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The welfare effects of social assistance programmes for women in India

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Abstract

The literature has established that the alarming female poverty rate in India is a crucial factor contributing to 'missing elderly women'. This paper examines the role of an unconditional cash transfer programme (the Indira Gandhi National Old Age Pension Scheme– IGNOAPS) implemented in India on household expenditure on education, medical expenses and food items when the programme recipient is an elderly woman. The paper uses the longitudinal household-level data (2004–05 and 2011–12) released by the India Human Development Survey and utilises a quasi-experimental framework of propensity score matching combined with fixed effects to estimate the effects of the pension amount received by elderly women on disaggregated consumption expenditure. The findings of this research suggest that women's access to IGNOAPS has a positive effect on consumption expenditure on nutrient-rich food, while the pension amount also increases education and medical spending. The results obtained in the paper are explained through the elderly women's increased bargaining power and the income effect. The results remain consistent after addressing concerns about endogeneity using an instrumental variable. The study provides evidence that elderly women's access to IGNOAPS reduces household food poverty and improves other welfare dimensions in the household.

Keywords

Women, IGNOAPS, bargaining power, poverty

JEL Codes

D13, I38, J14, J18

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1. Introduction

This paper examines the role of an unconditional cash transfer programme (The Indira Gandhi National Old Age Pension Scheme – IGNOAPS) as a means of dealing with the phenomen of 'missing women', especially among the elderly.[1] There are two economic rationales behind cash transfer programmes targeted at women. The first is based on the non-unitary household model, which suggests expenditure allocations made by men and women are different. The standard unitary household model assumes that a household is a single entity and that members within the household are altruistic. The unitary model assumes that members of a household pool their income together. This implies that additional non-labour income would bring in the same welfare effect, irrespective of the programme participant's gender. The assumption of the income pooling hypothesis has been rejected by Thomas (1993), Attanasio and Lechene (2002), De Carvalho Filho (2012), Ponczek (2011), Duflo (2003) and Bergolo and Galvan (2018). Cash transfers targeted at women tend to increase their bargaining power and this favours the consumption expenditure decisions that they prefer (Bergolo &Galvan,2018; Holmes &Jones, 2010;Armand et al, 2016; Adato et al, 2000; De Brauw et al,2014; Rubalcava et al,2009).

The second economic rationale for targeting transfers at women is that they are economically vulnerable. A report by the UN Population Fund India (2017) highlights the fact that older women in the country are more financially vulnerable than men, while work by Kalavar and Jamuna (2011) found an increase in the potential for disability among elderly women. Roy and Chaudhuri (2008) found that older Indian women reported declining health status, lower healthcare utilisation and prevalence of disabilities compared with men. The differential in health outcomes can be explained through gender differences in socioeconomic status and the lack of financial empowerment among women. Anderson and Ray's work (2010; 2012; 2015) has noted excess female mortality at an older age in India. A preference for sons over daughters is a vital factor responsible for younger 'missing women' but, at the post-reproductive age, it is women's reduced bargaining power that has been cited as an essential factor in missing women, as this results in poverty among older women (Calvi,2016). Calvi's estimates show that poverty rates among women of post-reproductive age are 80% higher than those recorded for men. Work has been done by NGOs (eg the Agewell Foundation and HelpAge India) that emphasises the problems of increased poverty and discrimination faced by elderly women; such reports also suggest the need for elderly women to have income security.[2]

The impact of cash transfers on welfare is focused heavily on the income pooling hypothesis, which essentially tests the welfare effects of cash transfers between men

[1] 'Missing women' is a concept introduced by Amartya Sen. It denotes the relatively smaller proportion of women surviving compared to men and is widely seen in developing countries like India and China.
[2] https://www.agewellfoundation.org/pdf/reports/Older%20Women%20In%20India%20-%20A%20Note%20by%20Agewell%20Foundation%20-%20India.pdf; and https://www.livemint.com/Politics/z6BacVOwf5SvmpD9P1BcaK/20-of-population-to-be-elderly-by-2050-HelpAge-India-repor.html

and women. Less attention has been given to the welfare effects of a programme centred on female participants. The work by Schady and Rosero (2008) and Aker et al (2016) has compared the welfare effects of unconditional cash transfer programmes between women who participate in a programme and women who do not, in order to understand the welfare effects generated among programme participants. Aker et al (2016) studied the effects of electronic transfers in delivering an unconditional cash transfer programme (Zap) in Niger. The programme identified women as primary recipients. The research ascertained that Zap improved dietary diversity by 9%–16%. Schady and Rosero (2008) studied the impact of Bono de Desarrollo Humano (BDH), an unconditional cash transfer programme given to women in Ecuador, and estimated its impact on food expenditure.[3] The transfer from BDH constituted only 10% of the median household income. Their empirical findings provide evidence that women's programme participation increases the share of spending incurred on food, compared with households where women did not participate in the programme.

Barrientos et al (2003) have demonstrated that, in developing countries, poor people perceive older and widowed women as the poorest; this underlines the need to evaluate the effects of IGNOAPS on female programme participants. The first of the UN's Sustainable Development Goals recognises the need to alleviate poverty in all forms everywhere. This further emphasises the need to focus on the impact of poverty alleviation programmes on elderly women. In this context, the following research aims to study the impact of the pension amount received from IGNOAPS on elderly women's household poverty. Household poverty is assessed through the consumption expenditure incurred. Here the consumption expenditure incurred on the following items has been studied: pulses; vegetables, fruits and nuts; meat, eggs and fish; milk and milk products; beverages; and education and medical expenses. The broad range of food consumption expenditure variables studied here reflects the dietary diversity of the household. Dietary diversity is an essential component of household food security, and strengthening food security reduces household food poverty. Education and medical expenditure incurred indicates investment in human capital and health care that promotes long-term household welfare.

There have been previous empirical studies on IGNOAPS (Kaushal, 2014; Garroway, 2013) in which the authors examined the impact on aggregated welfare indicators. However, to the best of my knowledge, this is the first study to investigate the impact of elderly women's participation in IGNOAPS on disaggregated household expenditure. The disaggregated consumption expenditure studied here is useful for understanding the micro-welfare effects of the programme and, if the pension amount received by elderly women boosts the household per capita consumption expenditure,then this will augment the economic security of the elderly women in the household, reduce their old-age poverty rate and increase their probability of later age survival.

In this research, I have used the two rounds of household longitudinal data (2004–05 and 2011–12) released by the India Human Development Survey. Propensity score

[3] This programme was previously known as Bono Solidario.

matching (PSM) has been used to construct a valid counterfactual group from the secondary dataset. The constructed control group has similar characteristics to the treatment (IGNOAPS)-receiving households. The only difference between the treatment and control group is the women's participation in IGNOAPS. To circumvent the effects of time-invariant unobservable characteristics, such as cultural norms that shape taste and preference, on the outcome variables, the method of fixed effects (FE) has been used in the PSM setting. To address remaining concerns on endogeneity, an instrumental variable (IV) strategy was used. The empirical findings here suggest that the payment received from IGNOAPS has a positive impact on the consumption expenditure incurred on pulses (0.02%); vegetables, fruits and nuts (0.04%); meat, eggs and fish (0.05%); milk and milk products (0.04%); and beverages (0.07%). The programme also has a positive effect on education (0.05%) and medical expenditure (0.03%) incurred by the household. The findings here are explained through the lens of income effect and women's higher bargaining capacity.

The following section gives a brief overview of the programme studied here, followed by details of the data in Section 3, while the methodological framework is detailed in Section 4. Section 5 focuses on the empirical findings, Section 6 discusses the findings.

2 Indira Gandhi National Old Age Pension Programme

The National Social Assistance Programme (NSAP) was introduced by the central government of India in 1995 with the aim of providing a safety net for vulnerable sections of society. There were three major components of the scheme: the National Old Age Pension Scheme (NOAPS), the National Family Benefit Scheme (NFBS) and the National Maternity Benefit Scheme (NMBS). In the initial phase, NOAPS was provided to destitute applicants aged 65 or older, and the Federal government provided Indian National Rupees (INR) 75 to eligible beneficiaries. In 2007, the scheme was renamed the Indira Gandhi National Old Age Pension Scheme (IGNOAPS). The eligibility criteria used in the scheme changed from someone being destitute to any person who had attained 65 years of age or over and belonged to a household below the poverty line. The scheme was formally launched in 2007. The central assistance to the beneficiaries also increased, from INR 75 to INR 200. The second round of change happened in 2011. In a memorandum released by the Ministry of Rural Development in 2011, the age eligibility criterion for the programme was reduced from 65 to 60 years. Also, cash transfers to recipients above 80 years of age increased from INR 200 to INR 500.[4] The central government provides a fixed amount as transfers based on the state poverty line. State governments are requested to top-up the central government's contributions. There are inter-state variations in the transfer amount provided, as some

[4]National Social Assistance Programme, Government of India. [http://nsap.nic.in/; http://nsap.nic.in/Guidelines/modifications%202007.pdf;and http://nsap.nic.in/Guidelines/aps.pdf]. Accessed: Jan 2019

states make a larger contribution compared with others. A detailed discussion of the programme is provided by Kaushal (2014).

3 Data

I have used household-level panel data based on the India Human Development Survey (IHDS), conducted in 2004–05 and 2011–12. Both rounds are nationally representative. The 2011–12 round re-interviewed 40,018 households (original and split households within the same village) interviewed in the IHDS-1 survey. Using the panel component, the panel data at household-level have been constructed for 40,018 households which were monitored in both periods (Desai et al, 2005, 2011–12).Summary statistics of the key variables at the household level are presented in Table 1. The average per capita consumption expenditure on several items is presented for both rounds. The table suggests that the expenditure incurred on the disaggregated items increased in the 2011–12 round. The t-stat compares the difference in the mean values between the female programme-participant households and those where women did not participate. The average consumption expenditures incurred on several items varies substantially between participants and non-participants in the programme in the 2011–12 round. For the 2004-05 round, the mean expenditure incurred on vegetables, fruits and nuts, milk and milk products, and beverages were higher in programme-participant households. In the 2011–12 round, the average per capita expenditure incurred by households with a female IGNOAPS participant was substantially higher across all the expenditure categories compared with households that did not have a female IGNOAPS participant.

The other key characteristics of household composition, wealth, dependants in the household, education, place of residence, caste, religion, access to media, and number of other welfare benefits received by the household also varied substantially in both rounds between the female programme-participant households and those where women did not participate.

Table 1: Summary statistics before matching

Variables	Female pension recipient households (N=616)	Female pension non-recipient households (N=38688)	Female pension recipient households (N=616)	Female pension non-recipient households (N=38644)	T-stat	Female pension recipient households (N=1542)	Female pension non-recipient households (N=38688)	Female pension recipient households (N=1542)	Female pension non-recipient households (N=38688)	T-stat
Monthly per capita expenditure (INR)	*Mean (2004–05)*	*Mean (2004–05)*	*Std. Dev. (2004–05)*	*Std. Dev. (2004–05)*		*Mean (2011–12)*	*Mean (2011–12)*	*Std. Dev. (2011–12)*	*Std. Dev. (2011–12)*	
Pulses	19.78	20.18	31.04	18.81	0.52	25.19	20.18	18.75	18.81	2.48
Vegetables, fruits and nuts	113.59	108.88	162.22	136.84	0.84	176.27	108.88	185.91	136.84	4.75
Meat, eggs and fish	20.08	26.88	48.99	41.89	3.99	38.00	26.88	53.12	41.89	3.74
Milk and milk products	86.81	67.11	122.80	102.08	4.73	84.96	67.11	113.04	102.08	3.61
Beverages	91.12	89.12	88.68	109.03	0.45	160.74	89.12	155.74	109.03	5.72
Medical	88.08	89.10	223.31	290.43	0.09	146.85	89.10	443.01	290.43	1.34
Education	26.00	36.60	58.28	113.66	2.31	84.60	36.60	307.15	113.66	4.03
Other household characteristics										
Number of persons living in the household	6.33	5.82	3.61	3.01	4.10	4.94	5.82	2.69	3.01	1.65
If the household owns any agricultural land	0.43	0.48	0.50	0.50	2.54	0.47	0.48	0.50	0.50	0.99
Number of women who are 60 years and older	0.92	0.22	0.27	0.41	42.67	0.90	0.22	0.30	0.41	62.96
If the household has a female widow	0.87	0.19	0.34	0.40	42.24	0.83	0.19	0.38	0.40	58.31
Highest years of education for an adult in the household	6.56	7.46	5.05	5.01	4.38	6.67	7.46	5.25	5.01	12.55
Household	0.18	0.30	0.39	0.46	6.37	0.22	0.30	0.42	0.46	8.98

lives in an urban area										
Proportion of household members working for agricultural wages	0.28	0.21	0.40	0.36	5.21	0.27	0.21	0.41	0.36	7.65
If the women in the household have access to newspaper	0.25	0.39	0.57	0.68	4.90	1.32	0.39	0.61	0.68	7.23
If the women in the household have access to radio	0.40	0.51	0.65	0.68	3.88	1.18	0.51	0.46	0.68	4.67
Household head belongs to either scheduled caste or scheduled tribe	0.38	0.29	0.49	0.46	4.85	0.35	0.29	0.48	0.46	4.78
Household head is a Muslim	0.06	0.12	0.23	0.32	4.80	0.08	0.12	0.27	0.32	5.14
Number of other welfare benefits that the household receives	0.08	0.05	0.27	0.22	3.34	0.09	0.05	0.28	0.22	1.79
Amount received by the household in the programme	1823.52	0.00	1308.87	0.00	270	4113.84	0.00	2546.62	0.00	310

Source: Author's calculations based on IHDS data.

3.1 Definition of the variable and construction

The IHDS dataset collected information on the monthly consumption expenditure incurred on key food items (meat, eggs and fish; milk and milk products; vegetables, fruits and nuts; and other food items). It also provided information on education and medical expenditure (in-patient and outpatient) on an annual basis; this was later converted into monthly terms for the sake of uniformity in the expenditure variable studied here. The dataset details the 2005 price deflator, which is used to convert the nominal expenditures into real expenditure. Since the dependent variables are aggregated at the household level, a similar household-level measure on the household having a woman IGNOAPS participant has been used. The dataset provides individual-level information on the IGNOAPS beneficiary, transfer amount and their gender. The individual-level information was aggregated at the household level, and a single measure was developed on the transfer amount received by the beneficiary household. There is comprehensive information in the dataset on other household

characteristics, including the number of persons living in the household (household composition), the highest level of education in the household, whether the household is based in a rural or an urban area, and the caste and religion of the head of the household. There are also details on the economic characteristics of the household, such as whether the household holds any unit of agricultural land, any other welfare payments received by the household, and the sector of employment of other household members.

4 Empirical framework

Equation (1) was estimated using a fixed-effects regression method.[5] The fixed-effects regression model was estimated on the matched panel data. The details and the rationale for adopting the matching method are elaborated in the subsequent section.

$$Y_{ht} = \beta_0 + \beta_1 T_{ht} + \beta_2 X_{ht} + \mu_h + \varepsilon_{ht} \qquad (1)$$

In equation (1) Y_{ht} is the monthly, per-capita household consumption expenditure incurred on the following items: pulses; meat, eggs and fish; milk and milk products; vegetables, fruits and nuts; other food items; education and medical needs. The household (h) level information has been used for both periods (t) 2004–05 and 2011–12. The coefficient of interest is β_1 –-the estimated treatment effect (T_{ht}) of the transfer amount received by women in IGNOAPS. The impact of the transfer amount on the outcome variables captures IGNOAPS'S intensive margin effects. The estimated treatment effect is on the pension amount received from the programme, rather than the effect of programme participation, for the following reason. Extensive programme participation effects capture the effect of programme participation effects (binary variable: 1/0), and this intrinsically assumes that programme participation effects are uniform. A household with female programme participants takes the value 1; one without a participant takes the value 0. This does not account for any heterogeneity in the treatment effects. There are inter-state variations in the transfer amount provided, and the extensive margin effects will provide an upper-bound effect of the programme. The estimated intensive margin effect (pension amounts) of the programme accounts for the inter-state variation in the transfer amount received, which rationalises the choice of dependent variable here. The choice in the outcome variable is guided by Shady and Rosero (2008) and Aker et al (2016).

X_{ht} is the vector of household-level characteristics controlled in the specification. This includes household composition (number of persons in the household), household wealth (any agricultural land owned or cultivated), education (highest years of educational attainment by an adult in the household), number of household members working for agricultural wages, place of residence (household based in an urban area),

[5] The choice between a fixed-effects and random-effects model is determined by the results from the Hausman test.

caste (if the household head belongs to a scheduled caste or scheduled tribe), religion (if the household head is a Muslim), and the number of other welfare benefits received by the household. The choice of control variables used here was motivated by the literature of cash transfers, and the country-specific control variables were also selected. μ_h represents time-invariant unobserved characteristics that affect consumption expenditure. Time-invariant unobservable characteristics also include cultural factors that shape tastes and preferences, which in their turn influence choices of food consumption. The advantage of using a fixed-effects regression is that it eliminates the effects of μ_h on the results.

4.1 Selection bias and propensity score matching

The IHDS for the 2004–05 and 2011–12 rounds provides information on the outcome variables and whether a woman is in the IGNOAPS, and the amount of transfer received from the programme. Unlike experimental settings, where the treatment is randomly assigned, in the case of IGNOAPS, households self-select themselves into treatment. It is possible that households in which women participate in the IGNOAPS are systematically different from households where a woman does not participate, thereby resulting in selection bias, which biases the estimated treatment effect. The method of matching is used to eliminate selection bias arising between programme participants and non-participants, and then to estimate the average treatment effects on the treated.

In a propensity score matching (PSM) model, we remove the systematic difference between the treatment and control group by conditioning the probability of receiving treatment on a broad range of 'X' covariates. Rosenbaum and Rubin (1983) have shown that absolute matching is not possible. In the case of high dimensions vector 'X' covariates, it is difficult to pair treatment with the control units. The authors suggested pairing treatment with control units based on the probability score generated on 'X' covariates (p (X)). However, to use PSM, we need to satisfy two assumptions. The first assumption is balancing property, the second assumption is unconfoundedness.

Balancing property

$$T \perp X \mid P(X)$$

This property ensures that the observable characteristics (X) are conditional on the propensity score $\mathrm{P(X)}$, and the covariates (X) included are independent of treatment status (T). For any given propensity score, the treatment and control group should, on average, look identical (World Bank).[6]

Unconfoundedness

$$\mathrm{Y_1, Y_0 \perp T|X}$$

[6] siteresources.worldbank.org/EXTHDOFFICE/.../11_Matching_Technical.pptx.

This assumption states that the outcome variables (Y_1, Y_0) are independent of the treatment status (T). This further means that selection in treatment assignment is dependent only on X covariates included (World Bank).[7]

PSM helps to pair participants in the programme with matched non-participants. Matching is performed here based on observable characteristics that affect both treatment assignment and the outcome variables (Khandker et al, 2010). In a PSM framework, we model the probability of receiving treatment based on observable characteristics. This addresses selection bias in treatment assignment. The covariate that is used here for constructing the propensity score includes the number of women in the household who are 60 years or older, whether they belong to Below Poverty Line (BPL) or Antyodaya (ultra-poor) households, the highest adult education level in the household, whether the household attended a public meeting in rural areas, whether it belongs to either a scheduled caste or scheduled tribe, whether the household includes a widowed woman, and women's access to a newspaper orradio. The choice of variables selected for the propensity score construction was based on the programme characteristics, implementation strategy (Caliendo & Kopeinig, 2008) and previous research on the programme (Unnikrishnan & Imai, 2019).The beneficiary selection criteria were based on the age criterion and whether the household belonged to a BPL or ultra-poor category, which motivated the inclusion of both these covariates in programme selection. The programme implementation strategies adopted by the government suggested using mass media and rural meetings to disseminate information about the programme, so these variables have been included in the propensity score model.[8]The descriptive analysis (Table 1) indicates that a large proportion of women participants in IGNOAPS are widows, which substantiates the inclusion of this variable. The variable on a household head belonging to a scheduled caste or tribe indicates both social and economic marginalisation. In the Indian context, scheduled castes or tribes represent socially marginalised groups.

The result of the probit model is reported in the Appendix section (Appendix 1).The results from the propensity score model constructed show that a household's poverty status (BPL or Antyodaya), the presence of elderly members, belonging to a socially disadvantaged caste and including a widow all increase the probability of women participating in IGNOAPS. Higher educational attainments are positively correlated with better economic outcomes, and this lowers the probability of taking part in IGNOAPS. Women's access to radio and newspaper also reduces the probability of them being in IGNOAPS. Access to mass media is positively correlated with household wealth (Garroway, 2013), which has an adverse effect on being a participant in a poverty-alleviation programme.

[7]siteresources.worldbank.org/EXTHDOFFICE/.../11_Matching_Technical.pptx.
[8] See the National Social Assistance Programme, Government of India, as cited in note 4.

I have used a kernel density matching algorithm to match treatment-receiving households with non-treatment-receiving households. The common support regions for treated and matched control households in both rounds are plotted in Figures 1A and 1B. Households that are outside the common support region were dropped from the analysis. In Figure 2, the probability scores for the treatment and matched control units were plotted to check the overlap assumption. Figures 2A and 2B show that the treatment and control groups have a similar distribution, which indicates that the overlap assumption has been attained.

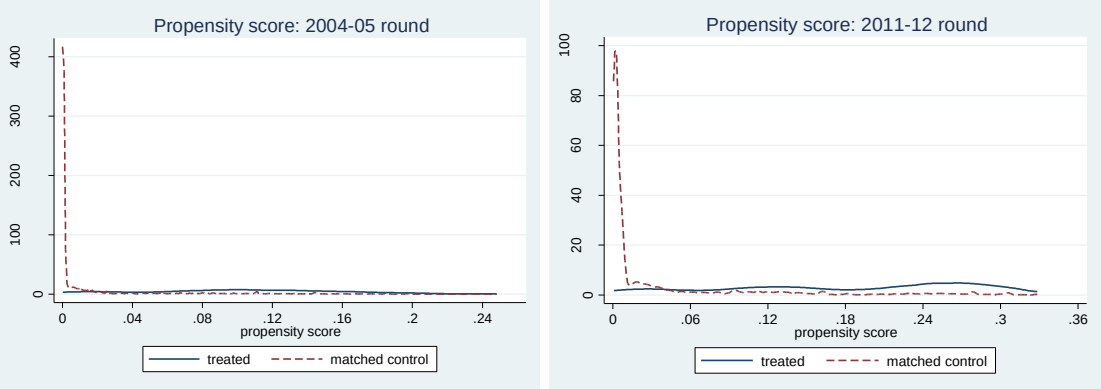
Figure 1: Plot for common support regions for treatment and matched control households

Figure 1A Figure 1B

Source: Author's calculations based on IHDS data.

Figure 2: Propensity score plot for treatment and matched control households

Figure 2A Figure 2B



Source: Author's calculations based on IHDS data.

Households where men take part in the programme and households with two participants, where one of the two is male, were dropped from the analysis to evaluate the impact of the programme when women constitute programme participants. There

are very few observations in the dataset of households with three participants. In all such instances, at least one of the participants was a man. Hence, those households were dropped from the estimation as well.

4.2 Fixed effects in the PSM setting

Post-matching, I have applied a fixed-effects model to estimate the effects of treatment on the outcome variable. The advantage of using a fixed-effects model is that it is useful for eliminating the effects of time-invariant unobservable characteristics like cultural preferences, which shape consumption behaviour. The methodological framework of combining PSM with fixed effects has increasingly been used in many studies (Imai & Azam, 2012; Kim et al,2008).

4.3 Instrumental variable in the PSM-FE Setting

PSM helps to match treatment with control units, but the limitation of this method is that matching is based on observable characteristics. Selection bias in treatment assignment can result both from observable and unobservable characteristics, and PSM takes into account selection bias caused only by observable characteristics. In the case of IGNOAPS, the government has prescribed eligibility criteria for beneficiary selection, and these criteria are visible from our dataset. However, if any unobservable time-varying characteristics affect treatment assignment, ignoring them leads to omitted variable bias. Therefore, an instrument has been used to address concerns over endogeneity.

The instrument that I have used here is the number of female beneficiaries participating in the programme at the village level. IGNOAPS is a decentralised programme and the power to identify new participants is vested with local governments. There are different ways to gauge the effectiveness of a welfare programme. For example, having a large number take part in the programme signifies the strength of the implementing agencies in identifying beneficiaries. There are both demand and supply-side restrictions that affect the effectiveness of a welfare programme. A supply-side limitation arises if budget constraints limit beneficiaries' uptake of the programme. In the case of IGNOAPS, the central government makes a uniform contribution to all the states in the country. The contribution made by central government corresponds to state poverty rates and the number of elderly living in the state.

$$cov(z, x) \neq 0 \text{ (the First stage exist)}$$

$$cov(z, u) = 0 \text{ (Exclusion restriction)}$$

Two conditions need to be satisfied for an instrument to be valid: the first is that the instrument needs to be strongly correlated with the endogenous regressor (the first stage). We can assess the strength of the instrument using the first stage F statistic and Stock Yogo test (discussed below). The second condition is that the instrument has to be random; this cannot be verified by any statistical test. Although it cannot be tested statistically, justifications could be provided to satisfy the second condition. It

could be contended here that the large presence of elderly people and the higher level of poverty in some regions can be correlated with the large intake of the programme. If this holds, then the exclusion restriction is violated. Comparison of the number of state-level programme participants (data are taken from the NSAP website) with the census information on the number of elderly present in each state suggests that it is not necessarily true that states with a large number of elderly residents (Goa, Kerala) also have an equivalent subscription to the programme.[9] Therefore, the assumption of a large inflow of IGNOAPS funds in states with a large elderly population can be overruled.

It is also possible that IGNOAPS fund flows are higher in certain villages because of the high level of poverty experienced in those villages, in which case, the instrument used is correlated with the outcome variables studied. This again violates the exclusion restriction. Estimates from the IHDS data show that IGNOAPS intake is larger in villages where the average monthly consumption expenditure is greater than the sample mean consumption expenditure; this signifies that the exclusion restriction is not violated.

Demand for a self-selected programme is constrained when there are barriers to inclusion in these programmes. Barriers include bureaucratic hurdles to getting the proof of eligibility required for the programme, corruption, or the amount of time involved in waiting for the transfer amount. The instrument on aggregate beneficiaries (women) at the village level signifies the effectiveness of local institutions in identifying participants. The instrument is the female beneficiaries, as they constitute the focal point of this research. A high transactional cost is a common characteristic featured in poverty-alleviation programmes implemented in developing countries (Mkandawire, 2005). The empirical results from the PSM-FE and the PSM-FE with an instrument variable are discussed in the next section.

5 Empirical Results

The estimated PSM-FE regression model results from equation (1) is reported in Tables 2è4. In Table 2, we have enumerated the regression results on the outcome variables on pulses, vegetables, fruits and nuts, and on education. Table 3 has the regression output on meat, eggs and fish, and milk and milk products. Table 4 shows the results for medical treatment and beverage and other food products expenditure. The results in Table 2 show that the transfer payment from IGNOAPS increases average monthly household per-capita consumption expenditure on pulses (0.02%), education (0.05%) and vegetables, fruits and nuts (0.042%), compared to similar households where women do not participate in IGNOAPS. We also find (Table3) that the treatment effect increases average per-capita expenditure on meat, eggs and fish (0.055%), and milk and milk products (0.039%). The transfer payment received also

[9]Information on the beneficiaries was taken from the NSAP website.[http://nsap.nic.in/nationalleveldashboardNew.do?methodName=getCenterData&schemeCategory=C&main=main]. Accessed: Jan-5th ,2020

has a positive effect on medical expenditure (0.03%), and spending on beverages and other food products (0.07%) (Table 4).

Table 2: Regression results from PSM-FE for pulses, education, and vegetable, fruit and nut expenditures

Household expenditure (per capita, log)			
	Pulses	Education	Vegetables, fruitsand nuts
Amount received in IGNOAPS (log)	0.021*** (0.004)	0.054*** (0.01)	0.042*** (0.004)
Number of persons living in the household	-0.099*** (0.003)	0.006 (0.01)	-0.084*** (0.003)
If the household owns any agriculture land	0.068** (0.023)	0.308*** (0.053)	0.098*** (0.024)
Highest years of education of an adult in the household	0.033*** (0.002)		0.063*** (0.002)
Household lives in an urban area	0.577*** (0.069)	1.003*** (0.138)	0.477*** (0.051)
Number of household members working for agricultural wages	-0.030 (0.024)	0.020 (0.053)	-0.174*** (0.025)
Household head belongs to either a scheduled caste or scheduled tribe	0.026 (0.034)	0.037 (0.086)	0.009 (0.036)
Household head is a Muslim	0.427** (0.138)	-0.506 (0.328)	0.144 (0.122)
Number of other welfare benefits that the household receives	0.195*** (0.027)	0.173** (0.055)	0.349*** (0.02)
Number of children in the household		0.231*** (0.015)	
Education level of the household head		0.080*** (0.006)	
Constant	2.798*** (0.038)	0.284*** (0.089)	4.301*** (0.036)
Household fixed effects	Yes	Yes	Yes
Observations	62112	62004	62112

*Notes: Standard errors clustered at household level in parentheses; * p<0.05; ** p<0.01; *** p<0.001.*
Source: Author's calculations based on IHDS data.

Table 4: Regression results from PSM-FE for medical and beverages expenditure

Household expenditure (per capita, log)		
	Medical	Beverages
Amount received in IGNOAPS (log)	0.030** (0.011)	0.068*** (0.007)
Number of persons living in the household	-0.024*** (0.007)	-0.024*** (0.004)
If the household owns any agriculture land	0.193*** (0.058)	0.091* (0.036)
Highest years of education of an adult in the household	0.066*** (0.006)	0.093*** (0.003)
Household lives in an urban area	0.724*** (0.155)	0.932*** (0.064)
Number of household members working for agricultural wages	-0.056 (0.06)	-0.285*** (0.039)
Household head belongs to either a scheduled caste or scheduled tribe	0.076 (0.095)	0.021 (0.044)
Household head is a Muslim	0.679 (0.37)	0.115 (0.179)
Number of other welfare benefits that the household receives	0.305*** (0.064)	0.412*** (0.04)
Constant	1.652*** (0.095)	3.484*** (0.049)
Household fixed effects	Yes	Yes
Observations	62120	62112

*Note: Standard errors clustered at household level in parentheses; * p<0.05, ** Notes: p<0.01, *** p<0.001;*
Source: Author's calculations based on IHDS data.

The results from the PSM-FE estimates suggest that, when women participate in IGNOAPS, this strengthens dietary diversity, as IGNOAPS households consume protein-rich (pulses, meat, eggs and fish), and nutritious (vegetables, fruits and nuts, milk and milk products) food. The positive effect of the programme on education and medical treatment demonstrates the preference to invest in long-term household welfare. Programme participants also spend more on beverages and other food items, including processed foods like biscuits, pickles and sauces. Overall, the results obtained here complement the findings of other studies (Schady & Rosero, 2008; Skoufias et al, 2013; Gertler et al, 2012; Haushofer & Shapiro, 2016).

There are two propositions through which the results can be explained. The first proposition is the income effect generated by cash transfers. An exogenous increase in the household income shifts the budget constraint, and this increases the consumption expenditure of the household. The second proposition is the increase in women's bargaining. Resources transferred to women augment their bargaining power, and this helps them to push through the expenditure decisions of their choice. In the case of

BDH, Schady and Rosero (2008) have established that even a modest transfer can favour expenditure decisions preferred by women.

Bargaining power is a latent variable as it is unobserved, but exogenous income in the hands of women is a strong proxy of their bargaining power (Doss, 2013).In the absence of individual-level consumption expenditure information, the literature on bargaining power has shown that women's bargaining capacity affects household budget allocation on several items, including food, education and adult goods (e.g. tobacco, alcohol and other intoxicants) (Quisumbing & Maluccio, 2003;Doss, 2006). Quisumbing and Maluccio (2003) have shown that a higher bargaining power among women in Bangladesh and South Africa increases the education expenditure share allocation in the household. In the case of Ghana, Doss (2006) has established that households where women have a higher bargaining power reduce expenditure shares on alcohol and tobacco.

If IGNOAPS increases women's bargaining power, then the transfer payment should increase the household budget share on education. Also, if women exercised their choice, then the budget share of spending on alcohol and tobacco should decline. So, additional regression models have been estimated for household budget share allocation on education and expenditure incurred on tobacco, alcohol and other intoxicants as the outcome variables. As expected, the results confirm that the transfer amount has a positive effect on education expenditure. The impact of IGNOAPS is negative on alcohol expenditure(Appendix2). The results show again that women prioritise spending on education over expenses incurred on intoxicants. This also provides evidence that IGNOAPS does enhance women's bargaining power.

A larger household size reduces per capita expenditure on most outcome variables; therefore, the effect of household composition was controlled for in all the estimates (Tables 2–4). The presence of children was also controlled specifically for the outcome variables on milk and milk products, and education (Tables 2 and 3). The results show that an increase in the number of children present in the household has a significant positive effect on education expenditure, while the increase in the number of children reduces the per capita expenditure incurred on milk and milk products.

The control variable of a household owning a unit of land has a significant positive effect on consumption expenditure incurred on pulses, education, vegetables, fruits and nuts, milk and milk products, medical treatment and beverages. Education and living in an urban area has a positive impact on all the consumption expenditure variables studied here. Higher units of educationare positively correlated with earnings, and this has a positive effect on consumption expenditure. The number of household members working for agricultural wages is an indication of the household's economic condition. The agriculture sector in India is characterisedby low wages and high levels of disguised unemployment. The results suggest that additional household members participating in agriculture have a significant negative effect on consumption expenditures incurred on vegetables, fruits and nuts, meat, eggs and fish, milk and milk products, and beverages. The explanatory variable on households belonging to a

scheduled caste or scheduled tribe has a significant positive effect on the consumption expenditure incurred on meat, eggs and fish. The control variable on the number of other welfare benefits received by a household also has a positive effect on all the outcome variables. Other welfare benefits include widows' pension programmes, disability benefits, maternity benefits, NGO benefits, Annapurna and other income benefits. The positive association between a household's access to other welfare benefits and consumption expenditure signifies the income effect generated from other sources of non-labour income.

The results remain consistent even after dropping observations that are clustered at low propensity score values (Appendices3, 4 and 5).[10]Althoughthe fixed effects model wipes away the effects of time-invariant omitted variable bias, it is possible that the estimated treatment effect (β_1)still suffers from time-varying omitted variable bias and measurement error. The main explanatory variable on the transfer payment received was self-reported and, if households under-reported the transfer amount received, this could have admitted a measurement error. Therefore, an instrumental variable was used to further examine the robustness of the findings.

5.1 Instrumental variable estimates with PSM and fixed effects

The IV estimates consist of two stages. In the first stage, the effects of the instrument 'Z' (the number of female beneficiaries in the programme) on the endogenous regressor (IGNOAPS amount received by women in the household) was estimated (2). In the second stage (3), I estimated the effect of the $\mathrm{IGNOAPS\ amount\ received\ by\ women_{ht}}$ that was instrumented with 'Z' in the first stage (2) on the outcome variables.

The First Stage:

$$IGNOAPS\ amount_{ht} = \pi_0 + Z_{ht}\pi_1 + X_{ht}\pi_2 + \sigma_h + \varepsilon_{ht} \quad (2)$$

The Second Stage:

$$\mathbf{Y_{ht}} = \boldsymbol{\varpi_0} + \boldsymbol{\varpi_1}\mathbf{IGNOAPS\ \widehat{amount}_{ht}} + \boldsymbol{\varpi_2}\mathbf{X_{ht}}\boldsymbol{\beta'_2} + \boldsymbol{\theta_h} + \mathbf{u_{ht}} \qquad (\mathbf{3})$$

[10]Households whose pscore values are below the mean pscore value were removed from the estimation to check the robustness of the estimate.

The strength of the instrument is determined by the computed first-stage F statistic. The statistical significance of the instrument at different levels (1%, 5% or 10%) indicates the instrumentis a strong predictor of the endogenous regressor. However, Hall et al, 1996) have shown that the statistical significance of the instrument is not sufficient. Therefore, Stock and Yogo (2002) proposed a new test. The null hypothesis in the Stock and Yogo test is that the proposed instruments are weak. Stock and Yogo have offered a set of critical values, which indicate the maximum level of bias (10%, 15%, 20% and 30%) that we are willing to tolerate in the estimated IV coefficients. If the computed F statistic is higher than the critical values in the Stock Yogo table, then we reject the null hypothesis on the instrument being weak. The results from the IV regressions (Tables 5, 6and 7) suggest a statistically significant first-stage F statistic, and the F statistic is greater than the critical values given in the Stock Yogo table. Therefore, the null hypothesis on the weak instrument is rejected.

Table 5: Results from instrumental variable regression estimates for pulses, education, and vegetables, fruits, and nuts expenditure

Household expenditure (per capita, log)			
	Pulses	Education	Vegetables, fruits and nuts
Amount received in IGNOAPS (log) instrumented with (number of women beneficiaries inthe programme at the village level)	1.358*** (0.062)	3.866*** (0.297)	2.418*** (0.104)
Number of persons living in the household	-0.102*** (0.009)		-0.087*** (0.012)
If the household owns any agricultural land	-0.036 (0.03)	-0.027 (0.101)	-0.087 (0.057)
Highest years of education ofan adult in the household	0.016* (0.007)		0.033** (0.012)
Household lives in an urban area	0.224 (0.272)	0.001 (0.425)	-0.151 (0.27)
Number of household members working for agricultural wages	-0.122* (0.05)	-0.204 (0.106)	-0.337*** (0.074)
Household head belongs to either a scheduled caste or scheduled tribe	0.013 (0.076)	-0.011 (0.264)	-0.014 (0.129)
Household head is a Muslim	0.543 (0.427)	-0.186 (0.704)	0.351 (0.465)
Number of other welfare benefits that the household receives	0.678*** (0.05)	1.492*** (0.220)	1.207*** (0.104)
Number of children in the household		0.306*** (0.030)	
Education level of the household head		0.091*** (0.017)	
First stage F-statistic	94.53	91.39	94.53
Household fixed effects	Yes	Yes	Yes
Observations	59386	59180	59386
Stock Yogo statistic 10% maximal IV size: 16.38 15% maximal IV size: 8.96 20% maximal IV size: 6.66 25% maximal IV size:5.53			

*Notes: * p<0.05; ** p<0.01; *** p<0.001; Standard errors clustered at the village level in parentheses.*

Source: Author's calculations based on IHDS data.

Table 6: Results from instrumental variable regression estimates for meat, eggs and fish, and milk and milk products expenditure

Household expenditure (per capita, log)		
	Meat, eggs and fish	Milk and milk products
Amount received in IGNOAPS (log) instrumented with (number of women beneficiaries inthe programme at the village level)	2.137*** (0.115)	2.061*** (0.11)
Number of persons living in the household	-0.087*** (0.013)	-0.106*** (0.015)
If the household owns any agricultural land	-0.161*** (0.047)	0.106 (0.065)
Highest years of education of an adult in the household	0.029** (0.01)	0.051*** (0.012)
Household lives in an urban area	-0.109 (0.211)	0.093 (0.365)
Number of household members working for agricultural wages	-0.361*** (0.08)	-0.438*** (0.081)
Household head belongs to either a scheduled caste or scheduled tribe	0.262* (0.119)	-0.006 (0.148)
Household head is a Muslim	0.293 (0.612)	0.344 (0.527)
Number of other welfare benefits that the household receives	1.031*** (0.065)	0.970*** (0.079)
Number of children in the household		0.026 (0.016)
Number of adults in the household		
First stage F-statistic	94.56	94.98
Household fixed effects	Yes	Yes
Observations	59402	59402
Stock Yogo statistic 10% maximal IV size: 16.38; 15% maximal IV size: 8.96 20% maximal IV size: 6.66; 25% maximal IV size:5.53		

*Notes: * p<0.05; ** p<0.01; *** p<0.001; Standard errors clustered at the village level in parentheses.*
Source: Author's calculations based on IHDS data.

Table 7: Results from instrumental variable regression estimates for medical and beverages expenditure

Household expenditure (per capita, log)		
	Medical	Beverages
Amount received in IGNOAPS (log) instrumented with (number of women beneficiaries inthe programme at the village level)	2.657*** (0.198)	3.743*** (0.214)
Number of persons living in the household	-0.028 (0.015)	-0.03 (0.02)
If the household owns any agricultural land	-0.012 (0.083)	-0.195* (0.092)
Highest years of education by an adult in the household	0.033* (0.016)	0.047** (0.018)
Household lives in an urban area	0.03 (0.388)	-0.039 (0.423)
Number of household members working for agricultural wages	-0.236** (0.086)	-0.538*** (0.101)
Household head belongs to either a scheduled caste or scheduled tribe	0.051 (0.197)	-0.014 (0.22)
Household head is a Muslim	0.907 (0.589)	0.435 (0.776)
Number of other welfare benefits that the household receives	1.253*** (0.106)	1.739*** (0.155)
First stage F-statistic	94.56	94.53
Household fixed effects	Yes	Yes
Observations	59402	59386
Stock Yogo statistic	10% maximal IV size: 16.38 15% maximal IV size: 8.96 20% maximal IV size: 6.66 25% maximal IV size:5.53	

*Notes: * p<0.05; ** p<0.01; *** p<0.001; Standard errors clustered at the village level in parentheses.*
Source: Author's calculations based on IHDS data.

In Table 5, the results from the Two-Stage Least Square (2SLS) estimates on the consumption expenditure incurred on pulses, education, and vegetables, fruits and nuts are enumerated. Table 6 has results on meat, eggs and fish, and milk and milk products. Table 7 contains estimates of medical andbeverages expenditures. After instrumenting the amount received by women in IGNOAPS with the aggregate female beneficiaries receiving the programme at the village level, the IV estimates suggest the following. On average, consumption of pulses increases by 1.36%, education expenditure by 3.86% and consumption of vegetables, fruits and nuts by 2.42%. The 2SLS estimates of the amount received by women in IGNOAPS indicate that meat consumption increases by 2.14% and milk expenditure increases by 2.06%.We also

found that medical expenditure increased by 2.65% and beverage expenditure by 3.74%.

The results from the IV estimates reinstate the findings from the PSM-FE regression estimates (Tables 3, 4 and 5). IGNOAPS strengthens household food security and has a positive effect on education and medical expenditures. However, the estimates from the IV regression need to be interpreted cautiously. The IV coefficients and the standard errors are more substantial than the OLS estimates, but they are preferred over OLS estimates as the latter are inconsistent in the presence of endogeneity. The standard errors in the IV estimates are clustered at the village level, and the subsequent higher level of clustering in standard errors at the village level in the 2SLS estimates results in larger standard errors compared to the OLS estimates.

Two products (X and Y) are substitutes if an increase in the price of a product (X) increases the consumption of the other product (Y). For example if, with an increase in the price of meat, eggs and fish, households start substituting more pulses, then the household food budget share for pulses increases. To empirically test the price effects, we have estimated the effect of IGNOAPS on a household's food budget share spent on various food items. The presence of a price effect would imply that, with an increase in price, the household food budget share allocated to certain items would fall. The results are reported in Appendix 7 and Appendix 8. The findings suggest that the share of the household budget allocated to all the outcome variables continues to be positive. The magnitude of the impact of IGNOAPS is large on household food budget share compared to the impact on household per-capita. The transfer amount received from IGNOAPS increases the average household food budget share for pulses (3%), vegetables, fruits and nuts (82%), meat, eggs and fish (12%) and milk and milk products (13%). The most substantial effect is on the average share of the household budget spent on beverages, as this increases by 95%.

Conclusion

In this paper, I have estimated the causal effect of an unconditional cash transfer programme (IGNOAPS) received by women on various outcome variables. The outcome variables studied here symbolise household food security, health, and education expenditure. IGNOAPS is not randomly assigned, and there could be a systematic difference between households where a woman participates in the programme (treatment) and the non-treatment receiving households. Therefore, PSM has been used to remove any systematic observable differences between the two groups. A fixed-effects regression model has been used to eliminate the effect of time-invariant unobservable characteristics, such as cultural factors that shape tastes and preferences. PSM is useful in removing any systematic observable differences between the treatment and the control group. It is possible that treatment assignment is affected by other time-varying unobservable characteristics, resulting in an omitted variable bias. An instrument variable approach has been used to address the problem of endogeneity in the main treatment assignment variable. The overall results obtained in this study – from both OLS effects and the 2SLS estimates – indicate that women's

access to IGNOAPS does strengthen household food security, health and education expenditure.

There are two plausible mechanisms for explaining the results here. The first mechanism is the income effect. With the arrival of non-labour income, households are encouraged to consume more. The second mechanism is that placing economic resources in the hands of women increases their bargaining power in households. The bargaining power of the elderly woman is a latent variable, and it is unobservable in the dataset. However, income, assets and institutional law are used as proxies for bargaining power. In this case, social pensions for women can be considered a proxy for bargaining power.

If the social pension programme augments women's bargaining power, then this will be reflected in the expenditure choices made. Women tend to allocate a more substantial budget share to goods that are jointly consumed by a household. We have found that female programme participants increase the budget allocation on education and reduce expenditure on adult (alcohol and tobacco) goods. These two results substantiate the argument that IGNOAPS augments bargaining power. This finding has a key policy implication. It has already been established in the literature (Calvi, 2016) that declining bargaining power among women of post-reproductive age in India results in old age poverty among women and thus further increases their mortality risk. A social policy that increases older women's bargaining power has the potential to reduce poverty and vulnerability among elderly women. This paper provides evidence that a social assistance programme (IGNOAPS), when received by older women, enhances their bargaining power and also increases their consumption expenditure on key household items. There is a strong link between women, poverty and poverty-alleviation programmes. Economic vulnerability is a serious concern for elderly women in India. The empirical results seen here provide evidence that financial resources, when transferred to women, do reduce elderly women's household food poverty and strengthen expenditure on schooling and health. This will undoubtedly help them to cope with some aspects of economic vulnerability.

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Appendix 1: Propensity score model constructed

Treatment assignment: If the household has a women receiving IGNOAPS		
Covariates (binary: 0/1; continuous)	2004–05 (probability values)	2011–12 (probability values)
Household has a BPL card (0/1)	0.158*** (3.55)	0.397*** (12.59)
Household has an Antyodaya card (0/1)	0.111*** (3.31)	0.398*** (6.96)
Presence of the elderly: the number of women in the household who are 60 years and older (continuous)	1.110*** (18.92)	1.104*** (29.59)
Household has a female widow (0/1)	0.898*** (17.31)	0.811*** (24.64)
Household lives in a rural area and attends a public meeting (0/1)	0.0426 (0.89)	0.0636 (1.92)
Highest year of education of adult in the household (continuous)	-0.0182*** (-3.80)	-0.0155*** (-4.79)
Household belongs to either a scheduled caste or scheduled tribe (0/1)	0.166*** (3.66)	0.0792* (2.49)
Women in the household have access to a newspaper (0/1)	-0.0933* (-2.32)	-0.0396 (-1.53)
Women in the household have access to radio(0/1)	-0.0721* (-2.13)	-0.0287 (-0.92)
Constant	-3.229*** (-45.32)	-2.831*** (-46.41)
Number of observations	40,153	41,115
Pseudo-R- square	0.31	0.30

Notes: t statistics in parentheses; * p<0.05, ** p<0.01, *** p<0.001.
Source: Author's calculations based on IHDS data.

Appendix 2: Household budget share spent on education and adult expenditure

	Budget share allocated to education	Budget share allocated to alcohol, tobacco and other intoxicants
Amount received in IGNOAPS (log)	0.001*** (0.000)	-0.0004*** (0.000)
Number of persons living in the household	0.0002 (0.000)	
If the household owns any agricultural land	0.002 (0.001)	0.0003 (0.001)
Highest years of education of an adult in the household	0.0002 (0.000)	-0.0004*** (0.000)
Household lives in an urban area	0.015*** (0.004)	-0.001 (0.002)
Number of household members working for agricultural wages	0.0003 (0.001)	-0.001 (0.001)
Household head belongs to either a scheduled caste or a scheduled tribe	0.0008 (0.002)	0.001 (0.001)
Household head is a Muslim	-0.010 (0.007)	-0.001 (0.002)
Number of other welfare benefits that the household receives	0.0003 (0.001)	-0.001 (0.001)
Number of adults in the household		0.001*** (0.000)
Household fixed effects	Yes	Yes
Observations	62114	62114

*Note: Standard errors clustered at household level in parentheses; * p<0.05, ** p<0.01, *** p<0.001*

Source: Author's calculation based on IHDS data

Appendix 3: Fixed-effects regression results after dropping PS (values are below mean for pulses, schooling, and vegetable fruit and nut expenditure)

Household expenditure (per capita, log)			
	Pulses	Schooling	Vegetables fruits and nuts
Amount received in IGNOAPS (log)	0.021** (0.007)	0.068*** (0.015)	0.050*** (0.006)
Number of persons living in the household	-0.088*** (0.011)	0.253*** (0.031)	-0.043*** (0.012)
If the household owns any agricultural land	-0.025 (0.092)	0.299 (0.171)	0.106 (0.083)
Highest years of education of an adult in the household	0.026** (0.008)	-0.058*** (0.017)	0.051*** (0.007)
Household lives in an urban area	1.009*** (0.249)	0.873 (0.455)	0.428* (0.218)
Number of household members working for agricultural wages	-0.052 (0.083)	-0.037 (0.158)	-0.069 (0.078)
Household head belongs to either a scheduled caste or scheduled tribe	0.081 (0.116)	-0.129 (0.267)	-0.017 (0.109)
Household head is a Muslim	0.541* (0.243)	-0.837 (0.927)	-0.044 (0.281)
Number of other welfare benefits that the household receives	0.304*** (0.064)	0.526*** (0.12)	0.397*** (0.058)
Household fixed effects	Yes	Yes	Yes
Constant	2.617*** (0.118)	-0.091 (0.27)	4.121*** (0.119)
Observations	5897	5897	5897

*Notes: Standard errors clustered at household level in parentheses; * p<0.05, ** p<0.01, *** p<0.001.*
Source: Author's calculations based on IHDS data.

Appendix 4: Fixed-effects regression results after dropping PS (values are below mean for meat, eggs and fish, and milk and milk products expenditure)

Household expenditure (per capita, log)		
	Meat, eggs and fish	Milk and milk products
Amount received in IGNOAPS (log)	0.057*** (0.011)	0.034** (0.012)
Number of persons living in the household	-0.056** (0.019)	-0.059** (0.019)
If the household owns any agricultural land	-0.05 (0.14)	0.329* (0.149)
Highest years of education of an adult in the household	0.048*** (0.014)	0.088*** (0.015)
Household lives in an urban area	0.442 (0.301)	0.807** (0.293)
Number of household members working for agricultural wages	-0.114 (0.136)	-0.330* (0.152)
Household head belongs to either a scheduled caste or scheduled tribe	-0.034 (0.211)	-0.165 (0.21)
Household head is a Muslim	-0.047 (0.93)	-0.962 (0.702)
Number of other welfare benefits that the household receives	0.338** (0.104)	0.456*** (0.109)
Household fixed effects	Yes	Yes
Constant	1.231*** (0.213)	2.305*** (0.209)
Observations	5898	5898

*Notes: Standard errors clustered at household level in parentheses; * p<0.05, ** p<0.01, *** p<0.001.*

Source: Author's calculations based on IHDS data.

Appendix 5: Fixed-effects regression results after dropping PS (values are below mean for medical and beverages expenditure)

Household expenditure (per capita, log)		
	Medical	Beverages
Amount received in IGNOAPS (log)	0.018 (0.018)	0.076*** (0.011)
Number of persons living in the household	-0.026 (0.027)	0.040** (0.015)
If the household owns any agricultural land	-0.115 (0.213)	0.088 (0.138)
Highest years of education of an adult in the household	0.053** (0.02)	0.109*** (0.0120
Household lives in an urban area	0.739 (0.487)	1.003*** (0.214)
Number of household members working for agricultural wages	0.008 (0.198)	-0.216 (0.133)
Household head belongs to either a scheduled caste or scheduled tribe	-0.105 (0.336)	-0.047 (0.144)
Household head is a Muslim	0.425 (0.819)	0.066 (0.244)
Number of other welfare benefits that the household receives	0.236 (0.15)	0.517*** (0.099)
Household fixed effects	Yes	Yes
Constant	2.031*** (0.298)	2.834*** (0.168)
Observations	5898	5897

*Notes: Standard errors clustered at the household level in parentheses; * p<0.05, ** p<0.01, *** p<0.001.*
Source: Author's calculations based on IHDS data.

Appendix 6: Budget share spent on food items

	Food budget share allocated to pulses	Food budget share allocated to vegetables, fruits and nuts	Food budget share allocated to meat, eggs and fish
Amount received in IGNOAPS (log)	3.050*** (1.01)	82.061*** (12.70)	12.326*** (1.73)
Number of persons living in the household	15.694*** (1.24)	255.835*** (14.58)	6.665*** (1.68)
If the household owns any agricultural land	28.117*** (6.90)	212.799** (90.85)	47.297*** (12.11)
Highest years of education ofan adult in the household	8.001*** (0.58)	135.347*** (7.91)	19.588*** (1.05)
Household lives in an urban area	131.592*** (15.73)	1,499.912*** (300.10)	274.718*** (37.64)
Number of household members working for agricultural wages	-26.264*** (4.73)	-286.191*** (43.05)	-65.222*** (8.58)
Household head belongs to either a scheduled caste or scheduled tribe	-0.988 (8.24)	17.187 (110.13)	-3.000 (15.53)
Household head is a Muslim	36.558* (21.97)	365.011 (351.80)	95.608 (78.99)
Number of other welfare benefits that the household receives	26.837*** (5.38)	690.668*** (60.38)	82.106*** (11.40)
Household fixed effects	Yes	Yes	Yes
Observations	62,091	62,099	62,099

*Notes: Standard errors clustered at the household level in parentheses; * p<0.05, ** p<0.01, *** p<0.001.*

Source: Author's calculations based on IHDS data.

Appendix 7: Budget share spent on milk and beverages

	Food budget share allocated to milk and milk products	Food budget share allocated to beverages
Amount received in IGNOAPS (log)	12.926** (5.99)	95.759*** (10.20)
Number of persons living in the household	45.692*** (3.91)	354.474*** (16.65)
If the household owns any agricultural land	160.657*** (21.74)	142.102* (80.66)
Highest years of education of an adult in the household	34.802*** (2.47)	142.501*** (6.96)
Household lives in an urban area	459.547*** (77.36)	2,114.652*** (213.40)
Number of household members working for agricultural wages	-83.668*** (13.88)	-122.335*** (42.15)
Household head belongs to either a scheduled caste or scheduled tribe	-7.505 (33.42)	48.834 (88.67)
Household head is a Muslim	89.175 (109.19)	199.500 (338.47)
Number of other welfare benefits that the household receives	152.528*** (23.86)	766.118*** (62.48)
Household fixed effects	Yes	Yes
Observations	62,099	62,099

*Notes: Standard errors clustered at the household level in parentheses; * p<0.05, ** p<0.01, *** p<0.001.*
Source: Author's calculation based on IHDS data.