

2018

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Jason VanAlstine  
*Indiana University Kokomo*

Steven R. Cox  
*Indiana University Kokomo*

Dianne M. Roden  
*Indiana University Kokomo*

Lisa Boothby  
*Indiana University Kokomo*

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## Recommended Citation

VanAlstine, Jason; Cox, Steven R.; Roden, Dianne M.; and Boothby, Lisa (2018) "Diversity in the Heartland of America: The Impact on Human Development in Indiana," *Journal of the Indiana Academy of the Social Sciences*: Vol. 20 : Iss. 1 , Article 11.  
Available at: <https://digitalcommons.butler.edu/jiass/vol20/iss1/11>

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*Diversity in the Heartland of America:  
The Impact on Human Development in Indiana\**

JASON VANALSTINE  
*Indiana University Kokomo*

STEVEN R. COX  
*Indiana University Kokomo*

DIANNE M. RODEN  
*Indiana University Kokomo*

LISA BOOTHBY  
*Indiana University Kokomo*

**ABSTRACT**

This article is the third in a series of studies measuring the impact of cultural diversity on human development. We disaggregate cultural diversity into three components: ethnicity, language, and religion. The first study examined the impact of diversity internationally. We found that countries are worse off with greater diversity, especially religious diversity; however, we found that more-prosperous countries with strong institutions benefited from increased diversity. We concluded that strong institutions are essential to maximize the benefits of diversity while mitigating the associated costs.

The second study examined the impact of diversity within the United States, where institutional strength was assumed to be relatively great and similar between states. We found an overall negative impact from diversity. Ethnic diversity was negatively associated with human development, while religious and language diversity had a positive impact. We concluded that in the United States, there is more tolerance for religious and language differences compared to ethnic differences.

In this third study, we examine the impact of diversity within the state of Indiana. As with our national results, we find a generally negative

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\* Correspondence concerning this article should be addressed to Jason VanAlstine, Associate Professor of Economics, School of Business, Indiana University Kokomo, 2300 South Washington Street, Kokomo, IN 46904; javanals@iuk.edu; tel: (765) 455-9279; fax: (765) 455-9348.

relationship between human development and diversity. Ethnic diversity has a negative impact, while religious and language diversity are generally positive influences. Strong political and legal institutions may not be sufficient to extract net benefits from diversity if social attitudes that guide behavior are not supportive. The results suggest that net benefits from diversity in Indiana may depend on improvement of social attitudes and in commitment to social services that support historically disadvantaged minority groups.

**KEY WORDS** Indiana; Diversity; Human Development; Ethnicity; Language

Diversity is often promoted as a positive outcome and pursued as a goal by organizations, communities, and governments. Diversity provides exposure to a variety of experiences, ideas, and skills; however, while some diverse societies seem to thrive, others seem to struggle. Diverse societies may suffer from difficulty in communication, difference in preferences, and conflict between polarized groups. Because of these potential costs and benefits of diversity, it is not surprising that previous research into the relationship between diversity and economic development has yielded mixed results. Most studies have found a negative relationship between diversity and economic development, whereas others have reported positive, mixed, or no relationship.

This paper is the third in a series of studies measuring the impact of cultural diversity on human development. We disaggregate cultural diversity into three components: ethnicity, language, and religion. The first study (VanAlstine, Cox, and Roden 2013) examined the impact of diversity internationally. We found that countries are worse off with greater diversity, especially religious diversity; however, we found that more-prosperous countries with strong institutions benefited from increased diversity. We concluded that strong institutions are essential to maximize the benefits of diversity while mitigating the associated costs.

The second study (VanAlstine, Cox, and Roden 2015) examined the impact of diversity within the United States, where institutional strength was assumed to be relatively high and similar between states. Despite the apparent institutional strengths, we found an overall negative relationship between diversity and human development that is driven by ethnic diversity. In fact, when it comes to both religious and language diversity, we found a positive relationship with human development. We conclude that people in the United States are more tolerant of religious and language differences, and less tolerant of ethnic differences.

In this third study, we examine the impact of diversity within the state of Indiana. As with our national results, we find a generally negative relationship between human development and diversity. More specifically, we find that ethnic diversity has a negative impact while religious and language diversity are generally positive influences. Strong political and legal institutions may not be sufficient to extract net benefits from diversity if social attitudes that guide behavior are not supportive.

## **PREVIOUS RESEARCH**

Many researchers have reported a negative relationship between cultural diversity and economic performance, typically measured as growth in per capita income (Alesina et al. 2003; Annet 2001; Barro and McCleary 2003; Easterly and Levine 1997; Grafton, Knowles, and Owen 2004; Montalvo and Reynal-Querol 2005). In contrast, some researchers reported a positive impact (Florida and Tingali 2004), some found no significant impact (Lian and Oneal 1997), and still others reported mixed results (Alesina and La Ferrara 2005; DiRienzo, Das, and Burbridge 2007).

These inconsistent results may reflect the presence of both costs and benefits relating to diversity. Although diversity can enhance creativity and innovation by introducing a variety of ideas and skills, it can also result in inefficiencies due to difficulty in communication, differences in preferences, and conflicts between polarized groups.

### *Costs of Diversity*

Ethnic, language, and religious differences can introduce social barriers to communication that can reduce productivity. Barro (1999) found that language diversity raises transaction costs and results in public policies that retard growth. Grafton et al. (2004) pointed out that lack of trust and barriers to communication can prevent mutually beneficial exchange of ideas. As a result, linguistically homogenous societies may be more effective in communicating ideas among themselves, allowing for faster technological development and economic growth.

Ethnic groups may have different preferences regarding their choice of public goods. Greif (1993) found that it is more efficient to transact with members of one's own type and that diversity introduces costs and inefficiencies due to competing demands of disparate groups. Alesina and La Ferrara (2000) found that increased diversity lowers the utility from public good consumption.

History is replete with examples of social conflict caused by cultural diversity. Conflicts such as these have the clear potential to retard economic development. Easterly and Levine (1997) found that ethnic diversity is a predictor of potential conflict and political instability. Shleifer and Vishny (1993) showed that ethnically diverse societies are likely to have higher rates of corruption. Collier (2000) found that cultural heterogeneity hampers growth because ethnically divided societies are prone to polarization and social conflict. Religious differences are often a barrier to social integration and are also a common source of stress and conflict (Warf and Vincent,, 2007). Grim and Finke (2007) found that restriction of religious freedom correlates with diminished well-being and with violent social conflict.

### *Benefits of Diversity*

A diverse populace provides different perspectives and opportunities for the exchange of new ideas that can stimulate innovation and creativity. The concept of collective intelligence describes the positive historical relationship between the amount of

interaction between diverse individuals and the inventiveness and rate of cultural change of a population (Ridley 2010).

A diverse mix of people brings together complementary abilities and experiences that may lead to productivity gains. Lazear (1999) found that higher diversity levels lead to innovation by increasing the number of ways that groups frame problems, producing a richer set of alternative solutions. Florida and Tingali (2004) found that a more diverse society leads to a more creative and innovative workforce that increases competitiveness. Interaction among different cultures encourages competition and exchange of ideas from different worldviews. Sobel, Dutta, and Roy (2010) showed that higher levels of cultural diversity increase the rate of entrepreneurship in the presence of good institutions.

## **MOTIVATION AND CONTRIBUTION**

The contribution of this third article in a series centers on the study of the impact of diversity in the state of Indiana. The first study found a negative relationship between human development and religious diversity internationally, and an overall benefit to diversity in prosperous countries with strong institutions. The assumption of the second study was that institutions in the United States are relatively strong and are likely similar between states and that as a result, the United States might be better positioned to handle the conflict and inefficiencies and to take advantage of the variety of skills and perspectives that come with higher levels of diversity. The second study found an overall negative relationship between human development and diversity in the United States that was driven by cultural diversity, however. We therefore concluded that strong political and legal institutions may not be sufficient to extract net benefits from diversity if social attitudes that guide behavior are not supportive.

Indiana, located in the heartland of America, should exhibit similar institutional strength across the state. For example, on the legal side, the state is divided into 92 counties, each led by a board of county commissioners. Ninety (90) counties in Indiana have their own circuit court with a judge. The remaining two counties, Dearborn and Ohio, are combined into one circuit. If social attitudes are driving the net impact of diversity in an environment of institutional strength, Indiana allows for a study of “Midwest values,” a “red state,” the “Bible Belt,” the Rust Belt, a “flyover state,” and “Hoosier hospitality.”

In addition to focusing our attention on the costs and benefits of diversity specifically in Indiana, this study utilizes three important contributions that were also used in the first two studies. First, we use a human development index (HDI) as a robust measure of societal prosperity. Sen (1993) argued that human development is a process of expanding capabilities and choices. He encouraged a shift in focus from indicators of economic progress to indicators that come closer to reflecting the well-being and freedom enjoyed by populations. As an alternative to focusing only on productivity, the HDI also considers education and health. These three components of HDI allow us to test whether diversity has selective impact on society that might be missed using only productivity measures. Second, we measure and consider three components of cultural diversity: ethnicity, language, and religion. The majority of previous studies have neglected one or

more aspects, typically focusing on ethnic or ethnolinguistic differences. Loh and Harmon (2005) presented the first global measure of biocultural diversity, measured as the average of indices of diversity in ethnicity, language, and religion. In a cross-country analysis, DiRienzo et al. (2007) found that ethnic, linguistic, and religious diversity each have a different impact on a nation's level of competitiveness. The three separate components of cultural diversity allow us to investigate whether certain elements of diversity are associated with higher or lower levels of social prosperity. Third, although virtually all previous studies have utilized one mathematical measure of diversity, diversity of any kind can be measured in multiple ways. Budescu and Budescu (2012) demonstrated that the choice of diversity measure can affect the conclusions that can be drawn, which limits the ability to compare and generalize results across studies. In response, we utilize four mathematical measures for each component of diversity. Comparing our results across the four measures ensures that our results are robust and are not dependent on the method of measurement.

## **DATA**

As mentioned previously, we assume that similarly strong institutions should exist across the 92 counties in Indiana. These counties show a surprising amount of diversity of demographic compositions, however. In Indiana, there are farm communities and manufacturing communities, diverse college towns and struggling inner cities, prosperous suburbs and shrinking small towns. The amount of diversity and the attitudes toward it are likely to vary accordingly.

Indiana has significant diversity in terms of rural and urban populations. As of the 2010 US census, the population of Indiana was 6,483,802. The average population of Indiana's 92 counties is 70,456, with Marion County as the most populous (903,393) and Ohio County the least populace (6,128). Seventeen (17) counties have populations exceeding 100,000, five of which exceed 250,000; and four counties have fewer than 10,000 people.

In terms of ethnic diversity, according to the 2010 census, Indiana is 81 percent white (non-Hispanic). The black/African American population is approximately 9 percent statewide, and 6 percent of the population is Hispanic/Latino. In most counties, the percentage white (non-Hispanic) population is greater than the state average: in 44 counties, it is greater than 95 percent, and in 66 counties, greater than 90 percent. In contrast, in two counties, the African American population is greater than 25 percent; in four counties, the Hispanic population exceeds 10 percent; and in two counties, the Asian American population is above 5 percent.

English is the dominant language in 95 percent of Indiana households. Spanish is spoken predominantly in 3 percent of households. In three counties over 10 percent of household have Spanish as their dominant language. In three other counties, more than 10 percent of households speak a European language other than English. In two counties, more than 4 percent speak an Asian/Pacific language.

Christianity is the dominant religion in Indiana among those who profess an affiliation (unaffiliated citizens range from 20 percent to 70 percent, depending on the county). Among Christians, Protestants are most common. Mainstream Protestants are more than 50 percent of the population in two counties, and more than 20 percent of the population in 33 counties. Evangelical Protestants are more than 20 percent of the population in 10 counties. Catholics represent more than half of the population in one county and more than 20 percent of the population in 11 counties.

### *Measures of Human Development*

Our cross-sectional study is based at the county level. Each of the 92 counties is a data point. To broadly measure social prosperity by county, we utilize the definition of the American Human Development Index (Social Science Research Council 2013–2014). This composite HDI utilizes data primarily from 2010 and is calculated as the simple average of indices based on health, education, and income. Each index is scaled to range between 0 and 10 based on the minimum and maximum state values. Higher values reflect greater levels of well-being. The health index is based on life expectancy at birth. The education index is based on school attainment. The income index is based on median personal income. This data allows for separate investigation of the relationship between diversity and health, diversity and education, and diversity and income. In addition, the composite index allows for measurement of the broader impact of diversity on overall prosperity.

### *Components of Diversity*

Similar to how we measure human development, we use a composite measure of cultural diversity defined as the simple average of ethnic, language, and religious diversity. The data for ethnic diversity come from the U.S. Census Bureau (2010). For each county, we utilize the percentage of the following ethnic groups: White not Latino, Latino, African American, Asian American, Native American, and Other. The data for language diversity also come from the U.S. Census Bureau (2010). For each county, we utilize the percentage of homes where the following categories represent the primary language spoken: English, Spanish, European, Asian, and Other.

The U.S. Census Bureau has been prevented by law and administrative rules from collecting even basic information on religious affiliation. As a result, the data for religion come from the U.S. Religious Landscape Survey (Pew Research 2008). For each county, we utilize the percentage of adults who associate with the following religions: Evangelical Protestant, Mainline Protestant, Historically Black Protestant, Catholic, Mormon, Orthodox, Jehovah's Witness, Jewish, Muslim, Buddhist, Hindu, and Other.

*Mathematical Measures of Diversity*

In our analysis, we utilize four mathematical measures of diversity for language, religion, and ethnicity. For consistency, all indices are defined so that higher values reflect greater diversity. The first measure is the percentage of the largest demographic group compared to the population ( $p_i$ ) subtracted from one:

$$\text{proportion index} = 1 - p_i \tag{1}$$

The maximum value is attained when the largest group is very small, implying a very large number of groups.

The second measure is the Shannon index, commonly used to measure species diversity in biology:

$$\text{Shannon index} = - \sum_{i=1}^N p_i \ln(p_i) \tag{2}$$

where  $p_i$  is the proportion of a county's population in demographic group  $i$  and  $N$  is the number of groups in the county. The maximum value is attained when all demographic groups have the same proportion.

The third mathematical measure utilizes the Simpson index, which measures the probability that two individuals drawn at random from a county will not belong to the same demographic group. We calculate this measure of fractionalization as:

$$\text{Simpson index} = 1 - \sum_{i=1}^N p_i^2 \tag{3}$$

where  $p_i$  is again the proportion of a county's population in demographic group  $i$  and  $N$  is the number of groups in the county. The maximum value is attained when there are many small groups and no dominant group, reflecting more diversity.

The fourth measure of diversity reflects that polarized groups may be more likely to engage in conflict. Specifically, if a state has two dominant cultural groups, there may be more conflict than if the county has many equally sized groups. Montalvo and Reynal-Querol (2005) proposed a polarization index:

$$\text{polarization index} = 1 - \sum_{i=1}^N \left( \frac{\frac{1-p_i}{2}}{\frac{1}{2}} \right)^2 p_i \tag{4}$$

where  $p_i$  is the proportion of a county's population in demographic group  $i$  and  $N$  is the number of groups in the county. This index measures the normalized difference from a



bimodal distribution and reaches a maximum when two equally sized groups dominate the demographic.

### *Control Variables*

Control variables are included in our regressions to increase the likelihood that we are measuring the impact of diversity and no other extraneous factors. We control for differences in urban and rural areas between counties by including the natural log of population density obtained from the U.S. Census Bureau (2010). We control for income inequality by using the Gini coefficient obtained from the 2010 American Community Survey. Zero (0) represents total equality, and 1 represents maximal inequality.

## **RESULTS**

Our basic linear regression model used throughout this article has the following form:

$$development = \alpha + \beta_X \mathbf{X} + \beta_D \mathbf{D} + \varepsilon \quad (5)$$

where  $\mathbf{X}$  is a vector of control variables described above,  $\mathbf{D}$  is a vector of diversity measures;  $\alpha$  and  $\beta$  are the coefficients to be estimated, and  $\varepsilon$  is the error term. To make the analysis sample representative of the target population, we utilize the weighted least squares method to estimate the coefficients in the model. The population of each county is used as the basis for the weighting. Solon, Haider, and Wooldridge (2015) caution that weighting to correct for heteroskedastic error terms to achieve more precise estimation of coefficients in linear regression models of causal effects can sometimes harm the precision of the estimates. One recommendation they make is to also use a non-weighted regression. In results not shown, we also utilized a non-weighted ordinary least squares regression. Adjusted  $R^2$ s and models' significance are similar, but coefficient estimates were more likely to be significant with the weighted model.

Table 1 presents the results from the regression described in Equation 5 to estimate the impact that our composite measure of cultural diversity (calculated using the proportion index) has on HDI and its three component indices of health, education, and income. Overall, cultural diversity has a significant negative impact. The control variable, population density, is positively associated with each of the HDIs. This indicates that a higher level of human prosperity is found in urban areas. Consistent with expectations, the Gini coefficient, which represents income inequality, has a significantly negative coefficient.

Tables 2 through 4 repeat this analysis using three alternative mathematical measures for our composite measure of cultural diversity. The results are very consistent with those presented in Table 1. The coefficient on cultural diversity is negative using all four mathematical measures of diversity. All results are statistically significant except when using the Shannon index. The coefficients on each of the components of health, education, and income are also consistently negative.

**Table 1. Cultural Diversity (Composite Measure) in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variables	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Cultural Diversity	-3.843 (-2.16)**	-4.60 (-2.49)**	-8.121 (-3.72)***	1.196 (0.52)
Ln (Population Density)	0.385 (3.19)***	0.114 (0.91)	0.529 (3.57)***	0.513 (3.25)***
Gini Coefficient	-6.839 (-2.10)**	-2.811 (-0.83)	9.084 (2.27)**	-26.79 (-6.29)***
Constant	6.632 (5.75)**	7.839 (6.55)***	-0.467 (-0.33)	12.524 (8.32)**
Observations	92	92	92	92
Adjusted R-squared	.08	.086	.24	0.31

*Notes:* Diversity for each county measured using the proportion index, which is the percentage of people who are not members of the dominant language/religion/ethnicity.

*t*-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level

**Table 2. Cultural Diversity (Composite Measure) in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Cultural Diversity	-1.131 (-1.14)	-1.061 (-1.02)	-2.315 (-1.83)*	-0.018 (-0.01)
Ln (Population Density)	0.333 (2.27)**	0.016 (0.55)	0.409 (2.19)**	0.574 (3.05)***
Gini Coefficient	-6.189 (-1.86)*	-2.116 (0.10)	10.435 (2.46)**	-26.887 (-6.29)***
Constant	6.556 (5.55)**	7.785 (6.29)***	-0.618 (-0.41)	12.502 (8.25)***
Observations	92	92	92	92
Adjusted R-squared	.04	.03	.16	.30

*Notes:* Diversity measured for each county using the Shannon index, which is at a maximum value when all groups have the same proportion.

*t*-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level

**Table 3. Cultural Diversity (Composite Measure) in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Cultural Diversity	-3.481 (-2.17)**	-3.530 (-2.11)**	-6.690 (-3.36)***	-0.224 (-0.11)
Ln (Population Density)	0.423 (3.17)***	0.117 (0.84)	0.565 (3.41)***	0.586 (3.37)***
Gini Coefficient	-6.536 (-2.01)**	-2.444 (-0.72)	9.728 (2.40)**	-26.893 (-6.32)***
Constant	6.590 (5.71)***	7.808 (6.46)***	-0.535 (-0.37)	12.497 (8.29)***
Observations	92	92	92	92
Adjusted R-squared	.08	.07	.22	.30

Notes: Diversity measured for each county using the Simpson index, calculated as one minus the probability that two individuals drawn at random will be from the same group.

t-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level,

**Table 4. Cultural Diversity (Composite Measure) in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Cultural Diversity	-2.815 (-2.57)**	-1.533 (-1.30)	-8.121 (-3.72)***	-2.189 (-1.53)
Ln (Population Density)	0.427 (3.50)***	0.013 (0.10)	0.529 (3.57)***	0.750 (4.73)***
Gini Coefficient	-6.602 (-2.05)**	-2.4671 (-0.71)	9.084 (2.27)**	-26.963 (-6.42)***
Constant	6.810 (5.96)***	7.9778 (6.51)***	-0.467 (-0.33)	12.593 (8.464)***
Observations	92	92	92	92
Adjusted R-squared	.10	.040	.24	.32

Notes: Diversity measured for each county using the polarization index, calculated as one minus the normalized difference from a bimodal distribution.

t-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level

Tables 1 through 4 demonstrate that cultural diversity is negatively associated with all measures of human development. In Tables 5 through 8, we display how the specific components of cultural diversity (language, religion, and ethnicity) affect human development.

Table 5, using the proportion index to compute diversity, shows that ethnic diversity has a significant negative coefficient for each of the three measures of human development and the composite measure. Language diversity is positively associated with health, and religious diversity is positively associated with income.

**Table 5. Elements of Cultural Diversity in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Language Diversity	2.192 (1.18)	7.199 (4.11) <sup>***</sup>	0.050 (0.02)	-0.672 (-0.26)
Religious Diversity	1.540 (1.75) <sup>*</sup>	0.668 (0.81)	-0.100 (-0.87)	4.051 (3.37) <sup>***</sup>
Ethnic Diversity	-5.920 (-5.26) <sup>***</sup>	-8.081 (-7.64) <sup>***</sup>	-6.774 (-4.60) <sup>***</sup>	-2.905 (-1.88) <sup>*</sup>
Ln (Population Density)	0.680 (5.52) <sup>***</sup>	0.501 (4.32) <sup>***</sup>	0.790 (4.90) <sup>***</sup>	0.750 (4.44) <sup>***</sup>
Gini Coefficient	-5.330 (-1.82) <sup>*</sup>	-1.194 (-0.44)	10.446 (2.74) <sup>***</sup>	-25.241 (-6.31) <sup>***</sup>
Constant	3.620 (3.04) <sup>***</sup>	4.454 (3.97) <sup>***</sup>	-3.173 (-2.04) <sup>**</sup>	9.579 (5.86) <sup>***</sup>
Observations	92	92	92	92
Adjusted R-squared	.27	.41	.32	.39

*Notes:* Diversity for each county measured using the proportion index, which is the percentage of people that are not members of the dominant language/religion/ethnicity.

*t*-values shown in parentheses.

<sup>\*</sup> significant at the 10% level <sup>\*\*</sup> significant at the 5% level <sup>\*\*\*</sup> significant at the 1% level

Table 6, using the Shannon index to compute diversity, shows ethnic diversity with a significant negative coefficient for each of the three measures of human development and the composite measure. Language diversity has a significant positive coefficient for each of the three measures of human development and the composite measure. Religious diversity is positively associated with income.

Table 7, using the Simpson index to compute diversity, shows ethnic diversity with a significant negative coefficient for each of the three measures of human development and the composite measure. Language diversity has a significant positive coefficient for the composite measure of diversity that is driven by a positive

relationship with health. Religious diversity has a significant positive coefficient for the composite measure of diversity driven by a positive relationship with income.

**Table 6. Elements of Cultural Diversity in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Language Diversity	2.566 (3.43) <sup>***</sup>	4.149 (5.62) <sup>***</sup>	1.764 (1.68) <sup>*</sup>	1.785 (1.83) <sup>*</sup>
Religious Diversity	1.995 (3.10) <sup>***</sup>	1.046 (1.65)	1.106 (1.23)	3.833 (4.57) <sup>***</sup>
Ethnic Diversity	-3.543 (-5.45) <sup>***</sup>	-4.264 (-6.65) <sup>***</sup>	-3.430 (-3.77) <sup>***</sup>	-2.936 (-3.47) <sup>***</sup>
Ln (Population Density)	0.663 (4.67) <sup>***</sup>	0.451 (3.22) <sup>***</sup>	0.688 (3.46) <sup>***</sup>	0.849 (4.59) <sup>***</sup>
Gini Coefficient	-4.530 (-1.57)	-0.388 (-0.14)	11.804 (2.91) <sup>***</sup>	-25.005 (-6.64) <sup>***</sup>
Constant	2.177 (1.67) <sup>*</sup>	3.812 (2.96) <sup>***</sup>	-4.188 (-2.29) <sup>**</sup>	6.907 (4.06) <sup>***</sup>
Observations	92	92	92	92
Adjusted R-squared	.29	.36	.24	.47

*Notes:* Diversity measured for each county using the Shannon index, which is at a maximum value when all groups have the same proportion.

t-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level

Table 8, using the Polarization index to compute diversity, shows that ethnic diversity has a significant negative coefficient for each of the three measures of human development and the composite measure. Language diversity is positively associated with health, and religious diversity is positively associated with income and negatively associated with education.

Overall, the results are robust across the four mathematical measures of diversity. Ethnic diversity is consistently associated with lower levels of human development (health, education, income, and the composite measure), with significant negative coefficients for all four human development measures using all four mathematical measures of diversity (16 regressions). Language and religious diversity are consistently associated with positive human development outcomes or, in some cases, inconclusive results. Language diversity is related to better health outcomes, with significant positive coefficients across all four mathematical measures of that diversity. Religious diversity is related to higher income, with significant positive coefficients across all four mathematical measures of that diversity.

**Table 7. Elements of Cultural Diversity in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Language Diversity	3.012 (2.39)**	6.110 (5.01)***	0.050 (0.02)	1.538 (0.93)
Religious Diversity	2.877 (2.55)**	1.257 (1.15)	-0.100 (-0.09)	6.872 (4.64)***
Ethnic Diversity	-5.559 (-5.57)***	-7.09 (-7.33)***	-6.774 (-4.60)***	-3.834 (-2.93)***
Ln (Population Density)	0.720 (5.44)**	0.536 (4.18)**	0.790 (4.90)***	0.817 (4.71)**
Gini Coefficient	-4.313 (-1.50)	-0.332 (-0.12)	10.446 (2.74)***	-23.969 (-6.33)***
Constant	2.182 (1.64)	3.689 (2.86)***	-3.173 (-2.04)**	6.620 (3.79)***
Observations	92	92	92	92
Adjusted R-squared	.29	.39	.32	.46

*Notes:* Diversity measured for each county using the Simpson index, calculated as one minus the probability that two individuals drawn at random will be from the same group.

*t*-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level

## DISCUSSION AND CONCLUSION

Many previous studies have found a negative relationship between diversity and economic growth, whereas others have reported positive, mixed, or no relationship. In a series of three studies, we utilized a broad measure of human development that includes health, education and income. We also disaggregated cultural diversity into separate components of ethnic, language, and religious diversity. Finally, we utilized four mathematical measures of diversity to ensure that our results were not dependent on the method used to calculate diversity. Our first study (VanAlstine et al. 2013) found that, internationally, countries are worse off with greater diversity, especially religious diversity; however, we found that more-prosperous countries with strong institutions benefited from increased diversity. Our second study (VanAlstine et al. 2015), which looked at the impact of diversity in the United States, found that individual states are worse off with greater diversity, particularly ethnic diversity. In contrast, both religious and language diversity exhibit generally positive relationships with human development, but not enough positive to offset the costs of ethnic diversity.

This third study investigated whether diversity also has an overall negative impact in Indiana. We used county-level data to examine the tradeoffs between the costs and benefits of diversity in the presence of assumed consistently strong institutions. We found that cultural diversity (a composite of ethnic, language, and

religious diversity) is negatively associated with our composite measure of human development (health, education, income). Ethnic diversity is consistently associated with lower levels of human development, including health, education, and income. Language diversity is positively associated with human development, especially health outcomes. Religious diversity is also generally positively associated with human development, especially income.

**Table 8. Elements of Cultural Diversity in Indiana Explaining Four Measures of Human Development Using Weighted Least Squares Regression**

Independent Variable	Dependent Variable			
	HDI	Health Index	Education Index	Income Index
Language Diversity	1.424 (1.75)*	3.134 (3.88)***	1.233 (1.18)	-0.672 (-0.26)
Religious Diversity	-0.354 (-0.18)	-0.575 (-0.29)	-5.670 (-2.21)**	4.051 (3.37)***
Ethnic Diversity	-3.795 (-4.55)***	-4.750 (-5.74)***	-4.132 (-3.84)***	-2.905 (-1.88)*
Ln (Population Density)	0.755 (5.27)***	0.496 (3.50)***	0.789 (4.28)***	0.750 (4.44)***
Gini Coefficient	-5.095 (-1.61)	-0.670 (-0.21)	8.794 (2.16)**	-25.241 (-6.31)***
Constant	4.499 (2.05)**	5.447 (2.50)**	2.247 (0.80)	9.579 (5.86)***
Observations	92	92	92	92
Adjusted R-squared	.21	.28	.28	.39

*Notes:* Diversity measured for each county using the polarization index, calculated as one minus the normalized difference from a bimodal distribution.

*t*-values shown in parentheses.

\* significant at the 10% level \*\* significant at the 5% level \*\*\* significant at the 1% level

Perhaps it should not be a surprise that the results in this article are consistent with those of our national study. Although less diverse than some states, Indiana is the home of farm communities and manufacturing communities, diverse college towns and struggling inner cities, prosperous suburbs and shrinking small towns. Apparently, in Indiana and the rest of the United States, this diversity generates potential benefits from the variety of experiences, ideas, and skills but also generates potential costs resulting from inefficiencies due to difficulty in communication, difference in preferences, and conflict between polarized groups. The benefits from language and religious diversity are garnered without equal costs related to potential intolerance and conflict. In comparison, the benefits from ethnic differences are exceeded by the associated costs from inefficiencies and potential conflicts. Unfortunately for human development, the net losses from ethnic diversity exceed the net gains from language and religious diversity.

These results call for comparison to the results from our first study (Van Alstine et al. 2013), which found a similar negative relationship between cultural diversity and human development using international data. More specifically, religious diversity was responsible for the negative relationship. So why is religious diversity generally negative internationally but positive in the United States and Indiana, and why is ethnicity neutral internationally but negative in the United States and Indiana?

The answer may be found in history and politics. Although internationally there is a long history of wars based on religious differences, the United States was formed (at least in part) on the basis of religious freedom. While the United States continues to be very sensitive to religious freedoms (the Census Bureau is not allowed to ask about religion), it has been slower to adapt to ethnic and racial differences. Racial tension and conflicts have been prominent throughout American history, from the Civil War to the race riots in the 1960s, to the high-profile controversies in 2016. Although Indiana has significant legal protections for ethnic-minority citizens, implementation of the laws and attitudes toward racial diversity may continue to lag the respect for religious diversity.

Of course, there is also an inherent problem with studying the benefits from ethnic diversity in the United States. In Indiana, the largest minority ethnic group is African American. This group has obvious historical disadvantages that explain, at least in part, lower levels of health, education, and income. As a result, counties in Indiana with higher levels of cultural diversity are likely to have higher levels of African Americans who have historically worse outcomes. Thus, it might not be surprising that a negative relationship is observed. Worse, this relationship can be readily observed and might result in some people believing that ethnic diversity is causing poor outcomes, thus reinforcing certain biases against diversity. Furthermore, because this study occurs at the county level, it is clear that “moving” costs would be much smaller when moving to another county to avoid such diversity than moving to another state. This can exacerbate the problem of lower human development outcomes, as, typically, more affluent people will have more resources to make such moves away from low-performing counties.

As discussed above, strong political and legal institutions may not be sufficient to extract net benefits from diversity if social attitudes that guide behavior are not supportive. If significant mistrust for diversity develops, there is greater likelihood of polarization and conflict between ethnic groups. Our results have implications for policies on race relations and immigration. If diversity is to be encouraged and accepted, strong institutional support is needed to ensure that the benefits can be extracted while costs are mitigated. The results suggest that net benefits from diversity in Indiana may depend on improvement of social attitudes and in commitment to social services that support historically disadvantaged minority groups.

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