Term Paper Project Proposal - 613

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Title Page and Abstract

Temporary Title: Discrete Choice and Nutrition in Bangladesh

(Tentative) Research Question: What is the relationship between social safety net utilization and household nutrition in Bangladesh?

Brief Abstract
Bangladesh has seen tremendous growth in GDP per capita and is slated to officially become a "developing" country by the United Nations in 2026. Although its poverty rate is diminishing, a large portion of the Bangladeshi population still lives in poverty and, as such, make use of the various social safety nets provided (primarily in the form of food or money) by the government or local NGOs. A natural byproduct of poverty is low nutrition levels and the purpose of this research project is to investigate the relationship between social safety net utilization and household nutrition. Data from the Bangladesh Integrated Household Survey will be used in this study to investigate the relationship between household nutrition (in the form of the Body Mass Index) and safety net utilization. As the data comes from a random selection of households across different regions in Bangladesh, the potential results found should have more external validity and potentially can have policy implications.

Motivation

The purpose of this research project is to investigate if and how household nutrition affects safety net utilization in Bangladesh (and perhaps, which type of safety net used). The results of this project can have various policy implications regarding the investment into nutritional infrastructure to bolster the Bangladeshi population to reduce reliance on government welfare. Furthermore, some literature has shown the (potentially) negative effects of in-kind transfers (both in terms of overall costs relative to cash transfers as well as reducing price-levels for local producers) and identifying which characteristics in the population opt for in-kind transfers can be the subject of policy action to reduce overall costs by reducing in-kind transfers (in favor of cash transfers or no transfers at all).

Brief Literature Review

In *The Economic Lives of the Poor*, Banerjee and Duflo find that, in 13 countries, the average person living under $1 per day spend between roughly a half to three-

quarters of their consumption on food. What is more interesting is that, surprisingly, the poor to seem to have a significant amount of choice in spending but do not seem to "exercise that choice in the direction of spending more on food" and there is survey data to suggest that the poor feel no extra compulsion to purchase more calories. In fact, when they are given more money, they don't often "buy" more calories but nutrition was not taken into account in that study.

Another paper, written by Cunha, De Giorgi, and Jayachandran compares the effects of cash and in-kind transfers effect the local economy. Due to the price effects of these transfers, in-kind transfers seem to have more indirect benefits than cash transfers for consumers **but** at the expense of producers (as local prices tend to fall). These results can also have policy implications if the ultimate goal is to reduce reliance on government welfare and increase fairness and competition within the local producers.

Lastly, Gentilini also studies the "Cash versus Food debate" and notes that "costs for cash transfers and vouchers tend to be significantly lower relative to in-kind food" and again, important policy implications regarding the sustainability of government welfare programs may be relevant as well to minimize in-kind transfers in favor of cash transfers.

Research Design

The data I plan to use comes from the Bangladesh Integrated Household Survey (BIHS) which began in the early 2010s and has followed a random selection of households in Bangladesh. Survey data from the third iteration of this study will be used. I am planning on looking at safety net utilization for each household and seeing if variations in household nutrition (via the number of children and non-children that are underweight) can help predict the likelihood of their choice. The classification of "underweight" comes from the CDC where any BMI at the fifth percentile (or lower) is considered underweight; for children, this threshold varies somewhat, but for adults, the threshold is 18.5. In the roughly 6,000 or so observations in this data set, only 4 households had chosen both a food and money safety net (I believe this lends credulity to my claim that social safety net use is a choice since almost all households either chose: none, food, or money). The majority either: did not use a social safety net, used a food safety net, or used a money safety net.

If I ultimately choose to look at utilization versus non-utilization, I will use a logit model; if I ultimately choose to look at those used a safety net (either food or money) (perhaps including not choosing either as well), I will use a logit (or multinomial logit) model. In either case, the primary source of variation will be the number of children and non-children that are underweight in each household.

I will also include a variety of controls that include: region, number of children, number of non-children, household Income, an indicator for if the household are able to consume crops they harvested, an indicator for if the head of household (primary respondent) has at least a High School equivalent education, and the time to the nearest town (a proxy for rurality). I am also open to including other parameters if I receive any suggestions.

I am leaning towards looking at the entire data as opposed to the subset of individuals who utilized safety nets to avoid selection issues as the entire dataset was randomly selected (although I think the latter study could be more interesting) - I am planning with meeting with you (professor Sidibe) on Monday to discuss my

issues/plans more. If I use the entire dataset, the choices I will consider are: none, money, or food and will use the entire dataset (subject to having the available data for each household)

Outline

- Data work mostly completed by now.
- Estimation hopefully completed by 4/10 - our upcoming meeting on the 3rd will hopefully clear things up as that is currently my biggest hurdle regarding possible selection issues.
- First Draft done by the 20th (if not earlier).
- Final Draft done by the 25th (deadline for my other class - Econ 642).

Preliminary Results (Feel free to Skip)

After getting the data I wanted (ie regions, number of children, number of non-children (over 6), number of children and non-children Underweight, as well as household income, an indicator if the head of household had at least HS equivalent education, and indicator if they consume their own crops, and the time to the nearest town), I got the following results:

First is non-utilization vs utilization (logit)
Second is looking at those who used SSN: money vs food utilization (logit)
Third is looking at three choice: none, money, and food (multinomial logit)

4 MODELS ESTIMATED:
1. Choice on NumNonChildrenUW & NumChildrenUW
2. Choice on NumNonChildrenUW & NumChildrenUW & NumChildren & NumNonChildren
3. Choice on NumNonChildrenUW & NumChildrenUW & Controls
4. Choice on Everything

	Model 1	Model 2	Model 3	Model 4
(Intercept)	-0.7347^{***}	-1.3224^{***}	-0.2167	-0.8908^{***}
	(0.0402)	(0.0847)	(0.1284)	(0.1444)
numNonChildUnderweight	0.2842^{***}	0.1987^{***}	0.2919^{***}	0.1757^{***}
	(0.0346)	(0.0363)	(0.0355)	(0.0375)
numChildUnderweight	0.1420^{*}	0.1187	0.1709^{*}	0.1225
	(0.0693)	(0.0800)	(0.0701)	(0.0810)
numChildren		-0.0429		-0.0089
		(0.0488)		(0.0497)
numNonChildren		0.1894^{***}		0.2782^{***}
		(0.0227)		(0.0253)
as.factor(region)Chittagong			-0.3179^{*}	-0.3371^{*}
			(0.1380)	(0.1398)
as.factor(region)Dhaka			-0.4736^{***}	-0.4552^{***}
			(0.1292)	(0.1307)
as.factor(region)Khulna			-0.0715	-0.0401
			(0.1512)	(0.1532)
as.factor(region)Rajshahi			-0.2023	-0.1551
			(0.1477)	(0.1495)
as.factor(region)Rangpur			-0.0890	-0.0193
			(0.1571)	(0.1589)
as.factor(region)Sylhet			-0.2834^{*}	-0.3928^{**}
			(0.1440)	(0.1466)
householdIncome			-0.0000^{***}	-0.0000^{***}
			(0.0000)	(0.0000)
cropConsumed			-0.1512^{*}	-0.2709^{***}
			(0.0635)	(0.0653)
atleastHS			-0.3290^{*}	-0.3020
			(0.1569)	(0.1588)
timeToTown			-0.0003	-0.0004
			(0.0006)	(0.0006)
AIC	6074.1427	6007.0671	6038.0862	5916.5453
BIC	6093.4772	6039.2913	6121.8691	6013.2178
Log Likelihood	-3034.0714	-2998.5336	-3006.0431	-2943.2726
Deviance	6068.1427	5997.0671	6012.0862	5886.5453
Num. obs.	4651	4651	4651	4651

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 1: Non-Utilization vs Utilization

	Model 1
numNonChildUnderweight	0.0408***
	(0.0087)
numChildUnderweight	0.0284
	(0.0188)
numChildren	−0.0021
	(0.0115)
numNonChildren	0.0645***
	(0.0058)
as.factor(region)Chittagong	−0.0756*
	(0.0302)
as.factor(region)Dhaka	−0.1028***
	(0.0286)
as.factor(region)Khulna	−0.0093
	(0.0352)
as.factor(region)Rajshahi	−0.0354
	(0.0335)
as.factor(region)Rangpur	−0.0045
	(0.0367)
as.factor(region)Sylhet	−0.0871**
	(0.0308)
householdIncome	−0.0000***
	(0.0000)
cropConsumed	−0.0631***
	(0.0152)
atleastHS	−0.0672*
	(0.0336)
timeToTown	−0.0001
	(0.0001)
Num. obs.	4651
Log Likelihood	−2943.2726
Deviance	5886.5453
AIC	5916.5453
BIC	6013.2178

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Table 2: Marginal Effects

	Model 1	Model 2	Model 3	Model 4
(Intercept)	-1.3023^{***}	-0.1066	-0.3849	0.3783
	(0.0812)	(0.1755)	(0.2273)	(0.2686)
numNonChildUnderweight	-0.1144	0.0369	-0.1043	0.0098
	(0.0679)	(0.0732)	(0.0721)	(0.0768)
numChildUnderweight	-0.2581	-0.1186	-0.1180	-0.0633
	(0.1470)	(0.1694)	(0.1514)	(0.1729)
numChildren		-0.0037		0.0287
		(0.1022)		(0.1063)
numNonChildren		-0.3753^{***}		-0.3189^{***}
		(0.0508)		(0.0566)
as.factor(region)Chittagong			-1.5450^{***}	-1.5101^{***}
			(0.2708)	(0.2732)
as.factor(region)Dhaka			-0.9233^{***}	-0.9786^{***}
			(0.2244)	(0.2280)
as.factor(region)Khulna			-0.2751	-0.2610
			(0.2537)	(0.2578)
as.factor(region)Rajshahi			-0.8387^{**}	-0.8723^{**}
			(0.2690)	(0.2725)
as.factor(region)Rangpur			0.2307	0.1520
			(0.2521)	(0.2567)
as.factor(region)Sylhet			-0.9721^{***}	-0.8954^{***}
			(0.2638)	(0.2682)
householdIncome			-0.0000^{***}	-0.0000
			(0.0000)	(0.0000)
cropConsumed			-0.3648^{**}	-0.2106
			(0.1297)	(0.1339)
atleastHS			-1.1761^{*}	-1.1767^{*}
			(0.5333)	(0.5359)
timeToTown			0.0059^{**}	0.0059^{**}
			(0.0019)	(0.0019)
AIC	1695.8168	1638.6617	1604.7563	1575.0474
BIC	1712.1914	1665.9526	1675.7127	1656.9202
Log Likelihood	-844.9084	-814.3308	-789.3782	-772.5237
Deviance	1689.8168	1628.6617	1578.7563	1545.0474
Num. obs.	1734	1734	1734	1734

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 3: Money vs Food

	Model 1
numNonChildUnderweight	0.0013
	(0.0106)
numChildUnderweight	−0.0087
	(0.0238)
numChildren	0.0040
	(0.0146)
numNonChildren	−0.0439***
	(0.0076)
as.factor(region)Chittagong	−0.1509***
	(0.0193)
as.factor(region)Dhaka	−0.1175***
	(0.0239)
as.factor(region)Khulna	−0.0335
	(0.0308)
as.factor(region)Rajshahi	−0.0956***
	(0.0233)
as.factor(region)Rangpur	0.0218
	(0.0383)
as.factor(region)Sylhet	−0.0994***
	(0.0236)
householdIncome	−0.0000
	(0.0000)
cropConsumed	−0.0292
	(0.0187)
atleastHS	−0.1109***
	(0.0313)
timeToTown	0.0008**
	(0.0003)
Num. obs.	1734
Log Likelihood	−772.5237
Deviance	1545.0474
AIC	1575.0474
BIC	1656.9202

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Table 4: Marginal Effects

	Model 1	Model 2	Model 3	Model 4
1: (Intercept)	-0.9725^{***}	-1.7735^{***}	-0.6745^{***}	-1.4953^{***}
	(0.0434)	(0.0927)	(0.0000)	(0.0000)
1: numNonChildUnderweight	0.3038^{***}	0.1904^{***}	0.3060^{***}	0.1691^{***}
	(0.0365)	(0.0384)	(0.0000)	(0.0000)
1: numChildUnderweight	0.1852^{*}	0.1443	0.1960^{***}	0.1438^{***}
	(0.0729)	(0.0850)	(0.0000)	(0.0000)
2: (Intercept)	-2.2816^{***}	-1.9627^{***}	-0.9018^{***}	-1.0425^{***}
	(0.0755)	(0.1572)	(0.0000)	(0.0000)
2: numNonChildUnderweight	0.1964^{**}	0.2451^{***}	0.2185^{***}	0.1985^{***}
	(0.0648)	(0.0692)	(0.0000)	(0.0000)
2: numChildUnderweight	-0.0645	-0.0015	0.0529^{***}	0.0291^{***}
	(0.1410)	(0.1603)	(0.0000)	(0.0000)
1: numChildren		-0.0437		-0.0167^{***}
		(0.0523)		(0.0000)
1: numNonChildren		0.2519^{***}		0.3264^{***}
		(0.0242)		(0.0000)
2: numChildren		-0.0501		0.0110^{***}
		(0.0950)		(0.0000)
2: numNonChildren		-0.1025^{*}		0.0508^{***}
		(0.0469)		(0.0000)
1: householdIncome			-0.0000^{**}	-0.0000^{***}
			(0.0000)	(0.0000)
1: cropConsumed			-0.0730^{***}	-0.2087^{***}
			(0.0000)	(0.0000)
1: atleastHS			-0.1835^{***}	-0.1499^{***}
			(0.0000)	(0.0000)
1: timeToTown			-0.0013	-0.0013
			(0.0007)	(0.0007)
2: householdIncome			-0.0000^{***}	-0.0000^{***}
			(0.0000)	(0.0000)
2: cropConsumed			-0.4656^{***}	-0.4835^{***}
			(0.0000)	(0.0000)
2: atleastHS			-1.3722^{***}	-1.3749^{***}
			(0.0000)	(0.0000)
2: timeToTown			0.0011	0.0011
			(0.0007)	(0.0007)
AIC	7770.2623	7649.3459	7645.6408	7497.4761
BIC	7808.9314	7713.7942	7813.2066	7690.8212
Log Likelihood	-3879.1312	-3814.6729	-3796.8204	-3718.7380
Region Fixed Effects			**X**	**X**
Deviance	7758.2623	7629.3459	7593.6408	7437.4761
Num. obs.	4651	4651	4651	4651
K	3	3	3	3

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 5: None vs Money vs Food

Choice	Variable	Marginal Effect
Money	atleastHS	-0.0009
Money	cropConsumed	-0.0314
Money	householdIncome	-0.0000
Money	numChildren	-0.0036
Money	numChildUnderweight	0.0280
Money	numNonChildren	0.0639
Money	numNonChildUnderweight	0.0295
Food	atleastHS	-0.0850
Food	cropConsumed	-0.0266
Food	householdIncome	-0.0000
Food	numChildren	0.0011
Food	numChildUnderweight	-0.0012
Food	numNonChildren	-0.0036
Food	numNonChildUnderweight	0.0092

Table 6: Marginal Effects