To accurately assess the impact of cash transfers on consumption of the poor we need to know the extent to which the program transfers displaced other transfers from public and private sources. Jensen (2004) shows that in South Africa private transfers fell when pension payments increased.[4]

Although in 2011 there was no announced policy of taking people off the other social protection rolls, it is possible that some families were dropped if their income increased above the minimum set by the relevant welfare agency. Likewise, private transfers may have declined as a result of cash transfers. Table 3 shows that, for the bottom 40 percent, in 2011 such substitutions likely took place and thus reduced the total value of transfers to poor households below what is indicated by cash transfers. Between 2010 and 2011, as cash transfers went from zero to 446,697 rials per person per month, social transfers decreased by 7% but private transfers increased in nominal terms by 16% (but declined in real terms). In addition, in 2011 fewer households received social or private transfers. The potential negative relation between cash transfers and other transfers may cause overestimation of the intensity of the treatment. However, the size of any bias is likely very small since other transfers were quite small in relation to cash transfers, and the average drop in such transfers was less than 2 percent of the cash transfers. Furthermore, less than one percent of the households in the bottom 40 percent experienced lower other transfers in 2011 compared to 2010.

[4]Nikolov and Bonci (2020) reviews the literature on the crowding out of private transfers by public social assistance programs.

Table 3: Average transfers for bottom %40, by source

Year	Social	Private	Cash	Total	% of households receiving transfers Social	Private
2010	41,282	34,633	0	75,914	23.2	19.8
2011	38,392	40,169	446,697	525,257	20.8	16.2

Notes: Nominal values of per capita monthly assistance by source. Bottom 40% of per capita expenditures. Observations are restricted to March 21 to December 20.
Source: HEIS 2010-2011

4 Data

We use data from two rounds of the Household Expenditures and Income Survey (HEIS), 2010 and 2011.[5] HEIS is a nationally representative survey stratified at the province level and by urban and rural areas, which has been collected annually by the Statistical Center of Iran (SCI) since the 1960s. Each year, about two-thirds of the base sample are designated as panel and re-interviewed the following year. The sample is randomly divided into 12 groups of roughly equal size, each group interviewed in a different month of the year, and panel households are interviewed in the same month each year.

Of the 38,285 households interviewed in 2010, 26,180 households (68.4%) were randomly selected and designated as panel to be re-interviewed in 2011, and the rest were designated to rotate out after one year. Of these 20,057 households (76.6%) were re-interviewed the second year; the rest had relocated or did not respond. Because the primary aim of the rotating panel is to reduce the year-to-year fluctuations and make the samples in adjacent years more similar, households are not followed if they relocate. As a result, attrition in our sample is 23.4%, which is higher than in normal panel surveys, but comparable to the attrition rate of other rotating panels. Madrian and Lefgren (2000), for example, finds an attrition rate of 29% for the Current Population Survey (CPS).

Besides attrition, the panel suffers from a difficulty in identification of

[5]As noted earlier, in this paper we use Gregorian years while the actual survey period is in Iranian years from March 21 to March 20. For example, year 2010 refers to the survey period between 21 March 2010 to 20 March 2011, and the last quarter of 2010 corresponds to the first quarter of 2011, and so on.

	No. of households	%remained in panel
Original survey size	38,285	
Designated as panel	26,180	100.0
Balanced panel	17,234	65.8
Intact households	12,531	47.9

certain household members between the two rounds. If an individual leaves the household, he or she is dropped from the sample and his or her individual number is given to the next member. To guard against mismatch of individuals across years, we drop another 2,823 observations because of a change in gender or age (by more than two years) of the head and/or spouse . This leaves us with 17,234 households or 65.8% of the original panel. To guard against the effect of changing composition of the household on consumption, we drop an additional 4,703 households whose membership had changed from one year to the next. This leaves us with 12,531 intact households in the panel.

Table 4 presents the summary statistics of the intact panel data and compares them with the 2010 base sample. These statistics do not show an appreciable difference between the two samples, suggesting that the constructed panel is representative for the whole population. The mean for expenditures is slightly higher and for net income is slightly lower in the balanced panel compared to the base sample, though these differences are not significant and are significantly reduced once we control for the observables.

HEIS is collected over 12 months and one-twelfth of the sample is interviewed each month. The survey reports the amount of cash transfers received in the past twelve months. In order to have a consistent measure for the amount of cash distributed to households who are interviewed in different months, we use the average monthly receipts as the total transfers rise with each month of the years. We assume that people who received transfers in the first month of program, for example, are fully expected to receive the transfer for the remaining of the year. We then adjust the amount of transfers by dividing the reported cash transfer received by the number of months since the start of program. If the household is observed after twelve months since the start of program, e.g. in January, February and March 2012, we divide their reported transfers by 12. Making this adjustment, the cash transfers per capita

Table 4: Comparison of the 2010 base sample and the balanced panel

	Intact household	Balanced panel	Base sample
Urban (%)	67.02	66.20	71.43
	(47.01)	(47.30)	(45.17)
Expenditures†	40.19	40.59	43.98
	(39.12)	(42.56)	(45.55)
Net income†	36.20	36.47	40.63
	(34.24)	(38.99)	(42.28)
Household size	3.77	3.99	3.80
	(1.59)	(1.72)	(1.67)
Head characteristics:			
% female	12.52	11.17	12.04
	(33.09)	(31.49)	(32.54)
Age	49.81	50.26	49.23
	(15.26)	(14.76)	(15.23)
% literate	74.79	73.29	75.54
	(43.42)	(44.24)	(42.99)
Years of education	6.43	6.15	6.67
	(5.33)	(5.29)	(5.46)
Married (%)	86.72	86.93	85.78
	(33.94)	(32.58)	(34.93)
Employed	68.47	69.14	68.67
	(46.46)	(46.19)	(46.38)
Observations	12,531	17,234	38,285

Notes: Summary statistics: individual level, base sample and balanced panel. Standard errors in parentheses. † Income and expenditures are per person in million rials per year. †† Cash transfers are per person per month in millions of rials only for households observed after the start of the program.
Source: HEIS 2010-2011

per month for households who received transfers is on average 455,255 in 2011 and 556,304 in 2010, which is very close to the official amount of 455,000 rials.

Attrition in panel-data is always a concern, especially when households that leave the panel differ systematically from those who remain. In our case, attrition is relatively high (24%) and appears selective. It is higher in urban areas, among renters, and richer families (see Table 6). The employment status of the head of the household and the number of employed household members are also correlated with attrition (those with more working members are less likely to attrit). A test of whether attrition is random or not, offered by Becketti et al. (1988), rejected the randomness of attrition, so following Fitzgerald et al. (1998) we re-weight our observations according to the inverse

Table 5: Comparison of treated and untreated groups at baseline

	Program	Comparison
Per capita expenditure (million rials)	43.28	39.38
	(48.52)	(36.88)
Per capita income (million rials)	39.87	34.07
	(51.72)	(29.05)
Hhold size	3.61	3.78
	(1.69)	(1.60)
Urban	0.69	0.64
	(0.46)	(0.48)
Head's characteristics:		
Literate	0.67	0.76
	(0.47)	(0.43)
Age	51.80	49.70
	(16.71)	(15.05)
Female	18.77	11.97
	(39.08)	(32.46)
Years of education	5.67	6.45
	(5.32)	(5.24)
Employed	60.02	68.53
	(49.02)	(46.45)
Observations	697	2515

Notes: Summary statistics: individual level, base sample and balanced panel. Standard errors in parentheses. † Income and expenditures are per person in million rials per year. †† Cash transfers are per person per month in millions of rials only for households observed after the start of the program.
Source: HEIS 2010-2011

probability of attrition calculated from a probit of attrition status on relevant household characteristics. Throughout this paper, we use these weights along with the probability weights provided by HEIS. Our regression results are not changed by much if we do not use the attrition weights.

5 Method

To identify the causal impact of cash transfers, we employ difference-in-differences (DID) and fixed effects. The DID method takes advantage of the fact that about 30 percent of the households did not receive transfers for the first 3 months of the program because they failed to complete the necessary paperwork. This method identifies impact by comparing change in consumption of those who received transfers both in 2010 and 2011 (our comparison group)

Table 6: Attrition is not entirely random: more urban households, renters and high income households attritted

	Rural(%)	Urban(%)	Total(%)
Attrited			
Yes	18.81	30.28	24.33
No	81.19	69.72	75.67
Attrition by home ownership			
Rent	31.32	43.34	39.22
Own	15.76	24.16	19.41
Attrition by pce quintiles			
1	16.47	21.94	17.83
2	17.92	27.60	21.89
3	18.08	30.52	24.57
4	18.68	30.24	25.99
5	21.99	33.39	30.40

Note: pce stands for per capita expenditures.
Source: Authors' calculations using HEIS 2010-2011.

and those who received it in 2011 only (treatment group). In the absence of access to credit, we would expect the late recipients (treatment group) to experience a larger increase in their consumption. However, access to short term credit through local grocery stores is not unusual in Iran, so the program impact as measured by DID may be smaller than fixed effect.

The DID estimates are obtained from the standard DID equation (see (Angrist and Pischke 2009)):

$$Y_{it} = \alpha_0 + \alpha T_i + \beta Year_t + \delta T_i \times Year_t + \mathbf{X}_{it}\beta + \epsilon_{it}, \tag{1}$$

where T_i is an indicator that takes value one for households who received transfers in the second period only, Y_{it} is the outcome of interest for household i in year t and it takes per capita consumption of broad categories such as food, durables, education as well as food items such as red meat, chicken, fruit, rice and bread. X_{it} contains household demographic covariates, and δ is the program impact.

The fixed-effects estimates take advantage of the fact that, because cash

transfers were uniform, their *intensity* of impact decreased with expenditures. The ratio of the transfers to expenditures (in the year prior to transfers) ranges from 63 percent for the lowest decile to 4 percent for the highest decile (see Table 15). We use the variation in the intensity of treatment and the change in consumption of key items between 2010 and 2011 to identify the impact of cash transfers on a range of household consumption items in a fixed effects model. Our fixed effects estimates are obtained from the following equation:

$$\Delta Y_{it} = \alpha \Delta CT_{it} + \mathbf{\Delta X}_{it}\beta + \Delta\theta_t + \Delta u_{it}, \tag{2}$$

where CT is the intensity of treatment, $\Delta\theta_t$ is the time trend and α is the coefficient of interest that captures the program impact.

6 Results

In this section we present the results of our estimations using DID ad fixed effects. We begin with the broad categories of expenditure and then move to the results for specific food items such as red meat, chicken, rice, fresh fruit, dairy and bread.

6.1 Impact on main consumption categories

We begin with the broad categories of consumption such as food, education, and durable goods using the fixed effects model. In the fixed effects model, the coefficient of interest is *intensity of treatment*, which we define as the ratio of cash transfers to total household expenditures in the year prior to transfers. Our intensity of treatment variable estimates the impact of cash transfers on consumption by comparing the behavior of those with higher intensity (the poorer individuals) to the behavior of those with lower intensity, all in the bottom 40 percent. We restrict the sample to the bottom four deciles of per capita expenditures (reported below) because households in higher deciles have different consumption habits and are therefore not suitable as comparisons for the poor. Our main conclusions are robust to including the whole population (not reported here, but available upon request).

We estimate the impact of transfers on the level of expenditures for impact on three broad categories of expenditures, food, education, and durables. These together account for about half of all expenditures. We limit our discussion to food which provides the only significant results (Tables 8 and 7). The widely reported results that cash transfer increase the amount spent on food is unsurprising (Banerjee 2016; Evans and Popova 2017). Our results for the level of food expenditures confirm this general finding (Table 7). The more interesting question is whether the share of food in total expenditures also increases. (Tiwari, Daidone, Ruvalcaba, Prifti, Handa, Davis, Niang, Pellerano, Van Ufford, and Seidenfeld 2016) who studies cash transfer programs in sub-Saharan Africa finds a positive impact on food expenditures but not on its share. Our results for the shares of the main expenditure items are more noteworthy because they show that the shares also increase with cash transfers (see Table 8). (Angelucci and Attanasio 2013) obtains a similar results to our and note that it is inconsistent with the well known economic intuition behind the Engel curve.

We not run to the estimates obtained with the difference-in-differences method using equation 1). We present the results for the level of expenditures and their shares in Tables 9 and 10. As these tables show, DID does not yield any significant coefficients, but its results do not contradict those from fixed-effects. The estimated program impact is the coefficient of the interaction term (first row of the table). It compares the food share for the group of households that received transfers in both years (comparison) with those who received transfers only in 2011 (treatment). Evidently, we cannot learn much from the difference in the behavior of these two groups with respect of share of consumption categories. The weak results could be because our assumption of lack of access to credit is incorrect. If credit for food purchases, say from the local grocery store is available, those who did not receive transfers in the first three months of the program were still able to spend more on certain items because the near certainty that they would soon be joining the other 60 million in receiving transfers, would qualify them for purchase on credit in local stores. When the window for registration was closed in December 2010, the government assured everyone that registration would resume two months later and transfers, including arrears, would be forthcoming. Thus the

Table 7: Impact on expenditure per capita of main categories, fixed effects, bottom 40%

	(1) Food	(2) Education	(3) Durables
Intensity of treatment	13.610**	0.113	-0.393
	(4.460)	(0.162)	(0.711)
Urban	85.849	32.486	328.689*
	(189.528)	(23.485)	(136.862)
Hhold size	-209.956**	-2.890	-50.712
	(60.703)	(7.956)	(36.497)
Age	-47.887	9.860*	7.487
	(52.328)	(4.668)	(28.941)
Age squared	0.642	-0.098*	-0.061
	(0.499)	(0.042)	(0.237)
Years of education	89.789**	3.475	94.412**
	(25.473)	(3.751)	(21.495)
Female	887.936**	32.870	-238.039
	(342.101)	(36.210)	(135.290)
Observations	4810	4835	4835
R^2	0.068	0.018	0.054

Notes: Intensity of treatment is cash transfers as a ratio of the last year per capita expenditure, Farvardin 1391 prices (March/April 2011). * $p < 0.05$, ** $p < 0.01$
Source: HEIS 2010-2011

universal transfers helped the poor increase their borrowing capability in local grocers. Buying by credit from local grocers is a well-known social custom in Iran.[6]

6.2 Food items

Looking deeper into consumption, we now turn to more food items – red meat, chicken, rice, fruit, dairy and bread. As before we begin with the fixed effects results followed by the DID results. Table 11 reports the fixed effects estimates

[6]A newspaper report in 2015 discussed how buying on credit from grocers is a well-known method of consumption smoothing. A shop owner is quoted as saying, "They are my usual customers. I have to help them in their time of need". https://www.ilna.news/-μŒ-4/284143-----

Table 8: Impact on expenditure shares of main categories, fixed effects, bottom 40%

	(1) Food	(2) Education	(3) Durables
Intensity of treatment	0.025**	0.000	0.002
	(0.008)	(0.001)	(0.006)
Urban	0.957	0.044	1.235**
	(0.620)	(0.125)	(0.438)
Hhold size	0.310	-0.041	-0.237
	(0.180)	(0.046)	(0.147)
Age	-0.150	-0.033	0.047
	(0.140)	(0.025)	(0.094)
Age squared	0.002	0.000	-0.000
	(0.001)	(0.000)	(0.001)
Years of education	0.055	-0.011	0.144
	(0.081)	(0.022)	(0.075)
Female	2.877**	0.219	-0.667
	(0.922)	(0.215)	(0.529)
Observations	4810	4835	4835
R^2	0.050	0.010	0.039

Notes: Intensity of treatment is cash transfers as a ratio of the last year per capita expenditure, Farvardin 1391 prices (March/April 2011). * $p < 0.05$, ** $p < 0.01$
Source: HEIS 2010-2011

of the impact on food items. As before, we focus on the coefficient of the intensity of treatment which measures the impact of transfers on consumption. Among the significant results, we note that a one unit increase in the intensity of treatment raises chicken consumption by 2.01 grams, fruit by 7.58 grams and dairy by 3.73 grams. Limiting the sample to the bottom 20% and 30% does not change these results. According to these results, the transfers increased consumption of protein (chicken and dairy, but not red meat) and fresh fruit.

The DID results in Table 12 are, again, more muted but not contradictory to the fixed effects results. Only in the case of fresh fruits, do we see positive and significant impact. Treated group increase their fresh fruit consumption by 713 grams per month more than the control group. The negative coefficient

Table 9: Impact on expenditure per capita of main categories, bottom 40%, DID

	(1) Food	(2) Education	(3) Durables
Treatment × Year	-12.24	-42.19	-298.02
	(297.22)	(31.55)	(224.32)
Treatment	261.43	22.39	99.15
	(224.85)	(23.89)	(169.85)
Year	1276.78**	63.09**	1037.64**
	(154.32)	(16.40)	(116.58)
Age	66.90*	15.71**	57.45*
	(30.24)	(3.21)	(22.84)
Age squared	-0.37	-0.13**	-0.58**
	(0.27)	(0.03)	(0.21)
Years of education	58.44**	10.59**	135.66**
	(21.31)	(2.27)	(16.11)
Female	-1253.62**	124.59**	-258.99
	(223.14)	(23.67)	(168.28)
R^2	0.143	0.114	0.119
Observations	3269	3276	3276

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$
Source: HEIS 2010-2011

of rice, which is also significant, is surprising but may be explained by substitution away from rice and in favor of more "luxury" items such as fresh fruit. Note that the DID compares consumption during the winter quarter where fresh fruits and vegetables are more expensive and therefore more desirable.

6.3 Consumption of calories and protein

Guided by our results in section 6.2 we now explore the program impact on protein and calorie intake of households. Our focus remains on households in the bottom 40% of per capita consumption. We first provide the results of the fixed effects model in Table 13. Program impact, measured by intensity of treatment is significant for both calorie and protein. Ten percent increase in treatment intensity results in an increase of calorie intake by 50 (1.81 percent

Table 10: Impact on expenditure shares of main categories, bottom 40%, DID

	(1) Food	(2) Education	(3) Durables
Treatment × Year	-1.41	-0.23	-0.58
	(0.91)	(0.17)	(0.77)
Treatment	0.59	0.07	-0.04
	(0.69)	(0.13)	(0.58)
Year	1.21*	0.15	0.78
	(0.47)	(0.09)	(0.40)
Age	-0.11	0.08**	0.20**
	(0.09)	(0.02)	(0.08)
Age squared	0.00	-0.00**	-0.00**
	(0.00)	(0.00)	(0.00)
Years of education	-0.43**	0.04**	0.55**
	(0.07)	(0.01)	(0.06)
Female	-2.33**	0.92**	-0.79
	(0.69)	(0.13)	(0.58)
R^2	0.282	0.131	0.135
Observations	3269	3276	3276

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$
Source: HEIS 2010-2011

increase) and protein by 1.6 grams (1.86 percent increase) per person per day. This result in consistent with our finding for chicken and dairy consumption.

The DID results in Table 14 are, again inconclusive. We find no statistically significant impact the consumption of calorie and protein. Although consumption of both increased from 2010 to 2011 as the Year coefficient in the table shows, this increase is the same between the treatment and control groups. A reason for the difference between groups being insignificant is that households in the control groups may have been able to but protein on credit when they were assured of retrospective cash transfer payments.

6.4 Threats to identification

We identify the impact of increase in intensity of treatment on the poor from those with higher incomes (but in bottom 40%). We need to show that the

Table 11: Impact on per capita food consumption, fixed effects model, (bottom 40%)

	(1) Redmeat	(2) Chicken	(3) Rice	(4) Fruit	(5) Dairy	(6) Bread
Intensity of treatment	0.45	2.01*	3.75	7.58**	3.73**	2.41
	(0.27)	(0.90)	(2.08)	(2.84)	(1.33)	(1.93)
Urban	-13.36	-17.84	-280.28	85.02	-442.82*	-520.90
	(25.02)	(70.60)	(239.74)	(297.20)	(187.57)	(341.32)
Hhold size	-18.45*	-37.55*	-108.37	-185.18**	22.44	29.06
	(8.21)	(17.98)	(56.64)	(52.21)	(61.79)	(83.16)
Age	-2.49	-23.96	-44.62	-62.93	-98.01*	-3.24
	(6.54)	(13.09)	(50.11)	(73.57)	(43.54)	(59.32)
Age squared	0.06	0.26*	0.50	0.72	0.84*	-0.09
	(0.06)	(0.12)	(0.46)	(0.70)	(0.41)	(0.53)
Years of education	13.60**	15.51*	77.20**	73.61	0.52	52.60
	(3.14)	(7.50)	(26.55)	(48.28)	(20.06)	(37.42)
Female	-1.88	230.51*	533.84*	877.17	106.10	399.66
	(42.87)	(109.30)	(242.68)	(624.29)	(319.75)	(489.14)
Observations	4810	4810	4810	4810	4810	4810
R^2	0.014	0.013	0.007	0.013	0.007	0.005

Notes: Dependent variables are household per capita consumption in grams. Intensity of treatment is cash transfers as a ratio of the last year per capita expenditure, Farvardin 1391 prices (March/April 2011). Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$
Source: HEIS 2010-2011

only difference between these groups was in the intensity of treatment. One threat to this identification is from different prices paid by different income groups. In Figure 5 we show that unit prices for beef and chicken moved in tandem for the five income quintiles.

7 Household composition

(to be completed) If households on average increased their food expenditures and improved their nutrition, we should see a stronger impact for female headed households and families with small children. In addition, households

Table 12: Impact on food consumption, bottom 40%, DID

	(1) Red meat	(2) Chicken	(3) Diary	(4) Fruit	(5) Rice	(6) Bread
Treatment × Year	48.27	-113.44	198.38	712.90*	-921.17**	-84.87
	(45.15)	(85.99)	(326.15)	(277.01)	(233.15)	(583.77)
Treatment	-33.59	57.97	-282.35	21.78	843.37**	-353.80
	(34.16)	(65.05)	(246.73)	(209.56)	(176.38)	(441.63)
Year	101.59**	207.77**	43.70	703.37**	684.33**	-47.17
	(23.44)	(44.65)	(169.34)	(143.83)	(121.06)	(303.11)
Urban	73.09**	15.31	-455.04**	230.26	-595.78**	2164.83**
	(21.59)	(41.12)	(155.96)	(132.46)	(111.49)	(279.15)
Household size	7.77	-106.81**	-42.37	-218.59**	16.73	-325.36**
	(7.00)	(13.33)	(50.57)	(42.95)	(36.15)	(90.52)
Age	6.48	20.79*	15.77	-26.97	58.64*	47.42
	(4.59)	(8.75)	(33.18)	(28.18)	(23.72)	(59.39)
Years of education	17.44**	3.45	53.85*	47.10*	-4.80	26.09
	(3.24)	(6.17)	(23.39)	(19.87)	(16.72)	(41.86)
Female	-70.82*	-135.49*	-719.41**	-1255.64**	-693.50**	-944.01*
	(33.90)	(64.56)	(244.86)	(207.97)	(175.04)	(438.27)
R^2	0.097	0.107	0.085	0.116	0.093	0.239
Observations	3269	3269	3269	3269	3269	3269

Notes: Dependent variables are per capita consumption in grams. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$

Source: HEIS 2010-2011

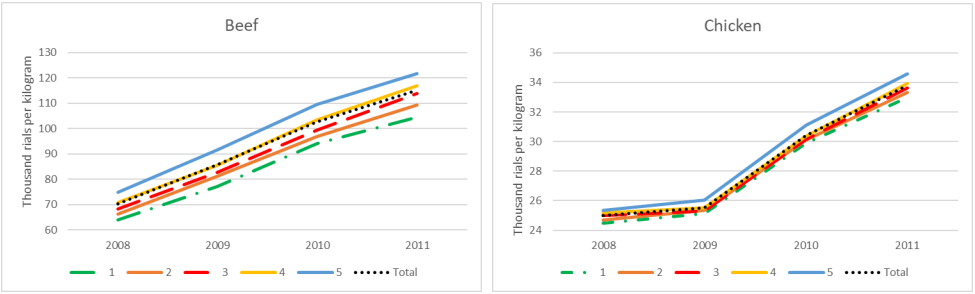


Figure 5: Unit prices of chicken and beef for expenditure groups moved together

Notes: Deciles of per capita expenditures in 2010.

Table 13: Fixed effects estimates of program impact on calorie and protein intake, bottom 40%

	Calorie (1)	Protein (2)
Intensity of treatment	4.87**	0.16**
	(1.20)	(0.04)
Urban	-10.63	-0.68
	(70.14)	(2.32)
Household size	-101.24**	-3.08**
	(20.98)	(0.76)
Age	-10.09	-0.10
	(16.40)	(0.58)
Age squared	0.13	0.00
	(0.15)	(0.01)
Years of education	29.85**	1.06**
	(8.51)	(0.30)
R^2	0.051	0.043
Observations	4810	4810

Notes: Sample restricted to bottom 40% of per capita expenditures.
Source: HEIS 2010-2011

in which women greater bargaining power might be able to channel more of the cash to food and nutrition.

8 Conclusion

In this paper we have reported on the impact of a large uniformly distributed cash transfer program on the welfare of the poor. We focused on how transfers were used to increase expenditures on broad categories of consumption as well as on specific items of nutrition such as protein and vitamins.

We use two method of identification, one based on the timing of receiving the transfer and another on its intensity, which we define as the share of cash transfers in income the year before. We find that the impact of transfers is generally positive. More money is spent on food in general and on specific healthy items, such foods rich in protein (chicken and diary) and rich in

Table 14: DID estimates of program impact on calorie and protein intake, bottom 40%

	Calorie (1)	Protein (2)
Treatment × Year	-139.04	-7.51
	(122.24)	(4.28)
Treatment	168.60	7.00
	(108.53)	(3.66)
Year	289.34**	10.17**
	(93.23)	(2.96)
Urban	-543.92**	-8.95**
	(75.81)	(2.50)
Household size	-65.34*	-2.23**
	(25.92)	(0.86)
Age	35.35*	1.09*
	(14.96)	(0.48)
Age squared	-0.24	-0.01
	(0.14)	(0.00)
Years of education	-10.72	-0.21
	(11.30)	(0.37)
R^2	0.163	0.140
Observations	3260	3260

vitamins (fresh fruits and vegetables).

These results complement other findings on cash transfers for Iran. Atamanov et al. (2016) show that transfers played a role in poverty reduction in the early 2010s before inflation reduced their real value, and (Salehi-Isfahani and Mostafavi-Dehzooei 2018) show that transfers did not reduce the labor supply of the poor. The paper contributes to the literature on cash transfers by providing evidence that unconditional transfers can improve the welfare of the poor. Our results also have strong implications for policy in Iran and other countries that subsidize energy. A major criticism of the program in Iran was that because of inflation the poor did not benefit from trading energy subsidies for cash. We show that replacing energy subsidies with cash transfers not

only reduce multiple harms done by energy subsidies (environmental degradation and price distortion), they also improve the poor's food consumption and nutrition.

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A Appendix

Table 15: Distribution of calorie and protein intake by decile

	Intensity of treatment (%)	Calorie		Protein (Grams)	
Decile		2010	2011	2010	2011
1	58	2052	2516	65	80
2	26	2728	2952	87	95
3	22	2910	2918	94	94
4	14	3049	3133	99	103
5	13	3198	3129	105	103
6	8	3234	3190	110	108
7	9	3446	3217	116	110
8	8	3555	3350	123	115
9	6	3874	3488	136	123
10	4	4828	3814	187	138
Total	17	3271	3163	111	107

Notes: Deciles of per capita expenditures in 2010. Calorie is per person per day and protein is in grams per person per day.

Table 16: Engel curve estimates of demand for food

	(1) year1990	(2) year2000	(3) year2010	(4) year2018
qpce==2	4.307***	2.705***	2.820***	1.837*
	(5.76)	(4.15)	(4.32)	(2.50)
qpce==3	3.778***	3.377***	3.445***	2.044*
	(4.22)	(4.31)	(4.24)	(2.37)
qpce==4	5.021***	3.693***	5.026***	3.565***
	(6.75)	(5.51)	(6.66)	(5.02)
qpce==5	7.611***	7.513***	7.655***	5.926***
	(24.81)	(25.70)	(24.34)	(16.99)
Log pce	1.188***	0.985***	0.942***	0.858***
	(71.25)	(69.01)	(78.16)	(64.81)
(qpce==2)*lpce	-0.364***	-0.191***	-0.176***	-0.106*
	(-5.90)	(-4.28)	(-4.42)	(-2.55)
(qpce==3)*lpce	-0.321***	-0.237***	-0.215***	-0.119*
	(-4.49)	(-4.52)	(-4.43)	(-2.48)
(qpce==4)*lpce	-0.419***	-0.257***	-0.309***	-0.201***
	(-7.24)	(-5.86)	(-7.00)	(-5.21)
(qpce==5)*lpce	-0.614***	-0.498***	-0.459***	-0.326***
	(-25.40)	(-25.61)	(-24.83)	(-17.09)
A02	-0.000164	0.000314	0.00248***	0.00379***
	(-0.75)	(1.90)	(16.82)	(27.32)
A01	-0.171***	-0.0949***	-0.0153*	-0.0185**
	(-14.78)	(-10.69)	(-2.18)	(-2.89)
Urban	-0.289***	-0.237***	-0.260***	-0.221***
	(-41.72)	(-44.09)	(-54.63)	(-50.06)
Constant	-2.787***	-0.488*	-0.0248	1.439***
	(-14.53)	(-2.45)	(-0.13)	(6.33)
Observations	18346	26873	38176	38863
R^2	0.689	0.667	0.572	0.570

Notes: Estimates form regressions of log food expenditures per capita on log total household expenditures. t-statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Source: HEIS 2010-2011

Table 17: Impact on share of food items, Fixed effects

	(1) D.sh_meat	(2) D.sh_redmeat	(3) D.sh_chicken	(4) D.sh_bread_wheat	(5) D.sh_rice	(6) D.sh_vegetables	(7) D.sh_fruit	(8) D.sh_dairy
intensity	0.000131**	0.000098**	0.000015	-0.000031	0.000064**	-0.000051	0.000070**	-0.000016
	(0.000026)	(0.000026)	(0.000023)	(0.000038)	(0.000019)	(0.000029)	(0.000013)	(0.000024)
hhsize	-0.000996	-0.000577	-0.000398	0.002169**	-0.001012*	-0.000093	0.000163	-0.000289
	(0.000618)	(0.000511)	(0.000281)	(0.000421)	(0.000410)	(0.000256)	(0.000256)	(0.000241)
urban	0.004970**	0.000702	0.003283**	-0.010082**	0.005989**	0.004867**	0.002176*	0.003066**
	(0.001914)	(0.001832)	(0.000869)	(0.001243)	(0.001672)	(0.001061)	(0.000876)	(0.000830)
N	11380	11380	11380	11380	11380	11380	11380	11380
R^2	0.004	0.002	0.003	0.026	0.004	0.013	0.006	0.005

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$

Notes:
Source: HEIS 2010-2011

Table 18: Impact on per capita food consumption change (in grams), Fixed Effects, (full sample)

	(1) Redmeat	(2) Chicken	(3) Rice	(4) Fruit	(5) Dairy	(6) Bread
Intensity of treatment	1.78*	6.58**	15.97**	23.38**	11.61**	5.83*
	(0.72)	(2.33)	(5.40)	(7.59)	(3.40)	(2.60)
Urban	-20.42	-53.97	625.95	-0.85	-442.72*	-139.57
	(30.37)	(92.78)	(339.24)	(294.83)	(179.60)	(271.23)
Hhold size	11.96	-2.23	-153.32	17.81	27.99	-14.21
	(12.98)	(53.42)	(84.76)	(107.87)	(48.91)	(73.18)
Age	-22.09*	-43.50*	-49.12	-137.74*	-79.62*	35.23
	(10.38)	(18.83)	(57.45)	(68.69)	(36.05)	(48.83)
Age squared	0.20*	0.42*	0.45	1.23	0.69*	-0.41
	(0.10)	(0.18)	(0.52)	(0.65)	(0.33)	(0.43)
Years of education	7.18	26.81	43.58	57.74	37.54	54.92
	(3.75)	(15.60)	(29.77)	(30.20)	(30.62)	(29.28)
Female	88.10	359.75*	204.99	1424.50*	-123.81	935.78*
	(93.79)	(175.99)	(417.87)	(630.07)	(276.67)	(372.88)
Observations	9068	9068	9068	9068	9068	9068
R^2	0.005	0.008	0.005	0.013	0.011	0.004

Notes: per capita consumption in grams
Intensity of treatment is cash transfers as a ratio of the last year per capita expenditure, Farvardin 1391 prices.
Source: HEIS 2010-2011