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## Education's Effect on Poverty: the Role of Migration and Labor Markets

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This is a revision of a paper that was presented at the Principal Paper session, "Whither Jobs and People?: Rural-Suburban-Urban Differences and Modern Growth Patterns," Allied Social Sciences Association annual meeting, Chicago, January 5-7, 2007. The revision benefited from comments of our discussant Sheldon Danziger and participants at the session.

### **Abstract**

Improving the quality of education and encouraging students to stay in school is one possible strategy for reducing poverty and raising local well-being in rural areas. A potential obstacle to this strategy, however, is outmigration to metro areas due to the lack of demand for this better-educated rural workforce, and secondarily, the necessity of leaving rural areas to attend college. Even where robust rural job growth exists, the lower wages offered by rural employers dampen the poverty reducing power of education.

In this paper, we test for both a "direct" effect of educational attainment on the poverty status of rural adults, which operates through access to higher-quality jobs; and an "indirect" effect, which operates through a higher likelihood of outmigration to urban areas and hence access to higher monetary returns to education. Drawing from a sample of 701 households in the Panel Study of Income Dynamics, we find that, in general, better-educated rural household heads are more likely to move to urban areas during the 1990s and that poverty status is affected by that move. As a first step in assessing the impact of labor market conditions, we examine the effect of the unemployment rate in the county of origin on the migration decision.

Education is a key determinant of economic well-being for both individuals and places. Despite overall improvements, however, rural residents still have significantly lower educational attainment than urban residents. Improving the quality of education and encouraging students to stay in school is one possible strategy for reducing poverty and raising local well-being. A better-educated workforce should have higher incomes. Partridge and Rickman showed that both education levels and increases in attainment explained spatial variation in poverty reduction.

Outmigration to metro areas is a potential obstacle to this strategy, however. Migration from rural areas occurs because of the lack of demand for a better-educated rural workforce and the necessity of leaving rural areas to attend college (Gibbs). Outmigration may prevent local human capital levels from reaching the threshold required to attract new industry or encourage expansion in the existing economic base. Even where robust rural job growth exists, the lower skill levels and wages offered by rural employers, on average, both dampen the poverty-reducing power of education and hinder long-term development prospects associated with an increasingly high-skill economy.

This study documents a direct and an indirect effect of education on household poverty status. Data from the Panel Study of Income Dynamics (PSID) is used to obtain a sample of 701 working-age (25-64 years of age) household heads that lived in a non-metro county in 1993. The metropolitan and poverty status of their households is observed in 1999. For adults who live in a rural area, greater educational attainment has a direct effect on eventual poverty status by increasing the likelihood of obtaining higher income (wherever they live) and an indirect effect on eventual poverty by increasing the likelihood of moving to an urban place with better income-earning opportunities. Controlling for the fact that better-educated rural adults are more likely to move to urban areas, the study finds that migration has an influence on the likelihood of being poor.

## **Education, Rural-Urban Migration and Poverty: Conceptual Framework and Hypotheses**

Human capital theory suggests that education and migration are related investment decisions. Education involves migration if nearby educational opportunities are not available, and migration depends on education if local employment opportunities appropriate to one's education are not available. Once formal educational investments have been made, income and poverty status are determined, in part, by education levels and rural or urban residence.

In our conceptual framework of education-poverty links (figure 1), pathway (a) represents the direct effect of education on poverty, which should be positive in sign (see Psacharopoulos and Patrinos for a review of the returns-to-education literature). Few studies, however, consider the ways in which education can indirectly affect the risk of being poor. A plausible indirect channel of influence, which we study in this paper, runs from educational attainment to migration probability to poverty risk, shown as pathways (b) and (c).

Theory and empirical evidence suggest a positive association between education and migration. The human capital theory of migration posits that working-age individuals contemplating a move consider the present value of benefits minus costs of moving (Sjaastad).<sup>1</sup> An individual's education level should influence both the costs and benefits of migration. From a cost perspective, well-educated workers may have improved access to information about employment opportunities outside their local labor market, and may be more efficient at researching such opportunities (Borjas).

Highly educated workers should also have greater incentives to move because the size of a worker's relevant labor market increases with education level. Costa and Kahn, for example, document that college-educated couples increasingly locate in large metro areas. The authors present evidence that this phenomenon is partly explained by the higher probability of finding a

job and improved matches in large metro areas. In short, net benefits of nonmetro-metro migration are expected to be higher for well-educated individuals.

This hypothesis is consistent with the rural-urban “brain drain” documented in some studies (Artz; Domina; Fisher; Gibbs and Cromartie; Baumann and Reagan). Fisher finds that individuals with low human capital choose to live in rural places or are reluctant (or unable) to leave them. Domina’s analysis of nonmetro migration patterns between 1989-2004 finds that rural college graduates are three times more likely to move to the city than less-educated rural people. Further, the data indicate that every year over 6 percent of all nonmetro holders of a bachelor’s degree migrate to a metro area.

The association between nonmetro-metro migration probability and poverty risk (pathway (c) in figure 1), is expected to be negative in sign. Neoclassical economic theory predicts workers are responsive to spatial wage differences and move to areas where wage levels are relatively high (Smith). The human capital theory views migration as an investment in human capital that yields future monetary returns (Sjaastad).

Our interest is the specific move from nonmetro-metro locations, and if such moves offer a route out of individual poverty. Mills and Hazarika (2001) show gains in initial earnings for those who migrate from their nonmetro county of origin. They also find that returns to schooling are higher for people who move to both metro and other nonmetro counties than for those who stay in place. There is other research showing returns to education are higher in metro than nonmetro areas (McLaughlin and Perman; Mills and Hazarika 2003). Other literature documents substantial benefits accruing to individuals who leave rural areas. Wenk and Hardesty, for example, find that moving from a rural to an urban area reduces time spent in poverty among young women. Rodgers and Rodgers show that, six years after moving, real annual earnings of rural-to-urban migrants are an average of 30 percent higher than if the move had not occurred.

## Empirical Model

To test the hypotheses outlined in figure 1, we specify a recursive empirical model consisting of two equations; one for migration, and the other for poverty. The probit model of nonmetro-metro migration accounts for the possibility that migration is endogenous to poverty (equation 1 below). The model assumes the probability an individual moves from a nonmetro to a metro area is a function of the householder's *age*, *education*, *gender*, *race*, *family size*, *marital status* and *change in marital status*; the *unemployment rate* of the county of origin; *region* binary variables for the region of pre-move origin; and a dummy variable indicating whether the householder *grew up in a rural area*. The nonmetro-metro migration model is:

$$\begin{aligned} & migration = \alpha_0 + \alpha_1 education + \alpha_2 age + \alpha_3 agesq + \alpha_4 gender + \alpha_5 race + \dots \\ (1) \quad & \dots + \alpha_6 maritalstatus + \alpha_7 chgmaritalstatus + \alpha_8 unemploymentrate + \alpha_9 region + \dots \\ & \dots + \alpha_{10} grewuprural + \varepsilon \end{aligned}$$

As discussed above, we expect a positive association between education and rural-urban migration. We included age and age-squared terms in the model because we expect that nonmetro-metro migration probability for adults falls from its peak in the mid-20s in a nonlinear fashion (Plane). Since migration is an investment, incentives to migrate are lower later in life due to the shorter time horizon over which migration gains can be realized. We expect female householders have a lower probability of making a nonmetro-metro move, reflecting the influence of family ties on women's geographic mobility (Nakosteen and Zimmer), particularly rural women. Finally, changes in marital status between 1993 and 1999 (through divorce, separation, or marriage) are included to account for these important life changes that likely influence residential choice.

Theory and empirical evidence do not provide guidance on the expected sign of the relationship between race and nonmetro-metro migration. Poor local labor market conditions may increase the likelihood of moving to metropolitan counties as workers search for

employment. To test for this, we include the 1992 unemployment rate of the respondent's county of residence, the last publicly available county unemployment rates in the PSID. The region binary variables are included to control for other inter-regional differences in labor market conditions and cultural norms. Finally, note that the *grewuprural* variable is an identifying instrument. We assumed growing up in a rural area influences the migration decision but is not directly associated with poverty status.<sup>2</sup>

The second equation in our recursive model is a probit model of householder poverty (equation 2). The dependent variable is a binary variable indicating whether the householder is income *poor*, defined as having before-tax family cash income less than or equal to 100% of the family-size-conditioned official poverty thresholds. In the model, *pmigration* denotes predicted migration from the first-stage probit regression. Householder characteristics (*education, age, age squared, gender, race, marital status, and family size*) and *region* are defined as in equation 1.

The poverty model is:

$$(2) \quad \begin{aligned} \text{poor} = & \beta_0 + \beta_1 \text{education} + \beta_2 \text{pmigration} + \beta_3 \text{age} + \beta_4 \text{agesq} + \beta_5 \text{gender} + \dots \\ & \dots + \beta_6 \text{race} + \beta_7 \text{maritalstatus} + \beta_8 \text{familysize} + \beta_9 \text{region} + \nu \end{aligned}$$

The poverty model captures some of the main determinants of human impoverishment highlighted by poverty researchers (e.g. Rank, Yoon, and Hirschl; Schiller). One common view is that poverty results from specific attributes of poor people, such as low levels of education or lack of competitive labor market skills. From this individualist perspective, poverty is a consequence of individual decisions related to education, employment, and family structure. These decisions in turn, have implications for economic well-being. Others argue that poverty is mainly the result of restricted educational, economic, and political opportunities. Restricted opportunities may be related to place of residence or may originate from discrimination on the basis of gender, race, ethnicity, or class. Thus, according to the restricted opportunity viewpoint,

poverty is conditioned by forces beyond the control of individuals and families. We consider these two explanations of poverty complementary, as reflected in equation 2.

### **Data**

This study uses data from the 1993 and 1999 waves of the Panel Study of Income Dynamics (PSID), a longitudinal survey that has followed a representative sample of about 5,000 families and their descendants since 1968 (see Brown, Duncan, and Stafford and Hill for detailed descriptions of the PSID). The PSID dataset is particularly useful for these analyses because it provides, for public use, information on nonmetro/metro residence for certain years.<sup>3</sup> We focus on a sub-sample of the PSID data consisting of 701 household heads aged 25-64 residing in nonmetro counties in 1993.<sup>4</sup> We then track nonmetro-metro migration of these individuals between 1993 and 1999 and measure their poverty status in 1999. Table 1 provides descriptive statistics for this subsample.

### **Results**

Table 2 gives estimated coefficients and their associated  $p$ -values for our two- stage probit model and estimated marginal effects, calculated at the mean of continuous variables (years of education, predicted migration, age, family size) and for a discrete change between 0 and 1 for binary variables (male, white, married, grew up rural). Stage I models the migration decision for working-age nonmetropolitan household heads in 1993 given by equation (1) (first and second columns of table 2). Stage II models poverty status for the same sample in 1999, given by equation (2). The model is run both with and without predicted migration (last four columns of table 2).

#### *Education's Association with Migration*

Our results provide evidence that educational attainment in 1993 influenced the decision by working-age nonmetropolitan household heads to migrate from nonmetropolitan to metropolitan counties between 1993 and 1999. The estimated coefficient in the migration model



is positive and statistically significant at the 5% level. This suggests that all else equal, more years of schooling will increase the probability of moving to a metropolitan county. In fact, we estimate that, *ceteris paribus*, an additional year of schooling increases this probability by 10 percent (table 2).

### *Education and Migration's Association with Poverty*

Stage II models poverty status with the inclusion of predicted migration, education and householder demographics, including family size and region of origin as explanatory variables. Columns 5 and 6 of table 2 show that, as anticipated, education has a very strong effect on the likelihood of being in poverty. The coefficient is highly significant, and the marginal effect estimate suggests that an additional year of education reduces poverty risk by 37.1 percent.

Contrary to expectation, however, the estimated coefficient on predicted migration is not statistically significant. This suggests that, given one's education, the poverty risk for those who are likely to move is no different than the risk for those likely to stay in rural areas. The results in columns 3 and 4 reinforce this conclusion about the strong direct effect of education on poverty risk; if predicted migration is dropped from the model, the estimated coefficient on education does not change.

### **Conclusion**

Our results seem to point to the following conclusions:

(1) There is a brain drain from rural counties: people with more education are more likely to move, *ceteris paribus*. This result from the migration model is supported by descriptive statistics in our sample: 19.3% of the people with twelve years of education migrated to a metro area, compared to 29.2% of people with sixteen years or more of education.

(2) More education is a path out of poverty: people with more education are less likely to be poor, *ceteris paribus*.

(3) While education appears to have a direct effect on poverty reduction, it does not have an indirect effect through encouraging migration. Even though more education increases the likelihood of moving to a metro area and reduces the probability of being poor, it is additional education and not moving per se, that reduces poverty risk. Education reduces poverty risk for both those who migrate and those who do not; people with more education are less likely to be poor, whether or not they move.

Lack of a migration effect once the educational selectivity of migration is accounted for, suggests that human capital investment drives residential choice and income. But that once this human capital level is controlled for, moving does not reduce the risk of poverty. This implies that encouraging migration (among the least educated) or discouraging migration (among the better educated) is probably not a good strategy for rural poverty reduction.

The weak association between migration and poverty may be due in part to the less stark differences in rural and urban economic opportunity in the 1990s, compared with previous decades. It seems reasonable that as rural and urban economic conditions become more similar, the human capital embodied in workers becomes a more important determinant of well being than where the human capital is utilized.

These findings also suggest that policies to discourage rural “brain drain,” in isolation from job growth strategies, are likely to have little impact either on the local educational profiles or on poverty rates. It then becomes important to know what job growth strategies are more likely to reduce poverty. Is a strategy that combines educational improvements with a high-wage job strategy ultimately a more effective way to reduce area poverty than simply providing lower-skill, but stable, jobs to less-educated rural residents near the poverty line? Additional research is needed to answer whether outcomes for these strategies differ in the short- and long-run.

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## Endnotes

<sup>1</sup> Benefits of migration include, for example, higher expected wages or a more favorable social, cultural, or physical environment at the destination location. Moving costs include both pecuniary costs such as information gathering and psychic costs associated with moving away from family, friends, and familiar surroundings.

<sup>2</sup> A respondent is considered to have “grown up rural” if s/he states that s/he grew up in or on a “farm, rural area, or the country”. When *grewuprural* is added as an explanatory variable in the poverty status model, it is statistically insignificant ( $p$ -value = 0.432), lending empirical support to its use as an identifying instrument.

<sup>3</sup> The PSID, the Current Population Survey (CPS), the Survey of Income and Program Participation (SIPP), the National Longitudinal Survey of Youth (NLSY), and the National Survey of America’s Families (NSAF) are the main national surveys used for poverty research. The CPS, similar to the PSID, provides public-use access to data on metro/nonmetro residence. However, in the CPS, a number of observations are suppressed for these area variables in order to protect the anonymity of respondents.

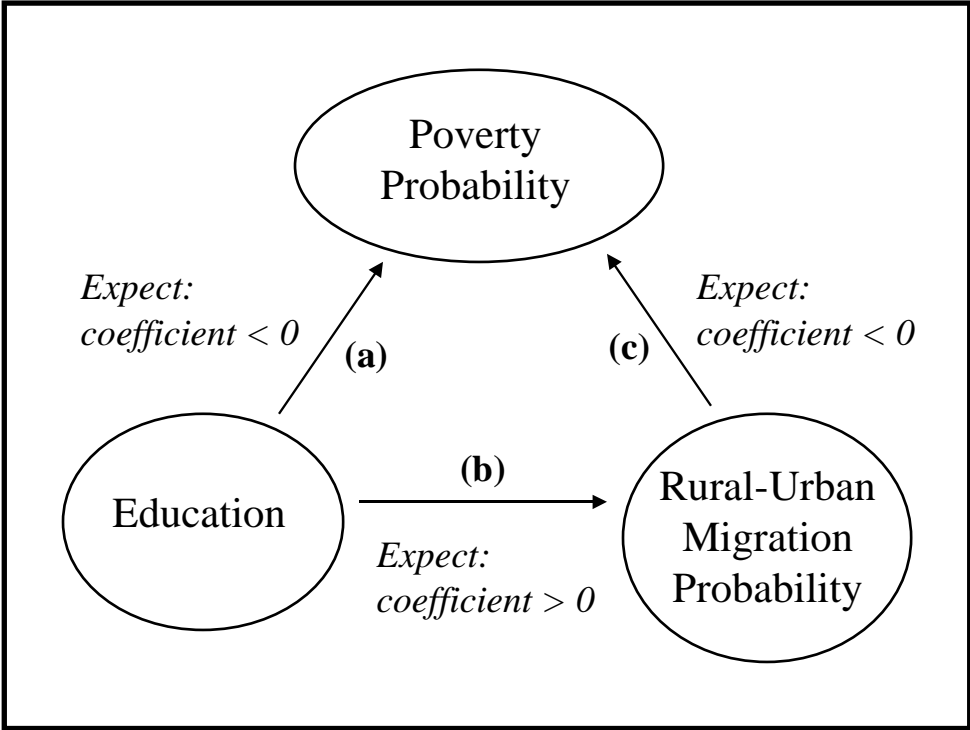
<sup>4</sup> The initial sample of working-age householders with nonmetro residence in 1993 was 870 individuals. A total of 166 observations were dropped due to missing values for analysis variables.

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Figure 1. Direct and indirect effects of education on poverty



**Table 1: Descriptive statistics for a sample of U.S. nonmetropolitan adults**

	<i>Variable Means or Percent of Sample</i>
Nonmetro-Metro Migration	18.8%
Poverty	10.1%
Years of Education	12.7
Age (1993)	39.4
Age (1999)	45.0
Male	81.7%
White	76.0%
Married (1993)	69.5%
Married (1999)	69.7%
Change of Marital Status	11.9%
Grew Up Rural	35.5%
Unemployment Rate	7.6%
Northeast (1993)	6.7%
Northeast (1999)	6.3%
North Central (1993)	32.1%
North Central (1999)	32.4%
West (1993)	8.2%
West (1999)	8.5%

Panel Study of Income Dynamics, 1993 and 1999 waves ( $N = 701$ ).



**Table 2: Migration and poverty status probit models with marginal effects (M.E.)**

	<i>Migration</i>		<i>Poverty Status</i>	
	Est. Coeff. ( <i>p</i> - Value)	M.E. (S.E.)	Est. Coeff. ( <i>p</i> - Value)	M.E. (S.E.)
Years of Education	0.064 (0.021)	0.015 (0.007)	-0.122 (0.003)	-0.011 (0.004)
Pr(Migration)	--	--	-1.813 (0.218)	-0.159 (0.125)
Poverty 1993	--	--	1.098 (0.000)	0.189 (0.051)
Age	0.027 (0.680)	0.006 (0.016)	0.014 (0.873)	0.001 (0.008)
Age Squared	-0.000 (0.559)	-0.000 (0.000)	-0.000 (0.848)	-0.000 (0.000)
White	0.185 (0.319)	0.042 (0.040)	-0.638 (0.006)	-0.076 (0.036)
Male	-0.007 (0.973)	-0.002 (0.050)	-0.318 (0.132)	-0.041 (0.026)
Married	-0.141 (0.515)	-0.034 (0.054)	-0.399 (0.073)	-0.041 (0.026)
Change Marital Status	0.261 (0.139)	0.068 (0.050)	--	--
Family Size	-0.127 (0.029)	-0.030 (0.014)	0.055 (0.393)	0.005 (0.006)
Grew Up Rural	-0.375 (0.008)	-0.084 (0.029)	--	--
Unemployment Rate	0.012 (0.610)	0.003 (0.006)	--	--
Northeast	1.866 (0.000)	0.638 (0.070)	1.444 (0.149)	0.316 (0.344)
North Central	0.131 (0.420)	0.032 (0.040)	0.307 (0.167)	0.030 (0.023)
West	0.554 (0.008)	0.161 (0.071)	-0.827 (0.126)	-0.041 (0.014)
Constant	-1.966 (0.126)	--	0.515 (0.798)	--

Notes: <sup>1</sup>Sample is of 701 working-age (25-64 years of age) household heads who are residents of nonmetropolitan counties in 1993.

<sup>2</sup>Age, Married, and Region of Residence use 1993 data for Stage I and 1999 data for Stage II; Years of Education uses 1993 data for both Stage I and Stage II.

<sup>3</sup>Marginal effects are calculated as  $(dy/dx)/Pr(\text{migration})$  or  $(dy/dx)/Pr(\text{poverty status})$ ;  $dy/dx$  is for discrete change of dummy variables from 0 to 1.

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<sup>4</sup>Years of Education has an upper bound at 17 years.

<sup>5</sup>More precisely,  $\Pr(\text{Migration}_i \mid \text{Years of Education}_i, \text{Age}_i, \text{Male}_i, \text{White}_i, \text{Married}_i, \text{Grew Up Rural}_i, \text{Region of Residence}_i), i = 1, \dots, 701$ .

<sup>6</sup>"Grew Up Rural" acts as the instrumental variable. It takes the value one if the respondent states that s/he grew up in or on a "farm, rural area, or the country" and zero otherwise.