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Differential impacts of education on food consumption behaviour: a study of household-level calorie consumption data

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- Conclusion

Does education lead to economical calorie choices?

https://medium.com/@taylorglancey/what-influences-our-food-choices-138a13c13cf

Introduction

- Education has long been acknowledged as essential for both personal success and economic growth.

Education

Market returns

Non-market returns

Education and Market outcomes

Outcome	Existing research
Labour market returns	Extensive research on market earnings (Schultz 1961; Mincer 1962; Hansen 1963; Becker 1964; Conlisk 1971) Increased employability and secure a high-quality job (Becker, 1975; Di Stasio & van de Werfhorst, 2016; Weiss, 1995) Some research on differences in fringe benefits and working conditions by education level (Duncan 1976; Lucas 1977; Freeman 1981; Smeeding 1983)
Economic growth, Productivity, GDP	Positive relationship between GDP growth and average level of schooling (Barro and Lee 1993; Barro 2000; Sianesi and Van Reenan 2003) Poverty reduction (Bynner et al. 2003; Danziger and Ratner 2010; Dickson and Harmon 2011; Harkonen and Bihagen 2011; Nordlund, Stehlik, and Strandh 2012)

Education and Non-market outcomes

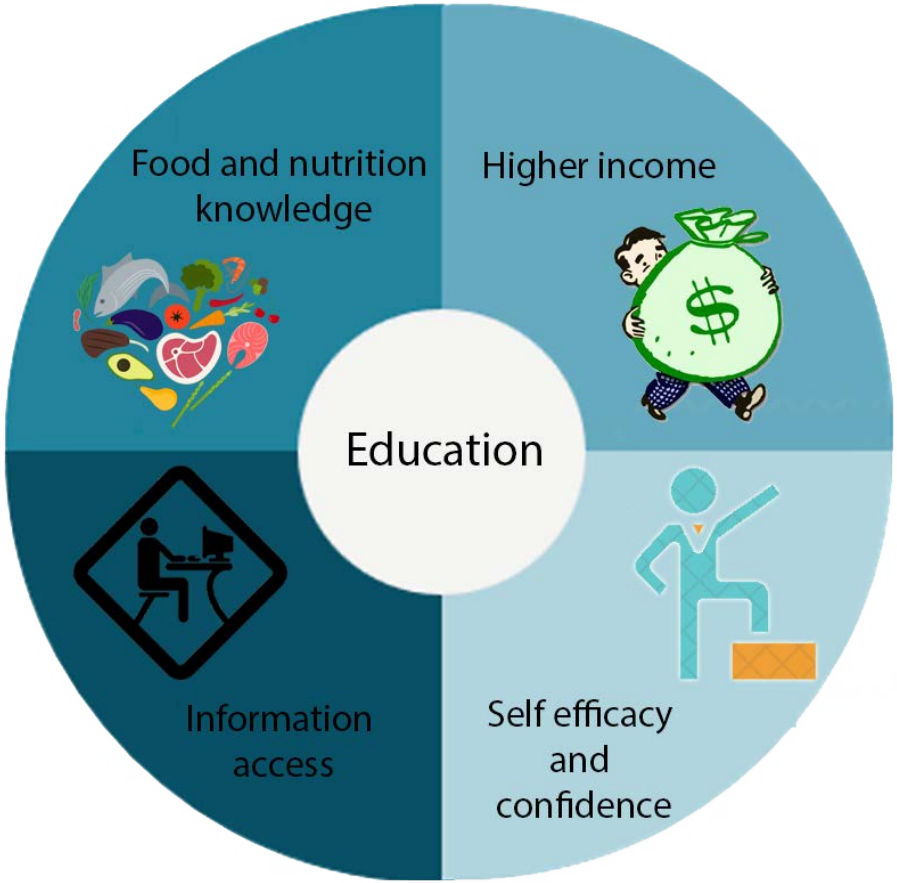
Outcome	Existing research
Individual health behaviour	Positive impact on health status (Leigh 1981; Berger and Leigh 1989; Leigh 1983; Kemna 1987; Grossman and Joyce 1989; Kenkel 1991); increases life expectancy (Feldman et al. 1989); lowers prevalence of severe mental illness (Robins 1984)
Child quality: education and cognitive development	Positively related to mother's and father's education (Dawson 1991; Haveman, Wolfe, and Spaulding 1991; Wachtel 1975; Murnane 1981; Sandefur, McLanahan, and Wojtkiewicz 1989; Ribar 1993)
Child quality: health	Child health is positively related to parents' education (Wolfe and Behrman 1982; Behrman and Wolfe 1987; Grossman and Joyce 1989; Strauss 1990; Thomas, Strauss, and Henriques 1991; King and Hill 1993)
Social cohesion	Positively associated with voting (Campbell et al. 1976; Gintis 1971); with reduced alienation and social inequalities (Comer 1988)
Crime reduction	Some evidence that schooling is associated with reduced criminal activity (Yamada, Yamada, and Kang 1991; Ehrlich 1975)

Education and Non-market outcomes cont..

Consumer choice efficiency:

- Michael (1982) found that a person with an additional year of schooling was significantly more efficient as a consumer ($220 in household income for an additional year of schooling).
- Benham and Benham (1975) analyzing the market for eyeglasses, find that persons with more schooling tended to pay less for glasses than those with less schooling. (Save approximately $4.20 per pair of eyeglasses for an additional year of schooling).
- Rizzo and Zeckhauser (1992) find that the charge per unit of time that a physician spent with a patient was lower for better-educated individuals than for those with less education.
- Less focus on food consumption efficiency

Why education matter in food consumption?



Research questions?

- How does education influence on calorie consumption choices of people across different income groups ?

- Do educated poor households pay less per calorie as compared to non-educated poor households?

https://www.movementandnutrition.co.uk/healthy-eating-what-is-a-healthy-diet/

Data: Why Sri Lanka?

- Sri Lanka is a lower middle-income country experiencing a nutrition transition
- The richness of Sri Lankan Household Income and Expenditure Survey (HIES) 2016 data
- No published study available that explore impact of education on calorie consumption choices in the Sri Lankan context

Data description

- Household Income and Expenditure Survey (HIES) -2016
- HIES provides data on
  - Demographic characteristics
  - Income: All forms of income
  - Expenditure on food and non-food items
- Sample in the analysis - 20,082 households
- Calorie distribution - 96 food items are aggregated into 16 sub-groups
- Use food composition databases to convert food intake into calories

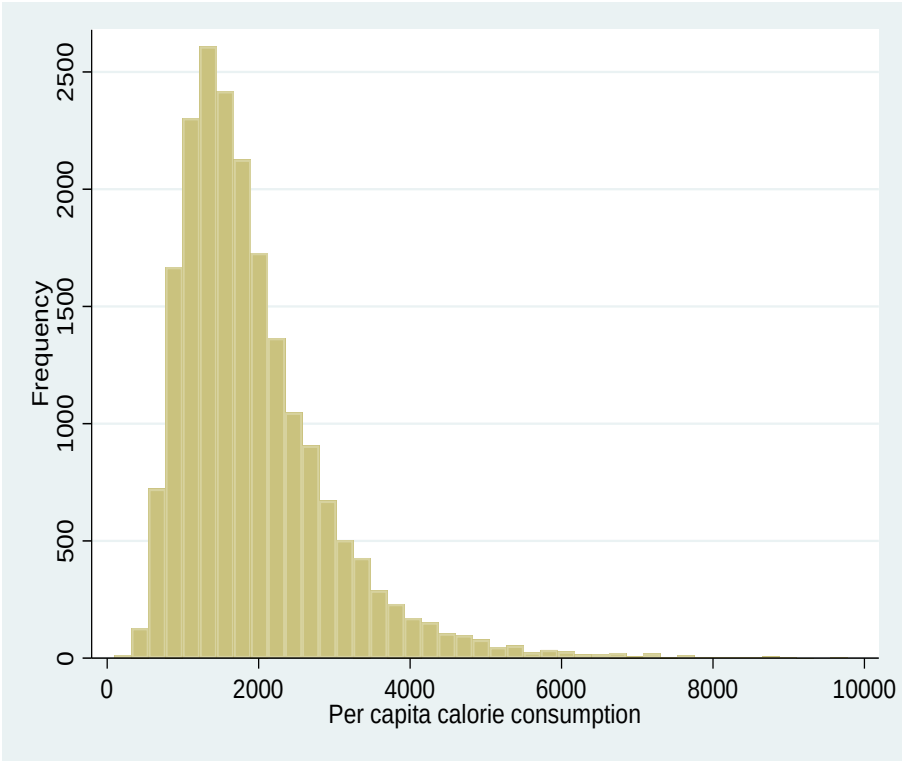


Figure 1: Calorie Distribution

Sample Characteristics

Table 1: Sample Characteristics

Description	2016	
	Mean	SD
Per capita daily calorie consumption(kcal)	1,933.44	1,056.36
Per capita total expenditure (Rs/month)	12,438.35	15,954.95
Share of expenditure on starchy staples[a]	0.21	0.16
Share of expenditure on non-starchy foods[b]	0.41	0.14
Calorie price (Rs/1000 calories)	84.39	28.84
Years of schooling	8.36	3.68
Household size	3.97	1.43
Gender of the household head(1=male;0=female)	0.74	0.44
Number of dependents in the family	1.63	1.2
Engaged in agricultural work (1=farming; 0=non-farming)	0.16	0.37
Household location: (1=urban;0=rural)	0.16	0.36
Access to government subsidy	0.2	0.4
Observations	20,082	

Notes: a) Starchy staples include cereals, other staples and yams
b) Non-starchy foods include vegetables, leafy vegetables, fruits, meat, fish, dried fish, eggs and milk foods

Theoretical Framework

- Derive the Marshallian demand for food calories by following Cobb and Douglas (1928) utility function:

$$U_i = x_i^{a_i} y_i^{b_i} \qquad (1)$$

- The individual's budget for the two goods given by:

$$I_i = P_{x_i} + P_{y_i} \qquad (2)$$

P_{x_i} is the price of food calories and P_{y_i} is the price of non-food.

Theoretical Framework cont.

- Assume two individuals in the calorie distribution, the individual who is in any other point of the calorie distribution (continue to refer him as individual i) and who represents the average calorie intake (label him as with superscript bar).

- Construct the calorie price ratio which is given by:

$$\frac{P_{x_i}}{\overline{P}_x} = \frac{\alpha_i}{\overline{\alpha}} * \frac{I_i}{\overline{I}} * \frac{\overline{x}}{x_i} \qquad (3)$$

Theoretical Framework cont.

- Use Mincer earning function (Mincer, 1974) to link the price paid for a calorie by an individual (i) to their earning resulting from education.

$$ln\, w_i = f(s_i, e_i) = w_{0_i} + \rho s_i + \beta_1 e_i + \beta_2 e_i^2 \quad (4)$$

Where w is earnings, s is years of schooling and e is work experience for i^{th} individual.

- Introduce years of schooling into Equation (3) replacing income.

$$\frac{P_{x_i}}{\overline{P}_x} = \frac{\alpha_i}{\overline{\alpha}} * \frac{f(s_i, e_i)}{f(\overline{s}, \overline{e})} * \frac{\overline{x}}{x_i} \quad (5)$$

Theoretical Framework cont.

- Considering the case where e = 0, i.e. the experience component of the mincer equation is zero, Equation (5) can be simplified and written in log form as follows:

$$\ln\left(\frac{P_{x_i}}{\overline{P}_x}\right) = \ln\gamma + \ln\left(\frac{f(s_i)}{f(\overline{s})}\right) + \ln\left(\frac{\overline{x}}{x_i}\right) \quad (6)$$

- Where $\left(\frac{P_{x_i}}{\overline{P}_x}\right)$ = calorie price ratio

$\left(\frac{f(s_i)}{f(\overline{s})}\right)$ = ratio of years of schooling

$\left(\frac{\overline{x}}{x_i}\right)$ = calorie demand ratio

Methodology

- The OLS regression specification as follows:

$$ln\left(\frac{P_{x_i}}{\overline{P}_x}\right) = \beta_0 + \beta_1 ln\,(S) + \beta_2(C_{pc}) + \beta_3(E_{pc}) + \beta_4(SFE_{share}) + \beta_5\,(NSFE_{share}) + \delta' K + \varepsilon$$

$ln(S)$= log of years of schooling

C_{pc} = per capita calorie consumption

E_{pc} = per capita expenditure

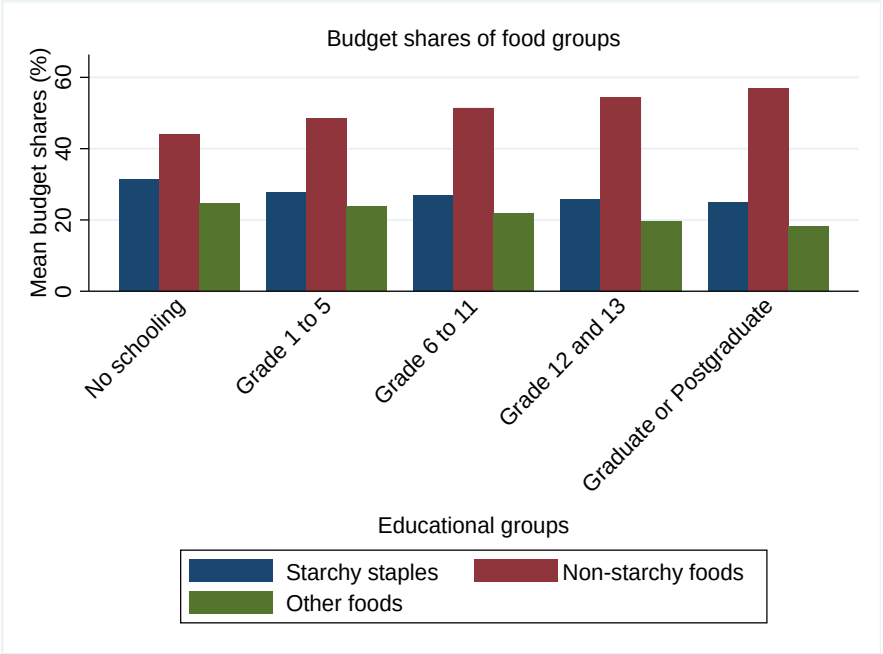
SFE_{share} = food expenditure share on starchy staples

$NSFE_{share}$ = food expenditure share on non-starchy foods

K vector of demographic indicators with δ' corresponding coefficient vector

ε= random error term

Results



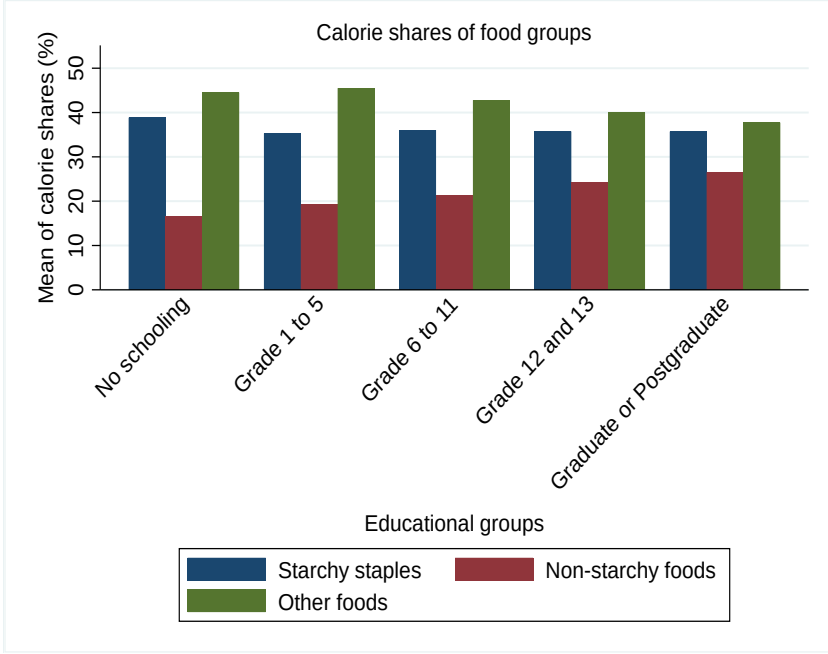


Figure 1: Budget shares and calorie shares of starchy staples, non-starchy foods and other foods, by educational groups in 2016.
Note: Foods included in the groups: starchy staples (cereals, other staples, yams and pulses); non-starchy foods (vegetables, leafy vegetables, fruits, meat, fish, dried fish, eggs and milk foods); other foods (coconut, oil, sugar and snacks)

Results cont.

Table 2: OLS estimates of Log of Calorie price ratio and Log of Years of schooling with Education dummy variable -2016

Variables	OLS			
	Bottom 25% of PCE		Top 25% of PCE	
	1	2	3	4
Per capita calorie consumption	-0.0003***	-0.0003***	-0.0001***	-0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Per capita total expenditure[a]	0.1138***	0.1155***	0.0018***	0.0019***
	(0.0037)	(0.0036)	(0.0002)	(0.0002)
Share of expenditure on starchy foods	0.2141***	0.2345***	0.7220***	0.7291***
	(0.0285)	(0.0271)	(0.0338)	(0.0336)
Share of expenditure on non-starchy foods	0.6677***	0.6884***	0.7772***	0.7887***
	(0.0280)	(0.0271)	(0.0395)	(0.0393)
Log of years of schooling	-0.0260***		0.0640***	
	(0.0055)		(0.0104)	
Household size	-0.0309***	-0.0320***	-0.0646***	-0.0651***
	(0.0031)	(0.0030)	(0.0040)	(0.0040)
Gender of household head	-0.0250***	-0.0255***	-0.0494***	-0.0466***
	(0.0076)	(0.0073)	(0.0095)	(0.0095)
Number of dependents in the family	0.0228***	0.0229***	0.0279***	0.0301***
	(0.0034)	(0.0033)	(0.0045)	(0.0045)
Engaged in agricultural work	-0.0262***	-0.0287***	-0.0677***	-0.0681***
	(0.0080)	(0.0079)	(0.0134)	(0.0133)
Household location:				
Urban	0.0931***	0.0880***	0.1299***	0.1334***
	(0.0132)	(0.0129)	(0.0089)	(0.0089)
Access to government subsidy	-0.0139**	-0.0145**	-0.0658***	-0.0738***
	(0.0068)	(0.0066)	(0.0192)	(0.0188)
Household head's education (1= Educated; 0 = Non-educated)				
		-0.0349***		0.0361***
		(0.0064)		(0.0133)
Constant	-0.3303***	-0.3737***	-0.0861**	0.0152
	(0.0253)	(0.0231)	(0.0369)	(0.0314)
Observations	4,455	4,839	5,047	5,114
R-squared	0.5932	0.5896	0.3223	0.3190

Note: Standard errors in parentheses. Levels of significance are indicated by asterisk, where *** p<0.01, ** p<0.05, * p<0.1

a) Note that per capita expenditure expressed as thousands in Sri Lankan rupees.

Concluding Remarks

- Education has differential impacts on household calorie consumption choices across different socio-economic groups.

- The findings of this study show that educated poor households pay less per calorie as compared to non-educated poor households. It doesn't indicate that they eat cheapest sources of calories. Instead, they manage household budget by purchasing food ingredients economically.

Concluding Remarks cont.

- In contrast, educated rich households pay more per calorie as compared to non-educated rich households. This is due to the fact that with higher educational attainment they might have more income, this will shift their consumption towards more expensive sources of calories/ pay more for non-calorie attributes such as quality, taste and convenience.

- This study highlights the differential impacts of education on calorie choices need to be considered in the design and implementation of future food and nutritional policies in developing countries.

Thank You!!!