

Differences in measures of family poverty and their association with educational outcomes

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Context: socio-economic disadvantage

- Socio-economic status affects children's educational outcomes. Government policy since 2010 has focused on diminishing the 'gap' in educational outcomes between advantaged and disadvantaged children and young people.
- Socio-economic status is a complex concept which includes: family income, parental education and occupation. These concepts are interdependent operating in different and cumulative ways on children's educational trajectories.
- Previous studies highlight that Free School Meals (FSM), representing income deprivation, is a reasonable socio-economic proxy for parental education and occupation, although these are better predictors of educational outcomes. These data are more difficult to obtain.
- Socio-economic disadvantage in education is conceptualised as income deprivation. This form of material deprivation is proxied by Free School Meals, a passported predominately benefit determined by Universal Credit eligibility.
- Since 2010, there has been significant welfare benefit reform, leading to volatility in FSM eligibility.

Research questions

- To what extent do available poverty proxies effectively identify children in poverty?
- What measure is the most effective proxy for identifying educational risk derived from poverty?

Operationalising income poverty

- Free School Meals and Pupil Premium are income derived, determined by welfare eligibility. Whilst FSM and PP operate binary poverty line indicators in education, the income threshold for eligibility varies per family and is dependent on different components, such as housing benefit and childcare, also known as ‘inescapable costs’.
- Pupil Premium (PP) is defined by FSM eligibility at any point in the past 6 years.
- Currently FSM is predominantly defined through assessment and access to Universal Credit. Benefit income is currently subject to benefit caps.
- This study seeks to operationalise poverty concepts, comparing the theoretical basis for conceptualisations and the educational effectiveness of available poverty variables in Millennium Cohort Study survey data.

Methodological approach and background

- Income deprivation is the aspect of socio-economic status that policy can best ascertain and compensate for in real time. If families lack funds, redistributive funding could be implemented through the welfare, tax and school funding systems to compensate. Improvements in parental education and occupation in theory would take longer to implement and may require generational change.
- Defining and identifying poverty is about understanding the availability and deprivation of family resource.
- Measures of poverty should seek to evaluate the availability of resources: a family's financial capability. Building on Sen's theory of capability, this methodology attempts to consider the 'freedom to achieve' (Sen, 1995) based on available family resources.
- In the economic evaluative space of family finance, this could be represented by net income **After Housing Costs (AHC)** and/ or **equivalised income**. Ideally net income would also consider all 'inescapable costs' such as childcare, debt and work travel, much of which is spatially varied.
- Both AHC and equivalised income are difficult to operationalise in the education domain, but crucially both are adopted in the Department for Work and Pensions' (DWP) 'Households Below Average Income' (HBAI) national statistics.
- Multilevel models were implemented as the null model demonstrated an ICC of 0.31 for KS4 attainment when school was added at level 2.
- A 'base' model was created with known predictors of KS 4 attainment: KS2 prior attainment, gender, ethnicity and socio-economic disadvantage.
- The Proportional Reduction of Error (PRE) was then compared in 8 models where the 'poverty' variable was changed. These included three poverty variables that operationalised equivalised income.

Dataset: Millennium Cohort Study

- Longitudinal birth cohort study, designed to over-sample disadvantaged stratum. MCS 6, [10.5255/UKDA-SN-8156-7](https://www.ukdataservice.ac.uk/datacatalog/studies-studyfiles/mcs6/mcs6-2015) (2015) represents a unique and complex data set for investigating children in poverty.
- Linked to administrative education data from the National Pupil Database (NPD), SN:8481.
- Sweep 6 contains several key derived income variables and represents a key stage in cohort member's life, aged 14.
- Analyses of cohort members where successful NPD linkage and productive outcome achieved at sweep 6.
- Final matched complete case data is representative of national. N=5,967.

Poverty concept	Theoretical dimension	Definition	MCS variable
Free School Meals	Poverty line measure of income deprivation	A passported benefit eligible to children living in low income or in a family in receipt of out of work benefits, predominately now defined through the means tested Universal Credit.	Categorical
Pupil Premium	Poverty line that attempts to account for oscillation in income deprivation	A school level disadvantaged status for children who have been in receipt of FSM at any point in the past 6 years.	Categorical
Indices of Multiple Deprivation (IMD)	Place based poverty, relatively ranked	A composite relative deprivation measure for Lower-layer Super Output Areas (LSOA) based on income, employment, education, health, crime, housing and environment domains.	Categorical ordinal: 1-10
Income Deprivation Affecting Children Index (IDACI)	Child poverty by place, relatively assessed	A rank assessment of LSOAs based on children under 16 living in income deprived families as a subset of IMD.	Continuous: 3,420 values
Relative poverty	Relational income inequality: poverty line	The proportion of the population living below either 50% or 60% of the national median income. 60% currently adopted in England.	Categorical
Equivalised income	Resource capability accounting for economies of scale and shared resource: 'freedom to achieve'	Family income adjusted by the share of resource required for the size and make-up of a family. It is used to compare actual standards of living.	Continuous, categorical and ordinal variables

OECD equivalisation methodology

Weighting	Family member
1	Head of household (adult)
0.5	Additional adult members
0.3	Child

The process of equivalising income therefore is to divide the total income by the number of household members using their respective weights (OECD, 2011).

Millennium Cohort Study provides derived finance variables: OECD equivalised relative income, OECD equivalised quintiles and OECD equivalised income.

A form of equivalisation?

Your circumstances	Monthly standard allowance
Single and under 25	£265.31
Single and 25 or over	£334.91
In a couple and you're both under 25	£416.45 (for you both)
In a couple and you are 25 or over	£525.72 (for you both)

Number of children	Extra monthly amount
For your first child	£290 (born before 6 April 2017) £244.58 (born on or after 6 April 2017)
For your second child	£244.58 per child

Source: www.understandinguniversalcredit.gov.uk

Circumstances: illustrative assuming maximum benefit eligibility	Maximum benefit income	Equivalised income
Single and you don't have children, or your children don't live with you	£13,400	£13,400/1= £13,400
Single with one child	£20,000	£20,000/1.3= £15,384
Single with two children	£20,000	£20,000/1.6= £12,500
Single with three children	£20,000	£20,000/1.9= £10,526
In a couple, no children	£20,000	£20,000/1.5= £13,333
In a couple with one child	£20,000	£20,000/1.8= £11,111
In a couple with two children	£20,000	£20,000/2.1= £9,524
In a couple with three children	£20,000	£20,000/2.4= £8,333

adapted from: www.understandinguniversalcredit.gov.uk

Who is in poverty?

	PP	FSM	FSM+3	OECD below 60% median	OECD equivalised bottom quintile	IMD most deprived decile	IMD education most deprived decile
<i>Frequency</i>	1,600	919	1,341	1,761	1,030	800	587
PP	100%	100%	100%	64.57%	72%	59.75%	35.26%
Non-PP	0	0	0	35.43%	28%	40.25%	64.75%
FSM	57.44%	100%	68.53%	42.87%	51.84%	41.63%	21.12%
Non-FSM	42.56%	0	31.47%	57.13%	48.16%	58.17%	78.82%

N=5,967

Proportional Reduction in Error (PRE)

	Model 1: ethnicity, gender, KS2 prior attainment, PP			Model 2: ethnicity, gender, KS2 prior attainment, equivalised income			Model 3: ethnicity, gender, KS2 prior attainment, FSM			Model 4: ethnicity, gender, KS2 prior attainment, 60% relative poverty (OECD equivalized)		
Random												
	PRE	SE	% variance	PRE	SE	% variance	PRE	SE	% variance	PRE	SE	% variance
Level 2	0.7	3.28	17.79	0.799	2.96	16.07	0.753	3.40	18.53	0.784	3.13	16.70
Level 1	0.544	2.82	82.21	0.556	2.73	83.93	0.540	2.86	81.47	0.542	2.81	83.30
Total	0.611			0.628			0.604			0.614		

P<0.001, N=5,903

	Model 5: ethnicity, gender, KS 2 prior attainment, IDACI			Model 6: ethnicity, gender, KS2 prior attainment, IMD			Model 7: ethnicity, gender, KS2 prior attainment, FMS+3			Model 8: ethnicity, gender, KS2 prior attainment, OECD quintile					
Random															
	PRE	SE	% variance		PRE	SE	% variance		PRE	SE	% variance		PRE	SE	% variance
Level 2	0.763	3.34	17.95		0.76392	3.31	17.89		0.762	3.30	18.17		0.808	2.93	15.41
Level 1	0.540	2.86	82.05		0.54041	2.84	82.11		0.545	2.82	81.83		0.554	2.74	84.59
Total	0.606				0.607				0.609				0.629		

Limitations and further work

- Availability of unequivalised income data, at this stage.
- Understanding of further inescapable costs: these further define resource capability.
- Comparison to parental education and occupation: missing data.
- Test the collinearity of poverty variables in models.

Discussion

- The number of children in a state of income deprivation, dependent on the poverty metric adopted, varies from 9.8% to 29.6%.
- The population in poverty defined varies significantly in terms of the number of PP, and in particular FSM children.
- All OECD equivalised income variables explain most variance: the greatest proportional reduction in error in all models.
- The greatest predictor of educational attainment at KS4 (Attainment 8) is KS 2 prior attainment (average KS2 SATs score). The extent to which this is also dependent on socio-economic disadvantage is more complex to extrapolate. The impact of income deprivation could be far greater.

Conclusions

- FSM, and therefore PP, are no longer effective proxies for poverty and socio-economic disadvantage in education.
- Changes to welfare policy matter in the education domain.
- The two-child poverty cap was implemented for new births from 2017. These children in larger families are now entering school. The poverty line approach to assessing the level of disadvantage will not recognise the depth of larger families' resource incapacity.
- Universal Credit transitional protections mean 'eligibility' is less tied to material deprivation. There are likely many more children in poverty during this period than those eligible. Additionally persistent and long-term disadvantage data will become less reliable.
- The predictive power of FSM is less when compared to equivalised poverty metrics: education policy is becoming less effective at targeting the children most at risk from socio-economic disadvantage.
- A further prediction of this paper is that as FSM eligibility moves further from the consideration of available recourse, the educational value of data will further diminish. Ultimately this paper highlights the problem of designating poverty in the political domain and then applying it uncritically to the education domain.