Differentiating Rural Poverty:
Poverty Measures and Student Outcomes

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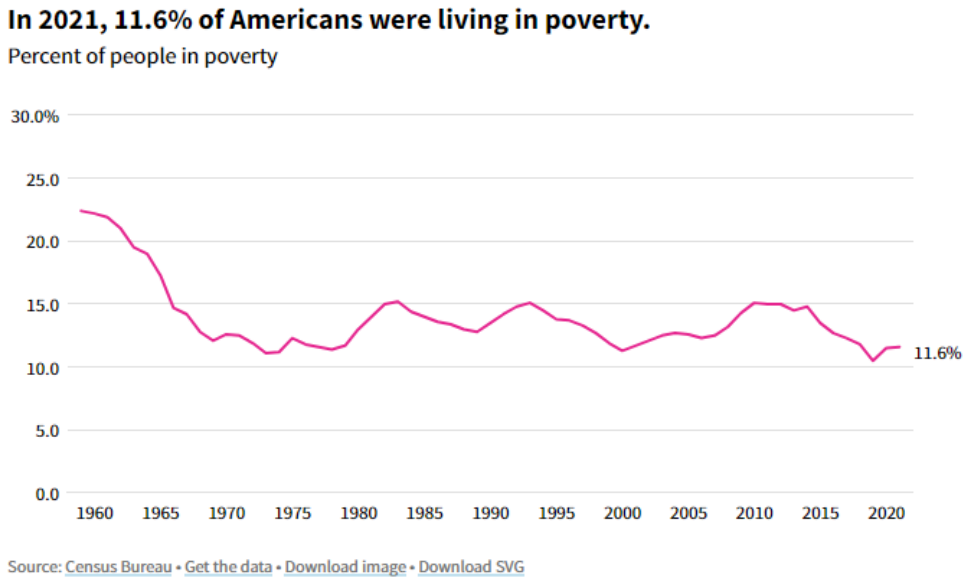
The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R372A200011 to the Montana Office of Public Instruction. The opinions expressed are those of the author and do not represent views of the Institute, the U.S. Department of Education, or the Montana Office of Public Instruction.

School Level Poverty Measure Study - Montana

This research has three parts. It addresses the suitability, sensitivity, and consistency of alternative poverty measures using Montana's Statewide Longitudinal Data System resources.

- **State level** between eight poverty measures, 16 student and institutional outcome variables.
- **Locale level** between six poverty measures, 12 student outcome variables.
- **Proximity to school by locale** – two poverty measures, eight student outcome variables.

This presentation focuses on the role of distance in analyzing educational outcomes and student poverty. It uses student level data on poverty.



https://usafacts.org/articles/what-does-living-at-the-poverty-line-look-like/

Emerging Insufficiencies of NSLP Eligibility Data

Participation in the National School Lunch Program (NSLP) has become decoupled from income and poverty.

- Data can be incomplete since income data is only collected one time and family income can vary over a year.
- Data can be inconsistent in that it differs from participation rates.
- Data can overidentify poor students since family income is benchmarked at 130% of the poverty level.
- Data can have inaccurate accounting of students in Community Eligibility Provision districts. With the Final Rule, schools can qualify for free meals for all their students if 25% of their students are from families that receive public benefits.
- Data faced many constraints due to pandemic expansion of school meals programs.

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THE GREAT SEAL OF THE STATE OF MONTANA

Correlations (Most Impoverished)

Eligibility Quartile 4

	Correlation	Count	Lower C.I.	Upper C.I.
CEP Direct Certification	0.869	127	0.819	0.906
Eligibility	1.000	168	--	--
Participation	0.450	166	0.320	0.564
Longevity	0.482	89	0.304	0.627
SAIPE	0.367	167	0.228	0.491
School Address	-0.380	167	-0.503	-0.242
SNP Estimate	-0.357	165	-0.484	-0.216
Student Addresses	-0.491	155	-0.602	-0.361

Classification: Less Economic Disadvantage

School Poverty Measure	Total Schools	Missing	Count	Count Exact Match	Percent Exact Match	Count Within One Quartile	Percent Within One Quartile
Quartile 1 (Higher Family Income)							
CEP Direct Certification	--	--	--	--	--	--	--
Participation	169	1	168	150	89.29%	168	100.00%
Longevity	44	0	44	34	77.27%	41	93.18%
SAIPE	169	4	165	91	55.15%	132	80.00%
SNP Estimate	169	5	164	91	55.49%	142	86.59%
Student Address SIDE	152	0	152	89	58.55%	131	86.18%
School Address SIDE	169	1	168	86	51.19%	142	84.52%

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Sensitivity of Estimated Association of School Poverty Measures and Outcome Measures to Attendance Rate

	Naive	Eligibility	Participation	SAIPE	School Address SIDE	School SNP	Direct Certification	Longevity	Student Address SIDE
HS Dropout Rate	-3.54 * (1.643)	-1.692 (2.006)	-1.766 (1.852)	-2.364 (1.703)	-3.202 (1.742)	-2.958 (1.748)	-2.683 (1.887)	-- --	-2.486 (2.129)
EWS Dropout Probability	0.899** (0.283)	-0.559 (0.318)	-0.676* (0.312)	-0.603* (0.300)	-0.825** (0.296)	-0.813* (0.299)	-0.010 (0.804)	-1.200 * (0.590)	-0.572 (0.347)
HS Graduation Rate	0.012*** (0.003)	0.009* (0.004)	0.008* (0.004)	0.011*** (0.003)	0.011*** (0.003)	0.011 (0.003)	0.002 (0.004)	-- --	0.012** (0.004)
Post Secondary Enrollment	0.624*** (0.185)	0.487* (0.212)	.428* (0.204)	0.583** (0.186)	0.590** (0.190)	0.571** (.189)	1.302 (0.651)	-- --	0.511* (0.201)

Differences Between ‘In-Town’ And ‘Out-of-Town’ Students

Income Differs Between The Two Populations

- Poverty data tells us that:
  - In cities and towns, students that live more than three miles from schools have higher incomes than students that live in town.
  - This trend reverses in rural communities where out-of-town students have lower incomes than students that live in town.
  - There is important variation within rural communities based on the distance the community is from an urban center. Students in communities less than 25 miles from an urban center have significantly higher incomes than student that live in rural remote communities.
- This effects how some poverty measures capture income. The *School Neighborhood Poverty Estimate* (D-ED) captures the 25 nearest neighbors to a geolocated address, often a school. This only captures income for those points closest to the schools. This causes:
  - An **underestimation** of income in city and town school communities
  - An **overestimation** of income in rural communities.

Correlations Comparing NSLP Eligibility to SIDE Estimates (Student Level)

Note: Significance level denoted by * is significant at the p < .05 level. A significance level of ** is significant at the p < .01 level.

Locale Category	Whole School SIDE	Students at distance	Students in-town school
Statewide	-.722**	-.584**	-.724**
City	-.793**	-.324*	-.769**
Town	-.673**	-.609**	-.731**
Rural	-.753**	-.692**	-.743**
Rural Fringe/Distant	-.763**	-.682**	-.750**
Rural Remote	-.751**	-.707**	-.734**

Linear Regression of Student Outcomes by Poverty Measures

		Eligibility	Whole School SIDE	Students Out-of-Town	Students In Town
Rural Fringe / Distant	HS Graduation Rate	0.458	0.248	0.277	0.32
	Post-Secondary Enrollment	0.398	0.311	0.201	0.283
	Satisfactory Attendance Rate	0.157	0.125	0.103	0.135
	Suspension/ Expulsion Rate	0.498	0.451	0.344	0.451
	ELEM SBAC ELA Proficiency	0.385	0.109	0.133	0.145
	ELEM SBAC Math Proficiency	0.383	0.093	0.102	0.101
	HS ACT Composite	0.477	0.378	0.372	0.456
Rural Remote	HS Graduation Rate	0.248	0.057	0.083	0.138
	Post-Secondary Enrollment	0.168	0.032	0.116	0.163
	Satisfactory Attendance Rate	0.085	0.042	0.151	0.127
	Suspension/ Expulsion Rate	0.163	0.025	0.128	0.146
	ELEM SBAC ELA Proficiency	0.285	0.03	0.104	0.132
	ELEM SBAC Math Proficiency	0.255	0.023	0.078	0.073
	HS ACT Composite	0.302	0.256	0.235	0.299

Conclusions

- Eligibility consistently explains variation in student outcome measures to a greater degree than alternative poverty measures.
- Sensitivity and consistency is dependent on context. Poverty measures have different results when compared to others. At the state level, results are mixed pointing to the need for a nuanced look at the construction of each measure.
- Alternative poverty measures tend to explain variation in student outcomes more readily in cities in comparison to towns or rural areas.
- Poverty estimates that rely on geolocations may underestimate poverty in rural areas.

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Thank you for your interest!

Please address questions/comments to:

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