Relative Deprivation and the Engel Curve*

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Abstract

We incorporate Yitzhaki's (1979) relative deprivation into a demand system in order to study stylised facts about spending diversity by estimating Engel curves. The predictions are confirmed using 20 year panel data from the Kerala Migration Surveys.

JEL Codes

A14, D01, D12, D31, I31, Z10

1 Introduction

Studying behavioural heterogeneity in spending, i.e. variation in observed household spending driven by tastes and unobservables ceteris paribus,[1] is germane to a range of considerations in economic development, not least the interactions within social groups. A growing literature argues that such heterogeneity is linked to spending diversity amid rising incomes, and that studying stylised facts about the latter may improve our understanding of the former. Quintessential to this is upward consumption driven by relative deprivation felt within one's reference groups (Charles et al., 2009; Khamis et al., 2012, Chen et al., 2005; Roy Chaudhuri et al., 2011; Riquelme et al., 2011). In this letter, we account for the effects of taste-based heterogeneity driven by relative deprivation on the spending patterns of households in Kerala, estimating Engel Curves to include the

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[1] demographic characteristics, prices

hitherto omitted variable (Calvet and Comon, 2003; Chen et al., 2005; Roy Chaudhuri et al., 2011; Riquelme et al., 2011; Chai et al., 2015).

Relative deprivation theory postulates negative externalities to oneself from economic gains to others in the socioeconomic groups of reference (Ravallion and Lokshin, 2005). Social comparisons, facilitated by conspicuous consumption, underpin these externalities. Spending patterns of this nature are rife among households in Kerala, partly because of its history of temporary labour emigration to the Gulf Cooperation Council (GCC) Countries since the 1970s (Sooryamoorthy, 1997; Nair, 1986; Zachariah et al., 2003; Zachariah and Rajan, 2016). Exposure to global standards in cosmopolitan states invokes inherent materialistic tendencies among aspirational individuals to alter their status and form new identities, by democratising the availability of economic resources for emerging middle-income groups (Appadurai, 1988; Osella and Osella, 2000). A study of 640 emigrants from 6 districts in Kerala confirmed previous findings by Batra et al. (2000) and demonstrated a link between exposure to global standards and conspicuous consumption (Paulose and Varghese, 2016). It is horse sense to see why for our context, if not similar social milieus around the developing world which experience high degrees of wealth inequality within social groups, relative deprivation becomes an important measure of household welfare (A. P and Vakulabharanam, 2016). Consistent with Runciman's (1966) argument that relative deprivation derives from the desire for something attainable, Yitzhaki (1979) provides a model that is nested in the economic inequality literature, allowing such deprivation to be realised using comparisons to wealthier individuals or units and defined by summation of the income gaps with those above in the appropriate reference group.

From this starting point, we first develop a theoretical model that generates predictions for household budget shares declined into food and non-food, conditional on relative deprivation. We test these predictions using panel data from the Kerala Migration Surveys (KMS), purging potential time-invariant sources of household level endogeneity. We employ multiple measures of the Yitzhaki index of relative deprivation in our analysis, based on combinations of geographic[2] and identity-based[3] reference groups (Yitzhaki, 1979). Estimating Engel Curves to represent budget shares of food outlays, we find evidence of a negative relationship between log total expenditures per adult equivalent and food share (Engel's Law) until a threshold of relative deprivation. These thresholds vary by reference group and expenditure class. [4]

We focus on two important contributions. First, we show theoretical and empirical support for the inclusion of relative deprivation to shed further light on unobserved behavioural heterogeneity in household spending patterns. Since Engel Curve estimations themselves may suffer from taste-based heterogeneity, this approach advances two literatures simultaneously (De Vreyer et al., 2020). Second, we use a relatively un(der)used panel dataset that contains information on caste, which is arguably the salient social reference group in the Indian context (Munshi, 2019). While previous studies on rela-

[2] *taluk*

[3] *caste*

[4] The taluk is a relatively small administrative unit below the district level, but above that of a community

tive deprivation focused on reference groups such as religion, political entity, or income quantiles, we learn from previous evidence in the mutual insurance literature to argue that examining relativist comparisons due to another's possessions requires a more granular social unit (Mazzocco and Saini, 2012). While the historical pre-eminence of *Jati* in India's contemporary social milieu, defining the operative social code that is determined at birth cannot be overlooked, caste also influences the direction of political winds since they represent electoral vote-banks (Deshpande, 2001).

2 Theoretical motivation

Consider a modified Stone-Geary utility function in which there are two consumption goods, food (F) and non-food (N):

$$U = \beta_F \log\left(q_F - \gamma_F - r\rho_F\right) + \beta_N \log\left(q_N - \gamma_N - r\rho_N\right). \tag{1}$$

In contrast to the usual linear expenditure system specification, equation (1) allows the autonomous level of consumption to be a function of relative deprivation r, where its weight in utility is parameterized by ρ_F and ρ_N. If relative deprivation plays no role in utility, which corresponds to $\rho_F = \rho_N = 0$, the specification simplifies to the usual Stone-Geary functional form. The consumer maximizes (1) subject to the budget constraint $x = q_F + p_N q_N$ where the price of food is normalized to one. It is straightforward to show that the food share equation is then given by:

$$s^F = \frac{\beta_F[x - p_N\left(\gamma_N + r\rho_N\right)] + \beta_N\left(\gamma_F + r\rho_F\right)}{x\left(\beta_F + \beta_N\right)}. \tag{2}$$

The following comparative statics results are then immediate:

$$\frac{ds^F}{dx} = \frac{\beta_F p_N\left(\gamma_N + r\rho_N\right) - \beta_N\left(\gamma_F + r\rho_F\right)}{x^2\left(\beta_F + \beta_N\right)}, \tag{3}$$

$$\frac{ds^F}{dr} = \frac{\rho_F\beta_N - \beta_F p_N \rho_N}{x(\beta_F + \beta_N)}, \frac{d^2 s^F}{drdx} = -\frac{\rho_F\beta_N - \beta_F p_N\rho_N}{x^2\left(\beta_F + \beta_N\right)} = -\frac{ds^F}{dr}x^{-1}. \tag{4}$$

3 Data and Estimation

Our empirical results use data from the Kerala Migration Surveys (henceforth, KMS) on 13,194 households observed in 2011 and 2016. To model relative deprivation, we use household consumption expenditures rather than income. While the latter is more prone to measurement error, the former is more robust, calculated through summations of more than 20 items, divided into food and non-food outlays at the monthly level.

Consider a log-linear approximation to (2):

$$s^F_{it} = \ln x_{it}\alpha_x + r_{it}\alpha_r + (\ln x_{it} \times r_{it})\alpha_{xr} + \lambda_i + \epsilon_{it}, \tag{5}$$

where differences in prices faced by the households are absorbed by the household-specific effects λ_i. The two expressions in (4) imply that α_x and α_{xr} are of opposite sign: $\text{sign}[\alpha_r] = \text{sign}[-\alpha_{xr}]$. Concomitantly, under the assumptions that $\alpha_r < 0$ and $\alpha_{xr} > 0$, $\frac{ds^F}{dx} < 0$ for low values of r and $\frac{ds^F}{dx} > 0$ for high values of r, so we expect $\alpha_x < 0$, with the threshold value of r above which the marginal effect of x becomes positive being equal to $\widetilde{r} = \frac{\beta_F \gamma_N p_N - \gamma_F \beta_N}{\rho_F \beta_N - \beta_F p_N \rho_N}$.

4 Results

Histograms for the key variables are given in Figure 1. Table 1 presents estimates of (5). The first column is based on the pooling estimator (where we pool the 2011 and 2016 waves of the KMS), while the last three columns correspond to the within-household estimator in which we purge household-specific, time-invariant unobservables. Inspection of the first and second columns, in which the relative deprivation variable is measured at the caste/religion level, reveals that there are only minor differences between the pooling and within-household results: as such, we focus on the latter in what follows. In all specifications, standard errors are clustered at the *taluk* level.

The first set of within-household results computes relative deprivation r_{it} for each year within each of the 20 religions/castes present in the KMS survey. The formula used is that given in Yitzhaki (1979). As predicted by our simple model, the marginal effect of total expenditures per adult equivalent on the food share is negative until relative deprivation becomes quite high, with the threshold value being equal to 2.6: relative deprivation for 97 percent of households in the sample lies below this level. The upshot is that higher relative deprivation mitigates the usual negative relationship between the foodshare and total expenditures per capita as shown in Figure 2.

Even this conditional relationship varies by expenditures class, as revealed by the non-parametric tensor smooth of Figure 3. As should be apparent, the threshold level of relative deprivation above which the relationship between log total expenditures per adult equivalent and the food share changes sign is significantly lower for lower levels of expenditures, thereby confirming the stylised fact of Engel's Law.

As is also predicted by our theoretical model, the marginal effect of relative deprivation (which is negative) is of the opposite sign of that of the interaction between relative deprivation and expenditures. Finally, notice in the last two columns where we switch either to a measure of relative deprivation based on the taluk, or to an even finer-grained definition which combines the taluk and caste/religion dimensions simultaneously, that the predictions of our theoretical model are still not rejected by the data.

5 Conclusion

This letter argues the relevance of includes a hitherto omitted variable, that of relative deprivation, in the discussion on subsistence consumption. Estimating Engel Curves that condition on relative deprivation in which Engel's Law holds illustrate the relevance of

our approach in further explicating behavioural heterogeneity in consumption. That the empirics are confirmed by panel data from a migrant-sending society such as Kerala hints at the external validity of extending such analyses for other similar contexts.

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Table 1: Engel curves for Kerala. 13,194 households, 2 years (2011 and 2016), 65 taluks. Standard errors clustered at the taluk level in parentheses. The first column corresponds to pooling results in which relative deprivation is measured at the caste-religion level. The last three columns control for time-invariant household-specific heterogeneity; relative deprivation is measured successively at the caste-religion, taluk and caste-religion/taluk level. Threshold relative deprivation is the level of relative deprivation at which the marginal effect of expenditures per adult equivalent becomes positive.

	Dependent variable = Food expenditure share			
	(1)	(2)	(3)	(4)
		Household FE		
Level of measurement of RD	Caste	Caste	Taluk	Caste/taluk
Log total expenditures per AE	-0.205^{***}	-0.187^{***}	-0.177^{***}	-0.165^{***}
	(0.007)	(0.017)	(0.020)	(0.017)
Relative deprivation	-0.538^{***}	-0.544^{***}	-0.313^{***}	-0.259^{***}
	(0.066)	(0.093)	(0.073)	(0.069)
Log tot. exp. per AE × RD	0.068^{***}	0.070^{***}	0.035^{***}	0.029^{***}
	(0.009)	(0.013)	(0.010)	(0.009)
Threshold relative deprivation	3.028	2.661	5.071	5.665
Percent. of obs. below threshold	0.993	0.975	0.999	0.999
Adjusted R^2	0.263	0.313	0.311	0.306
Note:				*p<0.1; **p<0.05; ***p<0.01

Figure 1: Histograms for the food share, log total expenditures per adult equivalent (AE) and relative deprivation calculated for three different comparison groups.

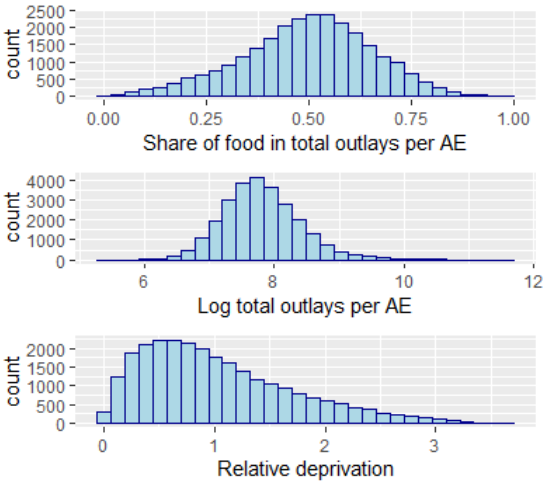

Figure 2: Marginal effect on the food share of log total consumption expenditures per adult equivalent, as a function of relative deprivation (at the religion/caste/taluk level). 95% confidence interval based on standard errors clustered at the taluk level. Underlying parameter estimates are from column (4) of Table 1.

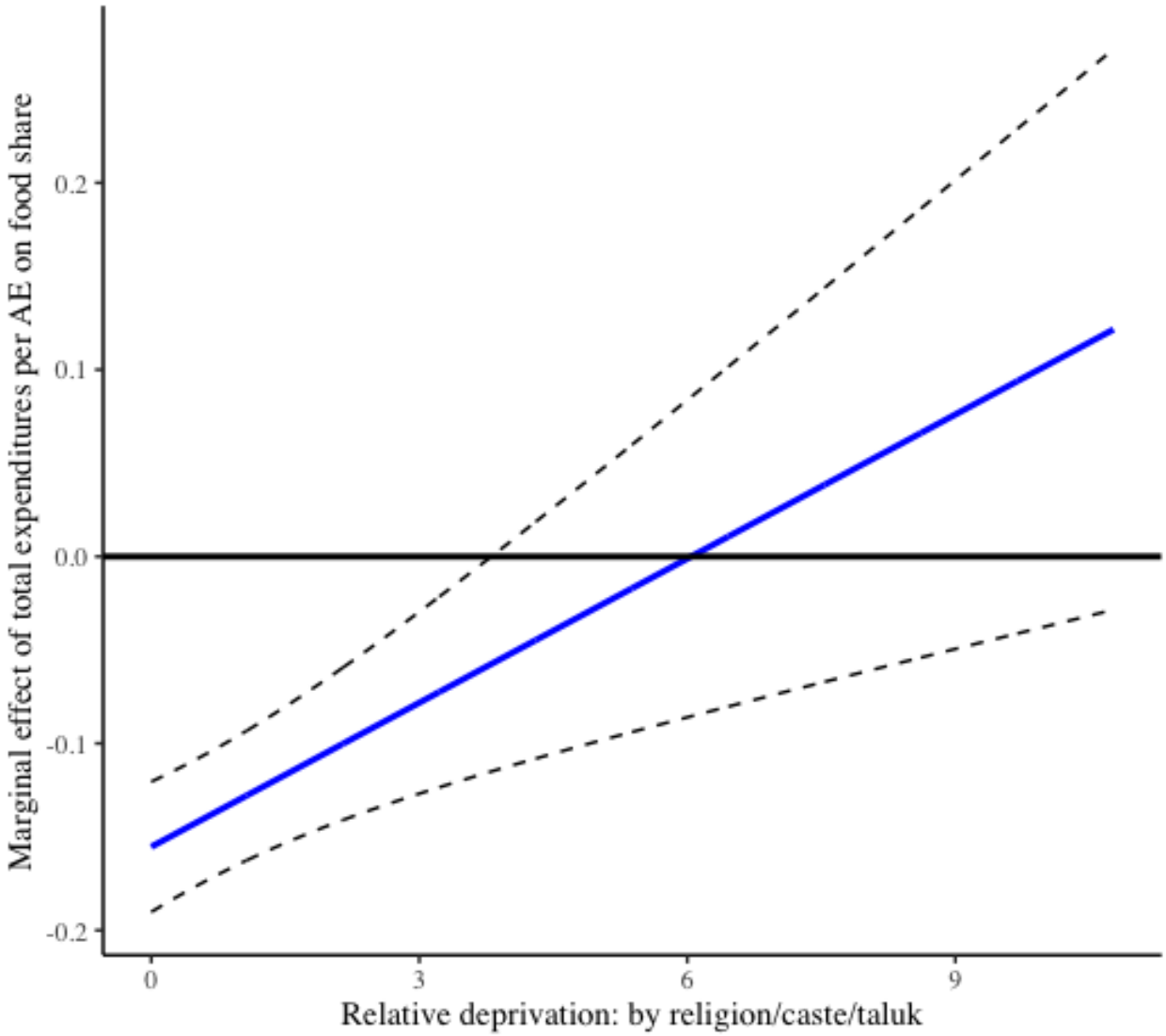

Figure 3: Non-parametric bivariate smooth of the food share as a function of log total consumption expenditures per adult equivalent and relative deprivation (measured at the caste/religion level).