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# Relative poverty as a determinant of migration: Evidence from Poland<sup>☆</sup>

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## ABSTRACT

We explore the relationship between aggregate relative poverty and migration. We draw upon Polish regional data and use a measure of aggregate relative poverty that is functionally related to the Gini coefficient. We find that the Gini coefficient and migration are positively correlated, holding the population's per capita income constant.

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## 1. Introduction

The relationship between migration and poverty is strong: very often migration facilitates, or is, an escape from poverty. The concept of poverty that researchers typically have in mind in the migration–poverty context is absolute poverty. Yet poverty has a compelling dimension of relativity: people could feel poor if upon comparing themselves with others they find that their income is lower than the incomes of others. Household members could undertake migration not necessarily to increase the household's absolute income but rather to improve the household's position (in terms of relative poverty) with respect to a specific reference group (Stark and Taylor, 1989; Stark and Taylor, 1991; Quinn, 2006).

There are various ways of measuring the prevalence and intensity of relative poverty. One measure, elicited from the rich literature on relative deprivation and reference groups (Stark and Wang, 2005 is a recent example) is the fraction of those in an individual's community with whom the individual compares his income and whose incomes are higher than the income of the individual, times the mean excess income. In a recent *Letter* (Stark, 2006), it was shown that summing

up the measure of relative poverty thus defined over all the individuals who constitute the community is equal to the total income of the community times the Gini coefficient of income inequality. That is, the aggregate relative poverty, ARP, is

$$ARP = G \sum_{i=1}^n w_i \quad (1)$$

where  $G$  is the Gini coefficient of inequality of the distribution of income and  $w_i$  is the income of individual  $i$ ,  $i = 1, \dots, n$ . Clearly, if we normalize the community's total income at 1, then the Gini coefficient is the community's aggregate level of relative poverty. The question that comes then to mind is whether, holding all other relevant variables constant, the inclination to resort to migration from a community is positively related to the community's aggregate relative poverty, as measured by the Gini coefficient. We expect to find empirical validation of the argument that the community's aggregate relative poverty impinges positively on migration. The simple intuition behind this expectation is that individuals care about their relative income or wealth (about their relative lack of income or wealth), and that migration is a response to a low relative position in a group (or in a population).

In Section 2 we draw upon Polish regional data to test the hypothesis that aggregate relative poverty impinges positively on the propensity to migrate. We find that aggregate relative poverty, as

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measured by the Gini coefficient, and migration are positively correlated, holding the population's per capita income constant. The results point to policy implications that we present in Section 3.

## 2. Empirical analysis

The analysis in this section is undertaken at the Polish regional level.<sup>1</sup> Poland consists of 16 voivodships (regions) that range in area from under 10,000 km<sup>2</sup> to over 35,000 km<sup>2</sup>, and in population from one million to over five million.<sup>2</sup> The data available to us cover international migration and interregional migration to and from voivodships.<sup>3</sup> The data are based on records from municipal population registers.<sup>4</sup> That the data pertain to population migration rather than to labor migration could cloud the interpretation of the results because population migration does not distinguish between employment-related migration and non-labor migration (migration that is due to marriage, divorce, education, or retirement, for example). However, a great many migration studies face this problem when only population-migration data are available.<sup>5</sup>

Kępińska (2004) shows that there is considerable inter-regional variation in the proclivities and patterns of migration in Poland. Indeed, a careful look at the regional migration patterns reveals significant regional differences. For example, in 2005 the gross international migration rates (the number of individuals from a region who left Poland to establish residence elsewhere per 1,000 of the region's population) ranged from about 0.08 in Mazowieckie voivodship to 3.3 in Opolskie voivodship. The regional distribution of international migration did not change significantly during the period 1999–2005. The south-western border regions (Opolskie, Śląskie, and Dolnośląskie voivodships) and the northern regions (Pomorskie and Warmińsko-Mazurskie voivodships) were the main sources of international migration.

The transition from central planning to a market economy led to a dramatic increase in the regional variation in economic outcomes in the transition economies. The richest regions in Central Europe have a per capita income about three times as high as that of the poorest regions (World Bank, 2004). Poland is not an exception; the country-wide Gini coefficient of income inequality for Poland increased from very low levels at the beginning of the transition period in the early 1990s, to 0.29 by 1998, and to 0.34 by 2004.<sup>6</sup> Data on the regional Gini coefficients are available to us for the period 1998–2004.<sup>7</sup> The regional Gini coefficients differ widely, with the highest level observed in Mazowieckie voivodship (Gini coefficient of 0.39 in 2004), and the lowest level recorded in Podlaskie voivodship (Gini coefficient of 0.28 in 2004).

<sup>1</sup> Most of the data used in this section were obtained from the *Demographic Yearbook of Poland* and from the *Statistical Yearbook of the Regions - Poland*, published by the Polish Central Statistical Office. Unpublished data on the regional Gini coefficients were obtained from the Polish Central Statistical Office by means of personal communication.

<sup>2</sup> The 16 voivodships correspond to the European Commission's NUTS-2 regional level.

<sup>3</sup> The data report overall immigration and emigration per voivodship, without distinguishing between the voivodship of origin and the country of destination (in the case of international migration) or between the voivodship of origin and the voivodship of destination (in the case of interregional migration).

<sup>4</sup> These figures are likely to underreport the actual extent of migration somewhat, since not all migrants report (or promptly report) their move to the authorities. However, since access to some public goods such as health care and schooling is easier in one's place of official residence, the official statistics probably provide a good measure of permanent migration while they may underreport temporary moves.

<sup>5</sup> van Leuvensteijn and Parikh (2002) compare population migration and labor migration for Germany and find that the regressions using population migration and the regressions using labor migration yield similar results.

<sup>6</sup> At the beginning of the transition period, the formerly socialist countries experienced no official unemployment and very egalitarian distributions of incomes.

<sup>7</sup> More precisely, the data are available for the years 1998, 1999, 2001, 2002, and 2004. We have interpolated the data for the years 2000 and 2003.

To test the hypothesis that aggregate relative poverty impinges positively on the propensity to migrate, we perform fixed-effects estimations, using both international and interregional migration rates for the period 1999–2005 as dependent variables, using the Gini coefficient as the main explanatory variable of interest, and controlling for per capita disposable income in the voivodships (Table 1).<sup>8</sup> The latter income is divided by the national average income to eliminate the effects of income growth.

Inclusion of other control variables merits some explanation. Research on labor migration emphasizes the importance of unemployment and job availability in determining migration.<sup>9</sup> We thus include in the regressions the voivodship unemployment rate so as to measure the paucity of regional employment opportunities. Exploring “the fundamentals” that drive world migration, Hatton and Williamson (2002) show that the countries that are most likely to generate migration are poor countries with a large share of young population. We proxy the level of *absolute* poverty in a voivodship by poverty rates (measured as the percentage of the population living below the poverty line), and we include the share of population aged 20–29 years in the regressions. To account for the degree of urbanization, we control for population density. In addition, in the regressions that use international migration rates as a dependent variable we control for net interregional migration rates, since regions that show relatively high internal mobility are also likely to generate high international migration. Since the explanatory variables may be endogenous to migration, they are lagged by one year. All the regressions include a time trend to control for unmeasured factors (for instance, changes in the demand for Polish labor in the destination countries, or improved communication and transportation links) that contribute to migration and that are potentially correlated with income inequality.

We begin the analysis with the simple case in which the postulated determinant of migration is income, and there is no direct effect of inequality. We refer to this case as the case of the *absolute income hypothesis*.<sup>10</sup> The results in columns 1 and 4 of Table 1 indicate that the coefficient on income is not significantly different from zero. We thus do not find support for the simple absolute income hypothesis.

We refer to the possibility that migration behavior is shaped by income relative to the incomes of others as the case of the *relative income* (or *relative deprivation*) hypothesis. To wit, Stark (2006) shows that aggregate relative deprivation is positively related to the Gini coefficient and argues that the Gini coefficient and migration are positively correlated, holding the population's income constant. Columns 2 and 5 of Table 1 show that a higher Gini indeed leads *ceteris paribus* to higher incidence of both international migration and interregional migration, although the coefficient in column 2 is significant only at the 10% level of significance.

Columns 3 and 6 of Table 1 control for other factors that could impinge on migration flows. The results in column 6 show that the Gini coefficient continues to have a positive and significant impact on migration. Somewhat weaker results in the same vein are suggested by column 3. That is, higher aggregate relative poverty in the voivodship of origin is associated with a higher overall propensity of migration.<sup>11</sup> Interestingly, unemployment has a negative effect on both international and interregional migration outflows. This finding

<sup>8</sup> Both the Breusch-Pagan test and the Hausman test were in favor of the application of a fixed effects model.

<sup>9</sup> See, for example, DaVanzo (1978), Greenwood (1985), and Blanchard et al. (1992).

<sup>10</sup> We could just as well have used the term *absolute poverty hypothesis*, indicating that migration is a consequence of low income; the prospect of earning higher income elsewhere induces migration by more among those whose incomes are low than among those whose incomes are high.

<sup>11</sup> We also estimated the specifications in columns 3 and 6 as a system, using the SUR estimator. The results were qualitatively similar.

**Table 1**  
Determinants of International and Interregional Migration, 1999–2005.

	International outflows			Interregional outflows		
	(1)	(2)	(3)	(4)	(5)	(6)
Income per capita	–0.649 (0.575)	–0.656 (0.502)	–0.320 (0.321)	2.545 (2.989)	2.480 (3.157)	5.186 (4.717)
Gini coefficient	–	2.188* (1.266)	1.998* (1.126)	–	19.98** (9.612)	25.31** (10.80)
Unemployment rate	–	–	–0.029* (0.017)	–	–	–0.064** (0.028)
Poverty rate	–	–	–0.004 (0.012)	–	–	0.123* (0.074)
Share of population aged 20–29 years	–	–	0.049 (0.036)	–	–	0.081 (0.078)
Population density	–	–	0.044*** (0.013)	–	–	–0.008 (0.028)
Net interregional migration rate	–	–	0.273*** (0.076)	–	–	–
Adjusted R <sup>2</sup>	0.86	0.85	0.86	0.70	0.70	0.71
Breusch-Pagan test (p-value)	323.01 (0.000)	306.29 (0.000)	311.54 (0.000)	147.26 (0.000)	149.41 (0.000)	95.13 (0.000)
Hausman test (p-value)	14.26 (0.000)	14.19 (0.003)	14.02 (0.005)	9.52 (0.008)	9.30 (0.009)	10.51 (0.003)

Notes: Fixed effects estimations. The dependent variables are the international and interregional outflows per 1,000 of the voivodship's end-year population. The explanatory variables are lagged by one year. All regressions include a time trend. There are 112 observations in all regressions. Robust standard errors are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

merits some reflection since it does not align with expectations or with the findings of others.<sup>12</sup> The result is, however, in line with the findings of Fidrmuc (2004). Using interregional migration data for Poland for the 1992–1997 period and for 49 voivodships (according to the old administrative classification), Fidrmuc finds that unemployment has negative effect on both inbound and outbound interregional migration flows. A plausible explanation for the negative effect of unemployment on migration is that the unemployed in Poland, as in other formerly communist countries, experience significant constraints in resorting to migration due to structural factors: for example, if a worker's human capital is not transferable across industries, an unemployed worker in a region that is dominated by traditional communist-era industries may face bleak employment prospects in other regions.

We find that the poverty rate in itself has no statistically significant effect or only marginally significant effect on migration. This result is in line with the finding of Hatton and Williamson (2002) that in Europe, poverty constitutes a weak constraint. We also find that regions with high (net) interregional migration flows tend to generate higher international migration rates. Population density has a significant impact on international migration flows. We might expect that a higher population density would be associated with advanced levels of urbanization and higher outflows of international migrants. A tentative interpretation of this finding is that a higher population density is associated with a higher share of high-skilled workers in a region's workforce, and these workers face better employment opportunities abroad, so that the pool of potential migrants may consist in large part of high-skilled workers who earn relatively high wages in their voivodship and hence exhibit little inclination to move to another voivodship (while still exhibiting a discernible inclination to move abroad).

While the aggregate relative poverty as measured by the Gini coefficient exhibits a robust effect on both international and interregional migration flows, it could be argued that measuring aggregate relative poverty by means of the Gini coefficient gives rise to

several concerns.<sup>13</sup> An argument could be made that since income is poorly measured, income deprivation is poorly measured too, and that the observed correlation between relative poverty and migration may be picking up some aspect of the measurement error in income. Therefore, it is helpful to check whether the result that aggregate relative poverty plays a significant role in determining migration is robust to alternative plausible measures of relative poverty. We thus repeated the regressions with the Gini coefficient replaced, in turn, by the coefficient of variation and by the ratio of the tenth to the first decile of income distribution. Although devoid of the behavioral link that exists between aggregate relative poverty and the Gini coefficient, these measures could still gauge the relative poverty of a population. The results reported in Table 1 were replicated employing these measures.<sup>14</sup> This suggests that the possible argument of a spurious correlation between the Gini coefficient as a (specific) measure of aggregate relative poverty and migration is ill founded.

The preceding argument differs in perspective and prediction from an argument that conditions migration on a comparison between the degree of income inequality at origin and the degree of income inequality at destination (Borjas, 1987). We contend that a higher level of aggregate relative poverty at origin, which is picked up by a conventional measure of income inequality – the Gini coefficient – leads *ceteris paribus* to a stronger propensity to migrate. In Borjas' analysis based on U.S. immigration data, however, countries with higher income inequality have lower migration rates.<sup>15</sup> Thus, there is an empirical distinction between our findings and those of Borjas.<sup>16</sup>

Finally, a concern could be raised that after all, whereas our theoretical argument is that a high Gini coefficient induces migration specifically by those who are at the bottom of the income distribution, our empirical results merely show that higher migration is related to a higher Gini coefficient. To address this concern, we can specify a model for individuals' behavior.

Assume that the probability of migration by individual  $i$  is determined by the linear probability model

$$\Pr(m_i = 1 | nrp_i, x_i) = \gamma nrp_i + x_i \beta \quad (2)$$

where  $m_i$  is a dummy for migration,  $x_i$  is a vector of control variables,  $nrp_i$  is normalized relative poverty for individual  $i$ , which in turn is defined as

$$nrp_i = \frac{\frac{1}{n} \sum_{j=i+1}^n (w_j - w_i)}{\bar{w}} \quad (3)$$

$\bar{w}$  is mean income,  $\gamma$  and  $\beta$  are coefficients, and the observations for  $w$  are arranged in ascending order. A positive relationship between normalized relative poverty and the probability of migration exists if  $\gamma > 0$ .

For Poland, it is impossible to test for the sign of  $\gamma$  at the individual level since household budget surveys do not include a question on the reasons for the absence of household members. Let us assume then that individuals compare their incomes with the incomes of others who live in the same voivodship as they do. In this case,  $nrp_i$  for each of the individuals in voivodship  $s$  can be calculated on the basis of data for that voivodship. The aggregate equivalent of Eq. (3) for voivodship  $s$  can be written as

$$E(\bar{m}_s | gini_s, \bar{x}_s) = \gamma gini_s + \bar{x}_s \beta \quad (4)$$

<sup>13</sup> Although there are a number of axioms on the nature of inequality that are broadly accepted, these are insufficient to permit us to make unambiguous inequality rankings between any two distributions of income. In particular, different inequality measures give different emphasis to different sections of the income distribution.

<sup>14</sup> This is not surprising since the cross-voivodship correlations between the different measures on income inequality are quite high, ranging above 0.95.

<sup>15</sup> For a fuller exposition of this issue see Stark (2006), p.149.

<sup>16</sup> A test that fully contrasts our analysis with that of Borjas requires, inter alia, data on income inequality at destination; for now we do not have such data.

<sup>12</sup> For example, Blanchard et al. (1992) come to strong conclusions about the predominance of migration over other forms of adjustment to changes in unemployment.

where bars stand for mean values of the variables in voivodship  $s$ , and  $gini_s$  in Eq. (4) replaces  $nrp_i$  in Eq. (2) since, as follows from Eq. (1), the Gini coefficient is equal to the mean normalized relative poverty (cf. Stark, 2006).<sup>17</sup> Correspondingly, the coefficient for  $gini_s$  in the aggregated model is equal to the coefficient for  $nrp_i$  in the disaggregated model.<sup>18</sup> Therefore, under standard assumptions of exogeneity and no systematic measurement errors, a positive regression coefficient for  $gini_s$  in the aggregated model implies a positive relationship between the normalized relative poverty and the probability of migration.

### 3. Conclusions

It seems fairly safe to anticipate that a higher level of absolute poverty will be associated with a stronger inclination to migrate. In this paper we ask whether *relative* poverty also impacts on the propensity to migrate. In a recent *Letter* (Stark, 2006), it was shown analytically that the Gini coefficient and migration are positively correlated, holding the population's per capita income constant. In this paper we have shown empirically that the Gini coefficient, our measure of aggregate relative poverty, and migration are positively correlated, holding the population's per capita income constant.

A tentative policy implication of our analysis is that if migration is to be constrained, reducing absolute poverty alone may not be enough. This insight could be of value when considering the consequences of alternative development regimes. Improvements in *average* incomes within the communities of origin by no means guarantee elimination of relative poverty. In the midst of overall economic development, relative poverty may well be exacerbated. The relatively poor are likely to exhibit a rising propensity to migrate. Indeed, reducing income inequality in areas of origin could do as much to dampen migration as raising incomes there.

The links between relative poverty and migration are important for thinking about social policy as migration policy. If migration is affected by relative poverty, tax and transfer policies that change the distribution of income will have repercussions that work not only through the usual mechanisms, but also through inclinations to migrate. That is, if income has a nonlinear effect on migration, redistribution of income toward the poor is likely to reduce the inclination to migrate on average. On the other hand, if migration were linear in income and there were no effect of relative poverty on migration, then no matter how extreme is the inequality of income and how wide are the associated inequalities in migration inclinations, income redistribution would have no effect on migration. When assessing the evidence of the effect of relative poverty and income

inequality on the inclination to migrate, we are tackling an important policy issue.

Given the quality and the nature of the data that we have used, the results of our analyses should be interpreted with considerable caution. Nevertheless, the present inquiry illustrates the possibility of shedding light on interesting interlinkages, even when the data sets are far from complete. Our results could also be of value in guiding the generation of new data. For example, the analysis of the role of relative poverty in yielding migration outcomes would be more complete if information and data were available on reasons for the absence of household members in household surveys, on measures of aggregate relative poverty (Gini coefficients) for communities smaller than voivodships, and on the destination countries of international migrants.

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<sup>17</sup> Eq. (1) shows that the Gini coefficient is equal to the aggregate relative poverty divided by total income. Eq. (1) can be reformulated as follows: the Gini coefficient is equal to mean relative poverty divided by mean income. Since normalized relative poverty is equal to relative poverty divided by mean income, we conclude that the Gini coefficient is equal to mean normalized relative poverty.

<sup>18</sup> The dependent variable in the regressions reported in Table 1 is defined as the number of migrants per 1,000 of the voivodship's end-year population. This variable was used, instead of the rate of migration  $\bar{m}_s$ , in order to eliminate multiple upfront zeros in the estimates of the coefficients.