Illinois State University

ISU ReD: Research and eData

Summer 8-2-2012

Ethnic Diversity And Poverty: A Dynamic Panel Study Of Illinois Counties

Ambuj Neupane
Illinois State University, ambuj.neupane@gmail.com

Follow this and additional works at: https://ir.library.illinoisstate.edu/mte

Part of the Economics Commons

Recommended Citation

Ethnic Diversity and Poverty: A Dynamic Panel Study of Illinois Counties

Ambuj Neupane
Illinois State University
August 02, 2012

Abstract: Ethnic diversity's effects on factors of economic development have been studied widely in recent years. I expand upon this research by directly studying ethnic diversity's effects on the poverty rates within the counties of Illinois, using a dynamic panel technique devised by Blundell and Bond (1998). My results are consistent with the noted effects in previous literature, and provide extra weight towards measures of fractionalization and polarization. I conclude with policy implications and limitations which require future research.

Introduction:

The effect of ethnic diversity on economic development has been a very active subject in recent years. As the world becomes increasingly integrated, people are migrating to new locations. Communities are increasingly diverse, and as a result, many people from many different backgrounds need to learn how to live in the same community. The increase in diversity has made both policymakers and researchers keen to understand how diversity affects an economy, as it has implications that stretch into the social and political structure.

As many authors have noted (see Alesina and La Ferrera [2005] for a comprehensive review), ethnic diversity can bring both costs and benefits into an economy. The costs of ethnic diversity include racism, conflicts of preferences, prejudices, and general mistrust, which often lead to poor public policies that are less than optimal for society. Heterogeneous societies may also oppress minorities, leading to ethnic conflict. However, diversity also has benefits in the form of increased variety in abilities. Diversity also fosters the sharing of knowledge, which increases the potential for greater creativity and innovation. Therefore, it is far too complicated to label ethnic diversity as either 'good' or 'bad' for economic development.

Much of the previous work in this area has been concerned with issues of ethnic conflict, empirically investigating the role of conflict and its effects across countries. Studies have also looked at ethnic diversity's effects on investments, political stability, and growth rates. This paper studies ethnic diversity on a much smaller scale, focusing on the effect of ethnic diversity on the poverty rates within Illinois counties. This selection avoids most of the problems associated with ethnic diversity in the developing world (e.g., ethnic conflict, political upheaval, etc.). The counties of Illinois also have a good ethnic spread, as there are some counties which are very homogenous, and other counties which have a great deal of diversity.

The rest of this paper proceeds as follows. Section 2 reviews previous literature on ethnic diversity's effects on different facets of economic performance. Section 3 provides a brief overview of the distribution of poverty in Illinois. Section 4 follows with fractionalization and polarization theory, as well as the measurements I use for both theories. Section 5 provides a description of the data, followed by Sections 6 and 7, which discuss my estimation technique and results. Section 8 concludes.

Literature Review:

The relationships between ethnic heterogeneity on many different factors of economic development, such as growth, income inequality, and institutional quality have been well-explored in previous literature. Studies have been conducted on the international, national, and sub-national level, and have arrived at different conclusions on the effect of ethnic heterogeneity on economic development, all questioning the ways that ethnic diversity affects economic development.

A branch of the literature on ethnic diversity's effects on economic development uses variations of the index of ethnolinguistic fractionalization (ELF) as the primary measure for ethnic heterogeneity. Easterly and Levine (1997) use the ELF index in a cross-country comparison of African nations to argue that more racially fragmented countries experience less growth via ethnic conflicts. Specifically, they show that the high level of fragmentation in African nations is a major determinant of their slow growth. Collier and Gunning (1999) also associate fractionalization with the lack of growth-enhancing policies. Alesina et al. (2003) broadly confirm these findings and argue that ethnolinguistic fractionalization has negative effects on the quality of government policies and the quality of institutions.

Other studies include controls for democracy and income levels. Collier (2000, 2001) argues that the negative effects of fractionalization on growth occur only in non-democratic regimes. Easterly (2001) constructs an index of institutional quality in order to judge the effects of ethnic diversity on institutions, and finds that fractionalization's negative effect is much greater when the institutional quality is 'poor.' Alesina and La Ferrera (2005) go so far as to say that in societies with higher levels of income (associated with democratic societies), fractionalization may even have positive effects.

Although studies have largely shown that fractionalization has a negative pull on growth in cross-country comparisons, the effect is much less clear when focusing on American counties and cities. Glaeser, Scheinkman, and Shleifer (1995) studied the effects of fractionalization on population growth across cities in the United States. The use of population growth as a dependent variable is justified by noting that migration within the U.S. responds quickly to income opportunities. Glaseser et al. (1995) do not find any effect of fractionalization on the population growth of cities. Rappaport (1999) studies U.S. cities and counties, includes many more controls into his study, and finds that fractionalized counties grow less in terms of population. Alesina and La Ferrera (2005) follow this research and determine that, like cross-country examinations, fractionalization has a negative effect on initially poor counties and can have a positive effect for initially richer counties. Other U.S. based studies have examined the benefits of a diverse population to productivity. Florida (2002) constructs indices of diversity based off of ethnicity, nationality, gender, and sexual orientation, and argues that diversity attracts human capital. Similarly, Ottaviano and Peri (2006) find that individuals in culturally diverse cities earn higher wages than those in homogenous cities. These studies include other

factors affecting diversity in addition to ethnicity and serve to illustrate the point that a diverse population can be beneficial to a society.

A separate, but related strand of literature focuses on the effects of ethnic polarization on growth. The theory of polarization focuses on the argument that two equally powerful and opposing groups may have just as strong of a negative effect as fractionalization, if not stronger. Esteban and Ray (1994) construct the theory behind polarization, arguing that even in societies with low inequality, polarization builds tensions between groups, thus reducing the amount of trust across groups. The increases in tension demonstrate the negative effects of increased polarization on growth, as societies with more tension and less trust are bound to have weak growth-enhancing public policies. Montalvo and Reynal-Querol (2002, 2005) build upon the theoretical work of Esteban and Ray (1994), and provide empirical evidence of ethnic polarization's negative effects on different facets of growth (e.g., investments, ethnic conflicts). Alesina and La Ferrera (2005) measure ethnic polarization in conjunction with fractionalization and find that when measuring economic growth and government quality, the measure of fractionalization tends to be more significant than the measure of polarization.

To summarize, ethnic fractionalization has been shown to have a negative effect on different indicators of growth, except in richer and democratic societies. In richer societies, the positive effects of diversity may even outweigh the costs, demonstrated by fractionalization's positive effects on growth. Polarization can also be used to measure ethnic diversity and has been shown to have negative effect on growth.

Previous literature utilized either cross-sectional or longitudinal studies over large periods of time to study ethnic diversity's effects on economic performance. In addition, ethnic diversity's effects on poverty rates are scant within previous literature. I add to the previous

literature by studying ethnic diversity in Illinois counties over a period of ten consecutive years (2000-2009) using dynamic panel modeling and focusing on ethnic diversity's effects on poverty. The focus on a stronger estimation technique will provide a better picture of ethnic diversity's effects on poverty, a major indicator of a society's economic performance.
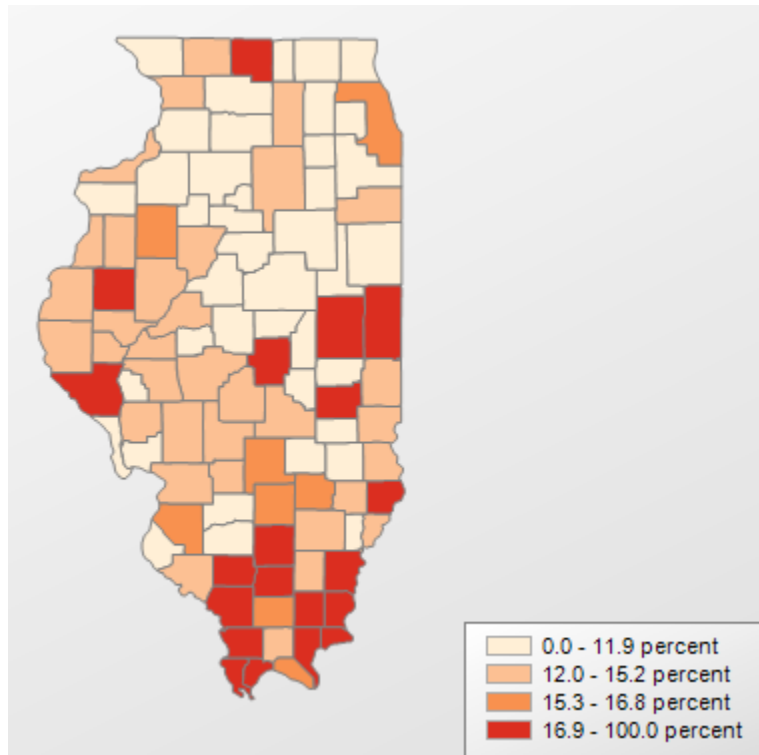
Poverty in Illinois:

The state of Illinois has 102 counties, some of which are large, such as Cook County, containing over five million people hailing from all over the world, and small, such as Alexander County, containing approximately eight thousand people and has very little ethnic diversity. The variation provided by these counties provides a good foundation for statistical analyses. However, it is prudent to understand both the definition of poverty and its concentration throughout Illinois counties before attempting to dissect the effects of ethnic diversity on poverty.

The U.S. Census Bureau utilizes a set of income thresholds that vary according to the size of a family and the ages of the members of a family. These thresholds were originally derived in 1963-1964, using the U.S. Department of Agriculture food budgets that were designed for families under economic stress combined with data about what portion of their income families spent on food. Those families who fall under the threshold are classified as being in poverty. These thresholds do not give any indication as to the severity of poverty within a certain area, which means a family subsisting just below the poverty threshold has the same classification as a family experiencing severe poverty. As such, the Census states that its measure of poverty is to be used as a "statistical yardstick". However, the poverty estimates generated through the Small Area Income and Poverty Estimates program provide county-specific data and are the estimates

through which federal funds are allocated. Due to the availability of data and its importance in

gathering welfare funds, I use this measure of poverty in this study.

Figure 1 - Distribution of Poverty in Illinois Counties, 2010

Source: U.S. Census Bureau

Figure 1 shows the distribution of poverty throughout Illinois counties in 2010. As can

be seen in the figure, poverty rates are concentrated in southern Illinois, with Alexander,

Jackson, Pulaski, and Fayette counties rating among the top ten counties with the highest poverty

rates in 2010. These rates have remained persistent over time, as evidenced by a 2001 Report on

Poverty by the Illinois Poverty Summit, which also noted the concentration of high poverty

through southern Illinois. The report also named the aforementioned counties as having poverty

rates that were over 1.5 times the state average (Illinois Poverty Summit 2001). Is it possible that ethnic fragmentation has a role in manufacturing the persistent poverty rates that these counties suffer? Perhaps ethnic polarization also plays a strong part? I argue that both fractionalization and polarization have a significant effect on poverty.

Theory:

The theories of fractionalization and polarization are the most common theories explaining the effects of ethnic diversity on economic development. These theories complement each other. Fractionalization demonstrates the effects of multiple ethnicities within a certain economy, while polarization demonstrates the effects of the degree of differentiation between ethnic groups.

Alesina and La Ferrera (2005) provide an excellent summarization of the theory on ethnic heterogeneity's effects on an economy. They argue that the costs of increased heterogeneity stem from a reduced ability to agree on public policy and public goods. In other words, as an economy becomes more ethnically fragmented, the different groups will not be able to agree on common goods at a cost to the economy as a whole. However, the benefits of increased heterogeneity stem from the variety in production. A social planner who wants to maximize total welfare would strike the balance between the costs of the decreased consumption of public goods with the benefits of increased productivity in the private sector. This argument comes with the stipulation that the benefits associated with ethnic heterogeneity are more relevant for advanced societies with richer economies, as those economies will have the means to capitalize on the variety in skills offered by an ethnically diverse population.

According to the theory of fractionalization, as a society becomes more ethnically diverse, economic performance will decrease, until a certain point, due to the decline in public goods and policies. After that point, increased fragmentation will increase economic performance, as the society will be too fractionalized for any particular ethnic group to have a strong pull on public policy; and therefore the society will reap the production benefits from the variety of skills without experiencing a great cost to the loss of public goods. These effects can be graphically displayed as a U-shaped curve, with ethnic diversity first harming economic performance, and then increasing it. In the case of this paper, I will see whether the relationship between ethnic diversity and poverty follows an inverted-U shape, since poverty is negatively correlated with economic performance.

The point where ethnic fragmentation is most harmful to economic performance is also the point where a society is theoretically most polarized. It is at this point where public goods and public policies are at a low, due to the fact that the different ethnic groups simply cannot find common ground. Therefore, in the context of this paper, when fractionalization is most detrimental to economic performance (i.e., when the number of ethnic groups is low enough to negatively affect public goods), polarization should be positive.

Measures of Fractionalization and Polarization:

Following the trend in previous literature, I use the ELF index to measure the degree of fractionalization. The index, constructed by Taylor and Hudson (1972), defines a fractionalization index, $FRAC$, as

$$FRAC = 1 - \sum_{i=1}^{N} \pi_i^2 \qquad (1)$$

where π_i is the proportion of people who belong to ethnic group i. This index measures the probability that two randomly selected individuals in a certain area (in the case of this paper, in a particular Illinois county) will belong to different ethnic groups. *FRAC* will increase as the number of groups increases, so in other words, as a society becomes more fractionalized, *FRAC* will increase from 0 to 1 as a society becomes more heterogeneous.

To measure polarization, I use the Q index, theorized by Esteban and Ray (1994), and utilized by Montalvo and Reynal-Querol (2002). According to Esteban and Ray (1994), the polarization of a distribution of individual attributes must demonstrate a high degree of homogeneity within each group, heterogeneity across groups, and there must be a small number of significantly sized groups. The Q index follows these guidelines and measures the normalized distribution of any particular ethnic group from a bimodal distribution.

$$Q = 1 - \sum_{i=1}^{N} \left(\frac{0.5 - \pi_i}{.5} \right)^2 \pi_i \qquad (2)$$

The Q index reaches its maximum when two equally sized groups face each other (when two ethnic groups π_i and π_j are most polarized). The index declines as the configuration of the groups differs from the "very polarized" 50-50 split. In a society with only two ethnic groups, the Q index should be highly correlated with the ELF index.

Montalvo and Reynal-Querol (2005) compare the two measures of ethnic diversity and find that when the number of ethnic groups is greater than two, for low levels of fractionalization, the relationship between fractionalization and polarization is positive and nearly linear. For medium levels, the correlation is zero, and for high levels of fractionalization, the relationship between fractionalization and polarization is negative.

Data:

All of the data used in this study were gathered from sections of the U.S. Census Bureau

for the years 2000-2009. As previously stated, the percentage of the total population of a county

in poverty in a particular year is gathered from the Small Area Income and Poverty Estimates

program. The ELF index uses racial data gathered from the Population and Housing Unit

Estimates Program. Racial data was gathered for the share of Non-Hispanic Whites, Blacks,

Asians, Native Hawaiian or Alaskan Native, and Others in a county's population in a particular

year. The Q index of polarization utilizes the same data as the ELF index. Finally, the median

household income for a county in a particular year is also gathered from the Small Area Income

and Poverty Estimates program, and is adjusted for year-2000 dollars. *Table 1* shows the

descriptive statistics of my variables.

Table 1 - Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Percent in Poverty (*Poverty*)	0.113	0.038	0.031	0.328
ELF Index (*ELF*)	0.171	0.140	0.013	0.679
Q Index (*Q*)	0.301	0.222	0.026	0.904
Adjusted-Median Household Income (*RealInc*)	38055.38	8400.92	22771.43	69798.89
Number of Observations =1020				

A few interesting points can be gathered by the descriptive statistics. The average

percent of people in poverty is skewed right, as more counties experience lower poverty rates. In

other words, higher poverty rates in Illinois counties are concentrated within fewer counties.

Comparing the descriptive statistics with the raw data shows that Cook County has the highest amount of fractionalization, and has a high amount of polarization as well. The county has experienced poverty rates between 12-14% throughout the years studied. Meanwhile, Scott County has the lowest amount of fractionalization, the lowest amount of polarization, and has experienced poverty rates from 9-10% throughout the years studied. At a glance, these data points are encouraging for the theories on ethnic diversity's effects on poverty. For example, Scott County and Cook County demonstrate that counties on both the high and low ends of fractionalization demonstrate stronger economic performance (via the lower levels of poverty).

I also note that when looking at the Q index of polarization, Alexander County has the highest amount of polarization. Alexander County also is approximately 48-49% fractionalized, has the highest percent of people in poverty, and also has the lowest real household income. These data points are again encouraging for providing empirical evidence of the theories of fractionalization and polarization.

Estimation Technique:

Using simple fixed-effects panel estimation is not sufficient for estimating ethnic diversity's effects on poverty. Poverty is a dynamic variable, with each year's value affected by the previous year. Due to the fact that the time period in this study has ten consecutive years of data, it is prudent to account for the influence of the original observations on the subsequent observation. Therefore, to create a viable model, I turn to the dynamic panel model devised by Blundell and Bond (1998). This model expands upon the Arellano and Bond (1991), who developed a method by constructing estimators based on moment equations from lagged levels of the dependent variable and the first differenced error terms. This method is known as a form

12

of the Generalized Method of Moments (GMM) estimation technique. The initial model is written as

$$y_{it} = \alpha y_{i,t-1} + \beta x_{it} + u_i + v_{it} \tag{3}$$

for $i=\{1,\ldots N\}$ and $t=\{1,\ldots T\}$ where y_{it} is the dependent variable i at time t, $y_{i,t-1}$ is the lag of the dependent variable, x_{it} is a vector of explanatory variables, u_i are individual fixed effects, and v_{it} is the error term. This method accounts for previous years' effects by using the lags of previous years in my equation, creating a model with an autoregressive process. However, it cannot be assumed that the variables in x_{it} are strictly exogenous (increased poverty has an effect on future income) so it is only possible to use predetermined regressors, as demonstrated by Arellano and Bond (1991).

However, Blundell and Bond (1998) demonstrated that when the autoregressive process is too persistent, then the lagged levels of the dependent variables are weak instruments. Since I am using annual data, there is a high likelihood of a persistent autoregressive process. Therefore, I use the Blundell-Bond method as my estimation method. My final model thus emerges as

$$Poverty_{it} = \alpha_1 Poverty_{i,t-1} + \beta_1 RealInc_{it} + \beta_2 ELF_{it} + \beta_3 ELF_{it}^2 + u_i + v_{it} \tag{4}$$

for $i=\{1,\ldots,102\}$ (signifying Illinois counties) and $t=\{2000,\ldots,2009\}$ where $Poverty_{it}$ is the percentage of people in poverty in county i at year t, $poverty_{i,t-1}$ is the lagged level of $poverty$, $RealInc_{it}$ is the median household income in year-2000 dollars in county i at year t and is treated as endogenous. ELF is the ELF index measure and ELF^2 is the square of the index measure, u_i

are county-specific fixed effects, and v_{it} is the error term. I also estimate a similar model to estimate ethnic polarization:

$$Poverty_{it} = \alpha_1 Poverty_{i,t-1} + \beta_1 RealInc_{it} + \beta_2 Q_{it} + u_i + v_{it} \qquad (5)$$

Here, all the previous variables retain their definition, and Q_{it} measures the Q index of polarization for county i at year t.

Analysis:

Table 2 - Empirical Results

	Dependent Variable: Percent of Poverty	
	Estimated Coefficients **(Standard Errors)**	
Variable	**(1)**	**(2)**
Lag of *Poverty*	0.456 (0.076)***	0.448 (0.174)**
Income (Year-2000 Dollars)	-0.000002 (0.0000004)***	-0.000002 (0.0000006)**
E.L.F.	0.184 (0.072)**	
E.L.F.^{2}	-0.183 (0.116)*	
Q		0.062 (0.017)***

* denotes significance at the 10% level
**denotes significance at the 5% level
*** denotes significance at the 1% level

I use a two-step GMM estimation technique with the Blundell-Bond method to estimate my final models, using lagged levels of poverty and real income as the instruments for my level equation. The standard errors are corrected for heteroskedasticity. The results are as listed in

Table 2. Column 1 denotes the results from Equation (4) and Column 2 denotes the results from Equation (5).

A preliminary look at the results shows that the E.L.F. index initially has a positive effect on poverty. This indicates that as a county experiences greater ethnic fragmentation, the percent of people in poverty within the county will also rise. However, at a certain point, increased ethnic fragmentation will yield a negative effect on the poverty rate. Therefore, the effect of a change in the E.L.F. index on the poverty rate varies by the index. In other words, the effect of ethnic fragmentation on poverty varies by the amount of fragmentation. Ethnic polarization is also shown to have a positive effect on the poverty rate, as demonstrated in the second regression. As the degree of polarization increases, the poverty rate will also increase. These results align with the theories of fractionalization and polarization.

By solving for the E.L.F. index with respect to the poverty rate, I determine the point at which ethnic diversity's effects on the poverty rate are maximized. The result yields an index score of 0.502. In other words, ethnic diversity's effects on poverty are maximized when a county is fractionalized to the point where their E.L.F. index score is 0.502 (at the halfway point between homogeneity and heterogeneity). It is at this point where ethnic fractionalization's costs on poverty are maximized, presumably in the form of sub-optimal public policies and public goods.

Conclusion:

I sought to examine the effects of ethnic diversity on poverty within the context of Illinois counties. Previous studies examining ethnic diversity's effects on different facets of

economic performance focused mostly on cross-country studies researching the effect of ethnic conflict on economic growth, institutional quality, and income inequality, among other factors. This paper added to previous work by directly considering ethnic diversity's effect on poverty using county level data with a stronger statistical analysis as compared with previous work.

The ELF index and the Q index were used to calculate the degrees of fractionalization and polarization, respectively, for each county in Illinois. I used the dynamic panel modeling technique devised by Blundell and Bond (1998) for my analysis. My results fall in line with the theory, with increasing fractionalization first exhibiting a positive effect on poverty and then a negative effect, implying an inverted U-shaped distribution. Polarization exhibited a positive effect on poverty.

The implications of this study are intriguing. Although the effects of ethnic conflict are not as severe in Illinois as they would be in a developing country, fractionalization still has a detrimental effect on economic performance, up until a county becomes too fractionalized, at which point fractionalization can even have a positive effect on economic performance. Polarization is noted to have a detrimental effect to economic performance. This finding is significant when considering public policy, as a moderately fractionalized and heavily polarized county will positively affect the poverty rate in a county.

This study had several limitations which need to be taken into consideration. The primary limitation was the lack of data at the county level. This limitation prevented the addition of more control variables, such as educational attainment and industrial composition, as the data simply were not available. Also, the indices of fractionalization and polarization have their own limitations, as only racial data was used to construct the indices. Thus, these indices fail to account for other facets of 'ethnicity,' such as language or cultural norms. Future work in this

area can include more control variables, as well as more comprehensive indices for ethnic

diversity.

References:

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, R. Wacziarg (2003),
"Fractionalization." *Journal of Economic Growth,* 8(2), 155-194.

Alesina, A. and E. La Ferrara (2005), "Ethnic Diversity and Economic Performance." *Journal of Economic Literature,* 43(3), 762-800.

Arellano, M. and S.R. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, 58, 277-297.

Blundell, R.W. and S.R. Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics,* 87, 115-143.

Collier, P. (2000), "Ethnicity, Politics and Economic Performance." *Economics and Politics*, 12, 225-245.

Collier P. (2001), "Implications of Ethnic Diversity." *Economic Policy,* 32, 129-166.

Collier, P. and J.W. Gunning (1999), "Explaining African Economic Performance." *Journal of Economic Literature*, 37, 64-111.

Easterly, W. (2001), "Can Institutions Resolve Ethnic Conflict?" *Economic Development and Cultural Change,* 49(4), 687-706.

Easterly, W. and R. Levine (1997), "Africa's Growth Tragedy: Policies and Ethnic Divisions." *Quarterly Journal of Economics,* 111(4), 1203-1250.

Esteban, J.M. and D. Ray (1994), "On the Measurement of Polarization." *Econometrica,* 62(4), 819-851.

Florida, R. (2002), "The Economic Geography of Talent." *Annals of the Association of American Geographers,* 92(4), 743-755.

Glaeser, E., J. Scheinkman, and A. Shleifer (1995), "Economic Growth in a Cross Section of Cities." *Journal of Monetary Economics,* 36(1), 117-143.

Illinois Poverty Summit Steering Committee, (2001). *2001 Report on Illinois Poverty*. Chicago: Heartland Alliance.

Montalvo, J.G. and M. Reynal-Querol (2005), "Ethnic Diversity and Economic Development." *Journal of Development Economics,* 76, 293-323.

Montalvo, J.G. and M. Reynal-Querol (2002), "Why Ethnic Fractionalization? Polarization, Ethnic Conflict and Growth." UPF Working Paper 660.

Ottaviano, G. and G. Peri (2006), "The Economic Value of Cultural Diversity." *Journal of Economic Geography*, 6(1), 9-44.

Rappaport, J. (1999), "Local Growth Empirics." Harvard University CID Working Paper 23.

Taylor, C.L. and M.C. Hudson (1972). World Handbook of Political and Social Indicators. New Haven, CT: Yale Univ. Press