Metro Area Industry Composition and Employment Prospects for Workers of Varying Skill Levels
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Introduction

Background

- Unemployment rates vary substantially across regions and cities (Elhorst, 2003).

- Industry composition affects regions' economic growth and unemployment rates (Izraeli and Murphy, 2003).
  - Regions with more industrial diversity have greater economic growth and lower unemployment rates (Elhorst, 2003).
  - Regions with high concentrations in manufacturing have slower employment growth and larger employment declines (Owyang et al., 2006; Drucker, 2009).

- Regional policymakers strive to grow or attract specific industries as a way to improve their local economies (Barkley and Henry, 2005).

- Better educated workers have lower unemployment rates (Theodossiou and Hipple, 2010).

- However, as with overall employment, the employment advantage for better educated workers varies across regions (Krolik, 2004).

- Does industrial composition also affect this employment advantage for better educated workers?

- If so, local economic policies based on growing specific industries may lead to unintended, and possibly negative, consequences for some residents.

Research Question

Does a local economy's industrial composition moderate the employment advantage for better educated workers?
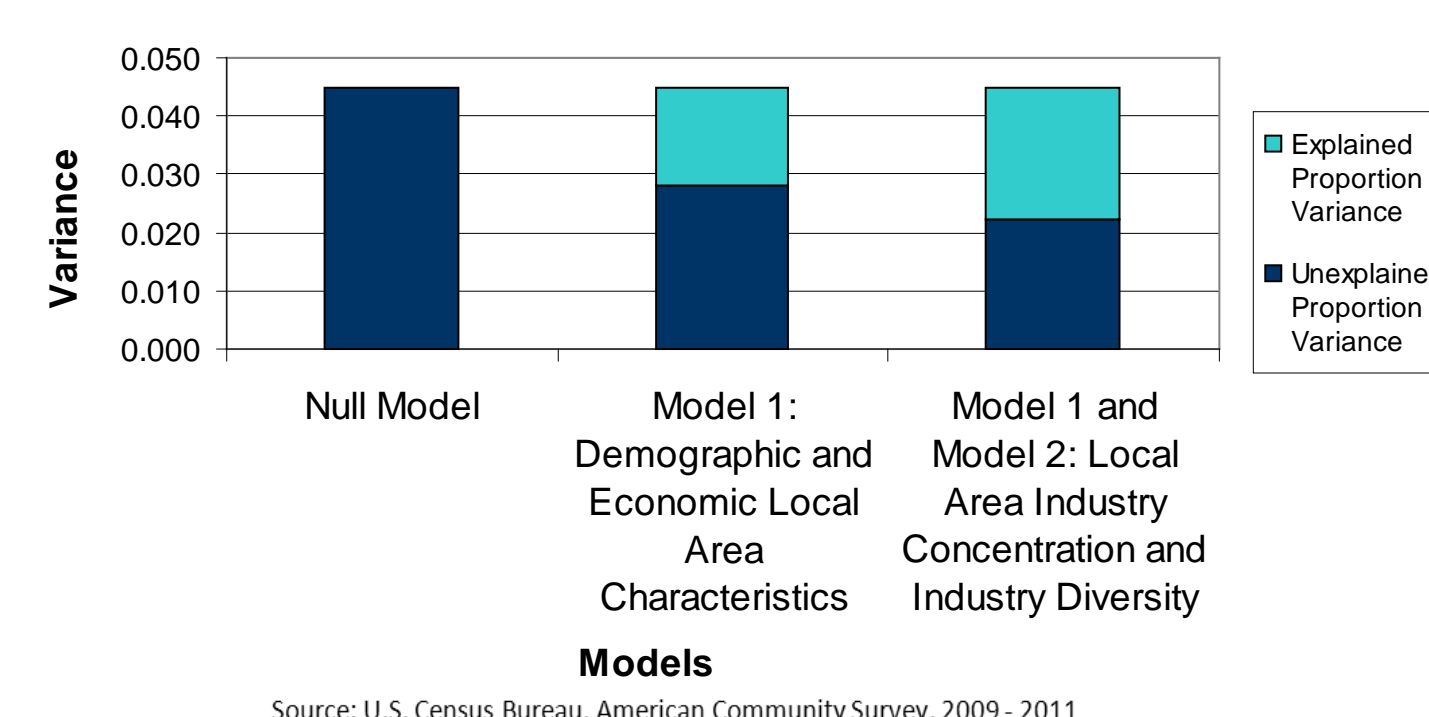
Data

- American Community Survey (ACS) 3-year file for 2009-2011
  - A nationally representative survey of 3 million household addresses each year
  - Collects housing, social, demographic, and economic measures

- For the industry composition variables discussed below, the universe includes:
  - Civilian residents age 16 or older,
  - Employed at the time of the interview,
  - In each of the 955 metro or micro areas and the United States total, including Puerto Rico.

- The 3-year ACS refers to the collection period 2009 through 2011, not a single reference day or year.

- Questions on work status refer to the 12 month period preceding the interview date.

- The 2009-2011 survey period covers the end of the recession (January – June, 2009) and the first years of the recovery (July, 2009 – December, 2011) (Theodossiou, 2012).

Defining The Local Economy's Industry Composition

- In this research, we conceptualize the local economy's industry composition in two ways:
  - **Primary Industry Concentration**, i.e., the industry group in which the metro area is most specialized, and
  - **Industry Diversity**, i.e., how many different industry groups in which the metro area is specialized.

- Both of these aspects of industry composition are measured using **location quotients**.

- A metro area's **primary industry concentration** is the industry group with the largest Location Quotient value.

- In this research, we measure a metro area's **industry diversity** in four categories:

  1. *Unspecialized* - No industry concentration that is at least moderately strong
  2. *Unipolar* – One industry concentration
  3. *Bipolar* – Two industry concentrations
  4. *Diverse* – Three or more industry concentrations

- **Location quotients** compare the share of a metro area's workforce employed in a specific industry group to the share of the nation's workforce in this same industry group (Blakely and Green Leigh, 2010).

- Location Quotient$_{IM} = (E_{IM} / E_{TM}) / (E_{IN} / E_{TN})$

  - Where: E = Employed, and subscripts I = Industry, M = Metro or Micro Area, T = Total Workforce, and N = Nation.

- A location quotient equal to or greater than 1.25 denotes an industry concentration that is at least moderately strong.

In this research, we group the industries into six conceptually similar categories, guided by a principal components analysis.

Industry Groups	Census Industry Codes	NAICS Industry Sectors
Manufacturing	1070-3990	31-33
Agriculture, forestry, fishing, and hunting, and mining; Construction	0170-0490; 0770	11 and 21; 23
Wholesale trade; Transportation and warehousing and utilities	0570-0690; 4070-4590, 6070-6390	42; 48-49 and 22
Information; Finance and insurance, and real estate, and rental and leasing; Professional, scientific, and management, and administrative, and waste management services	6470-6780; 6870-7190; 7270-7790	51; 52-53; 54-56
Educational services, and health care and social assistance; Public administration	7860-8470; 9370-9590	61-62; 92
Retail trade; Arts, entertainment, and recreation, and accommodation and food services; Other services, except public administration	4670-5790; 8560-8690; 8770-9290	44-45; 71-72; 81

Distribution of Primary Industries for Diverse, Bipolar, and Unipolar Metro and Micro Areas
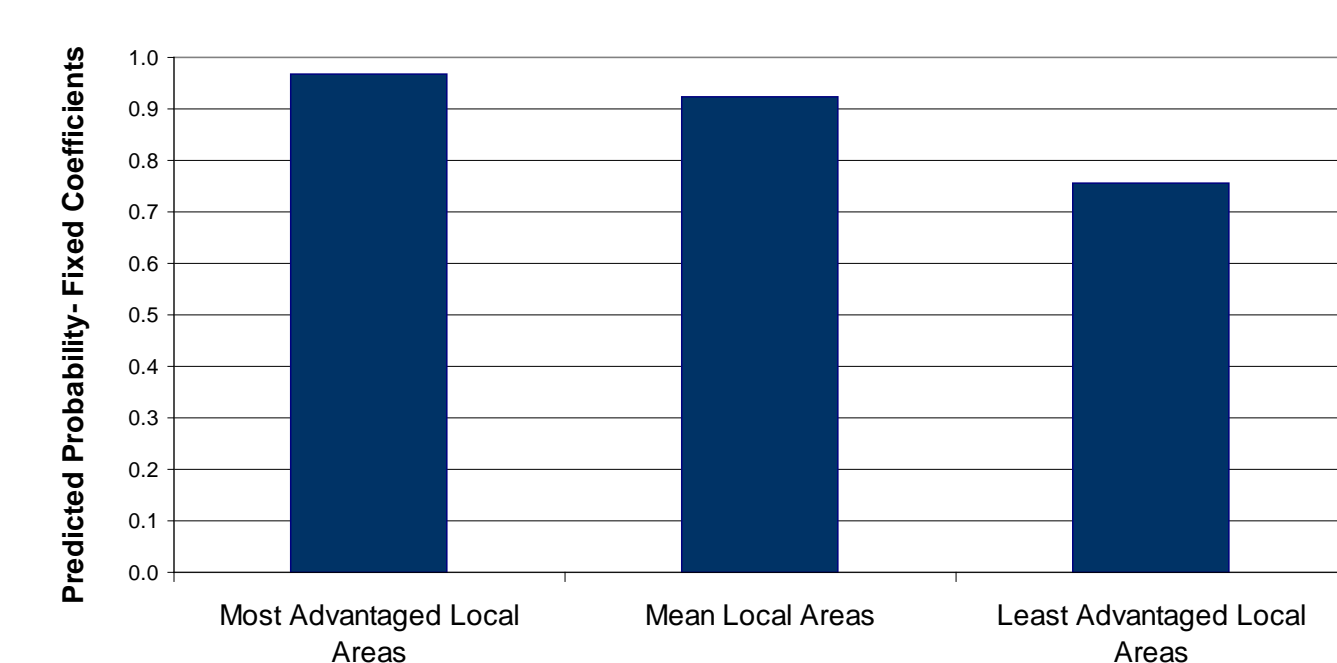
Model Results

Model Sample and Methods

- The analysis sample includes residents of all 955 metro and micro areas in the United States and Puerto Rico who are:
  - at least 25 years of age,
  - white, black or African American, Asian, or Hispanic, and
  - in the civilian labor force.

- To model a person's likelihood of being employed, we use a two-level, logistic, random-intercept model where:
  - 5,346,506 people are nested within the 955 metro and micro areas, and
  - a person's likelihood of being employed is allowed to vary randomly across metro and micro areas.

For employment, where a person lives matters...

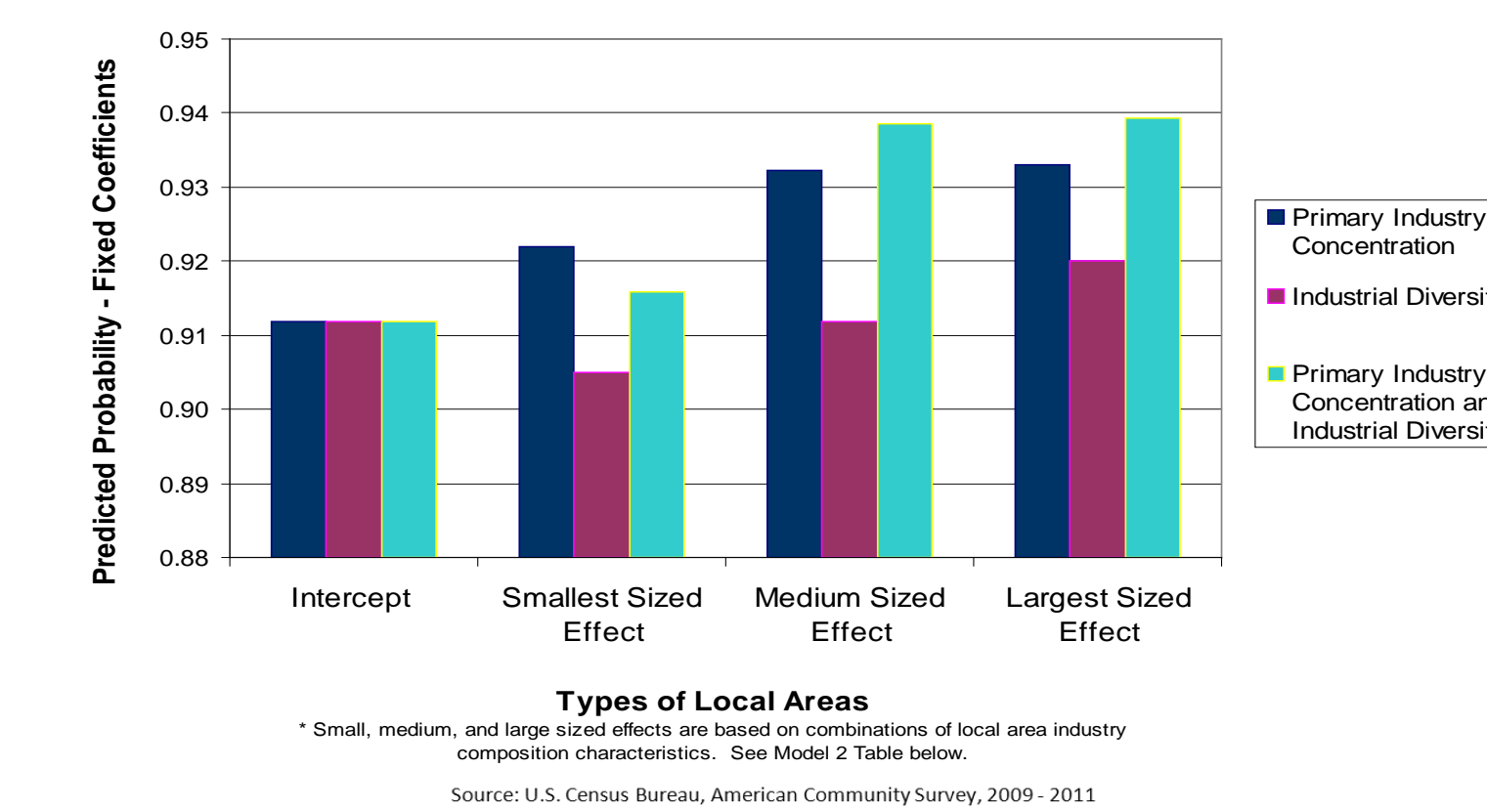| Model 3: Coefficient Values for Predicted Probabilities for Individual Characteristics				
	Effect	Intercept	Small Combined Effect	Large Combined Effect
Less than Bachelor's Degree	Reference	X	X	
Bachelor's Degree or Higher	+	X		X
White	Reference	X	X	
Black	-		X	
Hispanic	-			
Asian				
Male	Reference	X	X	
Female	+			X
Age	+	44 Years	25 Years	44 Years
Age Squared	+	1936 Years	625 Years	1936 Years

- 4.5% of a person's likelihood of being employed is due to the metro or micro area in which he lives.

- Characteristics of the metro or micro area, including industry composition, explain half of this variance.

A person's likelihood of being employed is much higher in certain types of metro and micro areas...
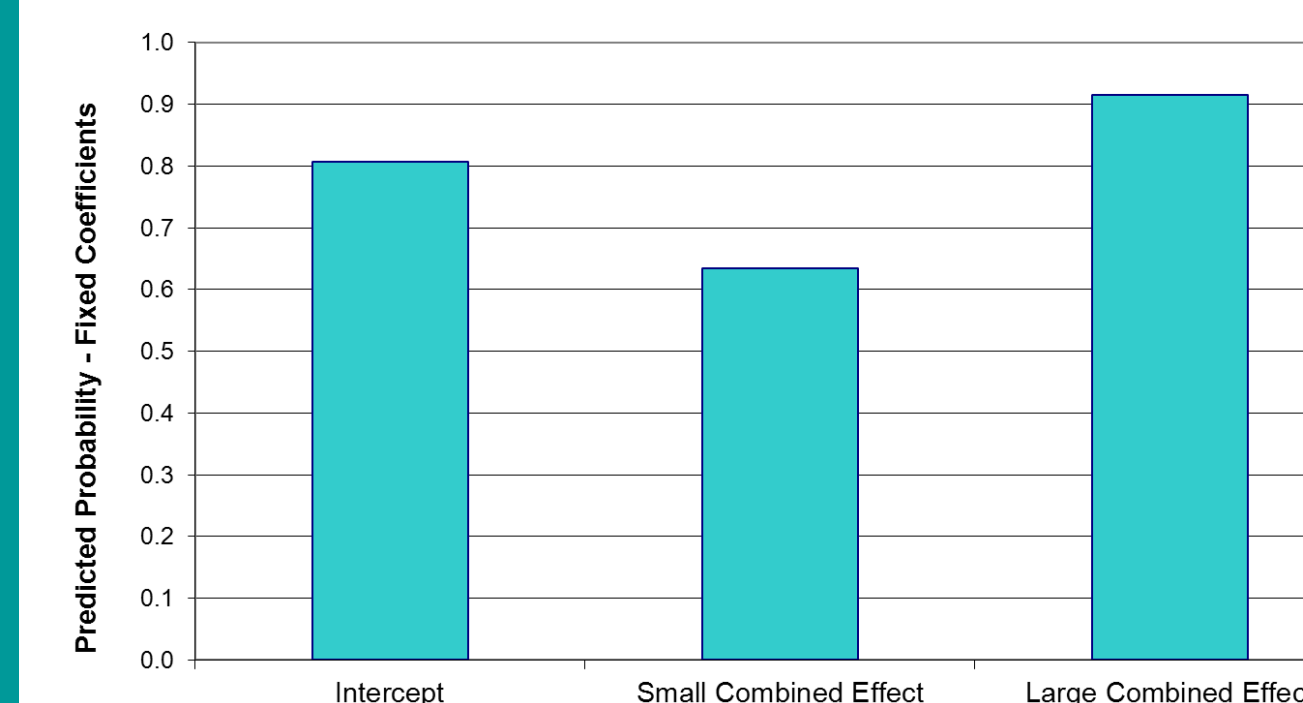
Model 1: Coefficient Values for Predicted Probabilities for Types of Metro and Micro Areas				
	Effect	Most Advantaged Local Areas	Mean Local Areas	Least Advantaged Local Areas
Percent Black and Hispanic Residents in Local Area	-	Minimum	Mean	Maximum
Civilian Labor Force Participation Rate in Local Area	+	Maximum	Mean	Minimum
Percent of Residents with Bachelor's Degree or Higher in Local Area	+	Maximum	Mean	Minimum
Percent of Workers Covered by a Union in Local Area	-	Minimum	Mean	Maximum
Minimum Wage in Local Area	Not Significant			
Percent Home Owners in Local Area	+	Maximum	Mean	Minimum

The industry composition of the local economy also affects a person's likelihood of being employed.

- Living in a metro or micro area concentrated in the Agriculture, Transportation, or Education industry increases the likelihood of being employed.

- Living in a bipolar local area increases the likelihood of being employed.

- Living in an unspecialized local area decreases the likelihood of being employed.

- Industry concentration has a stronger effect on the likelihood of being employed than does industrial diversity.

- Together, industry concentration and industrial diversity strongly affect the likelihood of being employed.

Model 2: Coefficient Values for Predicted Probabilities for Primary Industry Concentration, Industry Diversity, and Primary Industry Concentration and Industry Diversity					
	Effect	Intercept	Smallest Sized Effect	Medium Sized Effect	Largest Sized Effect
Manufacturing Primary Industry Concentration	Reference	X / X	X	X	X
Agriculture Primary Industry Concentration	+		X / X	X / X	
Transportation Primary Industry Concentration	+		X / X		
Finance Primary Industry Concentration	Not Significant				
Education Primary Industry Concentration	+				X / X
Arts Primary Industry Concentration	Not Significant				
Unipolar Local Area	Reference	X / X / X	X	X	X
Unspecialized Local Area	-		X / X		
Bipolar Local Area	+			X	X / X
Diverse Local Area	Not Significant				

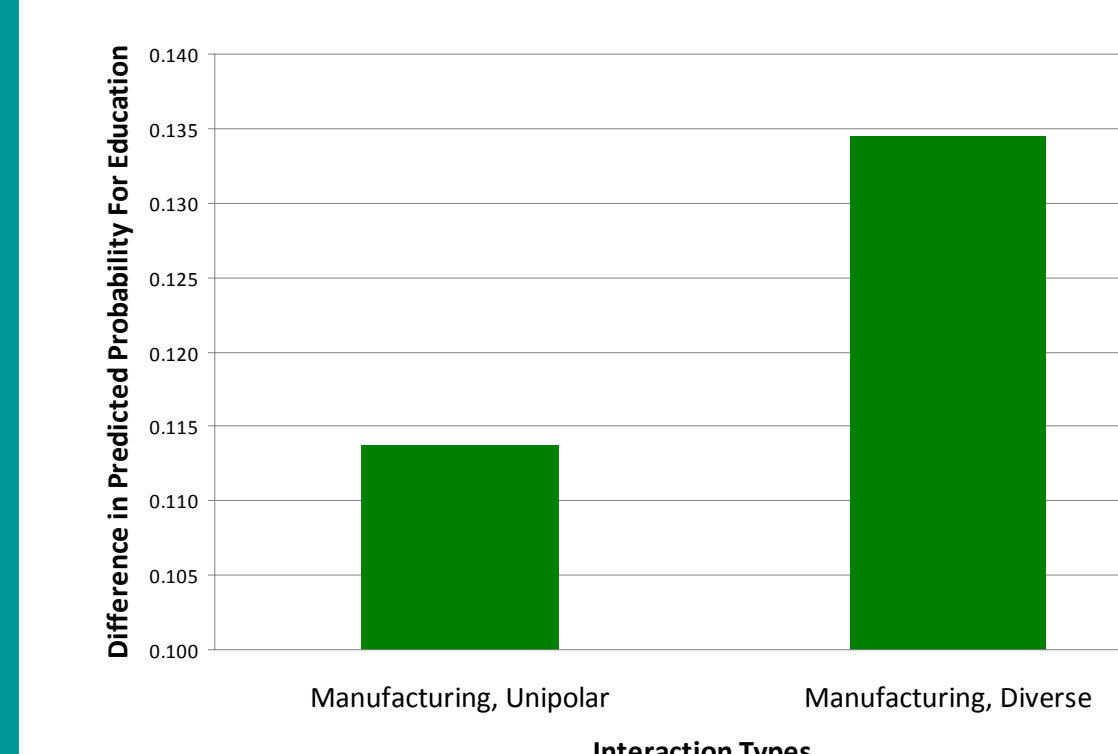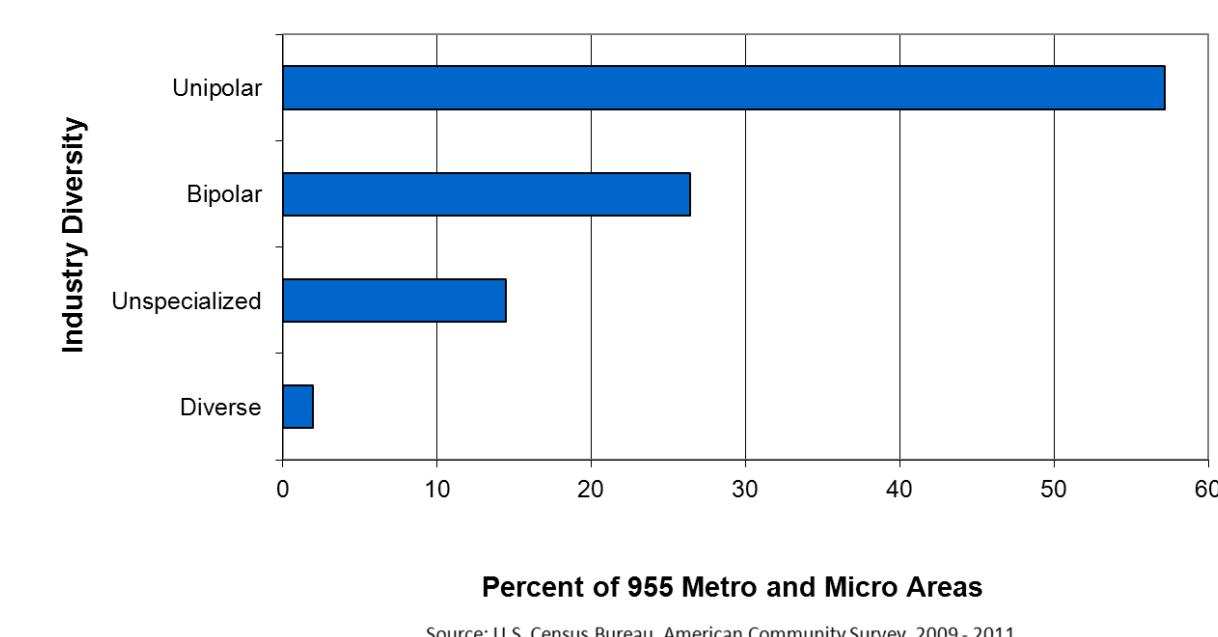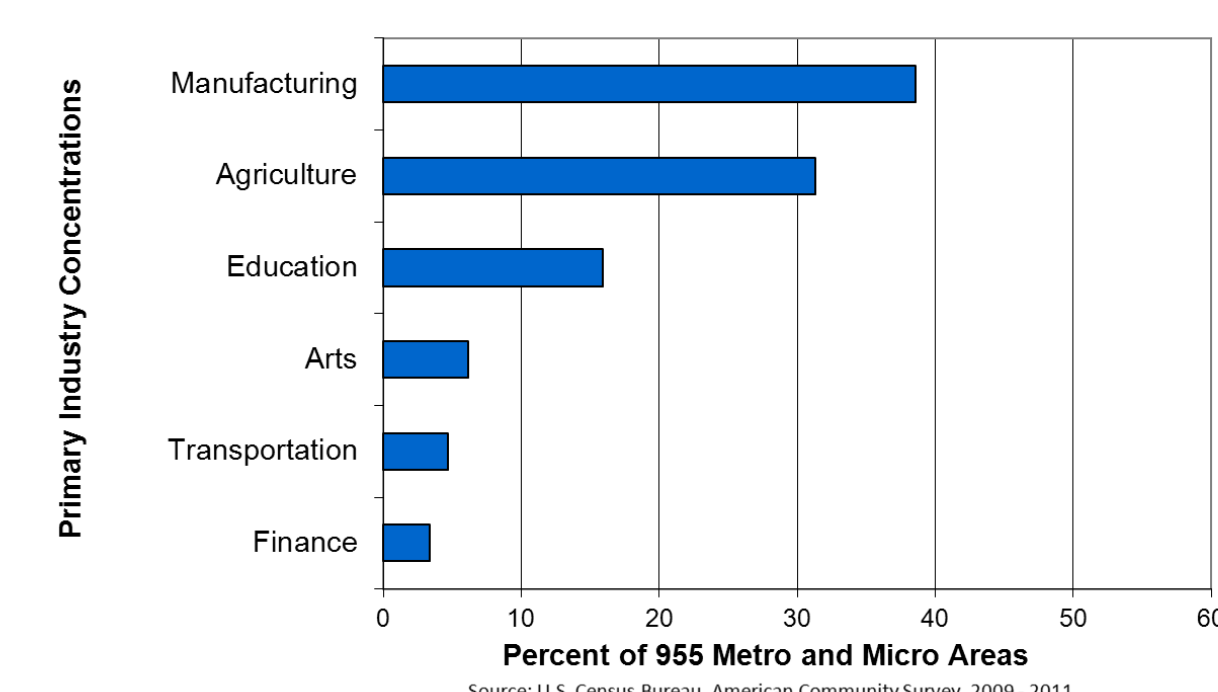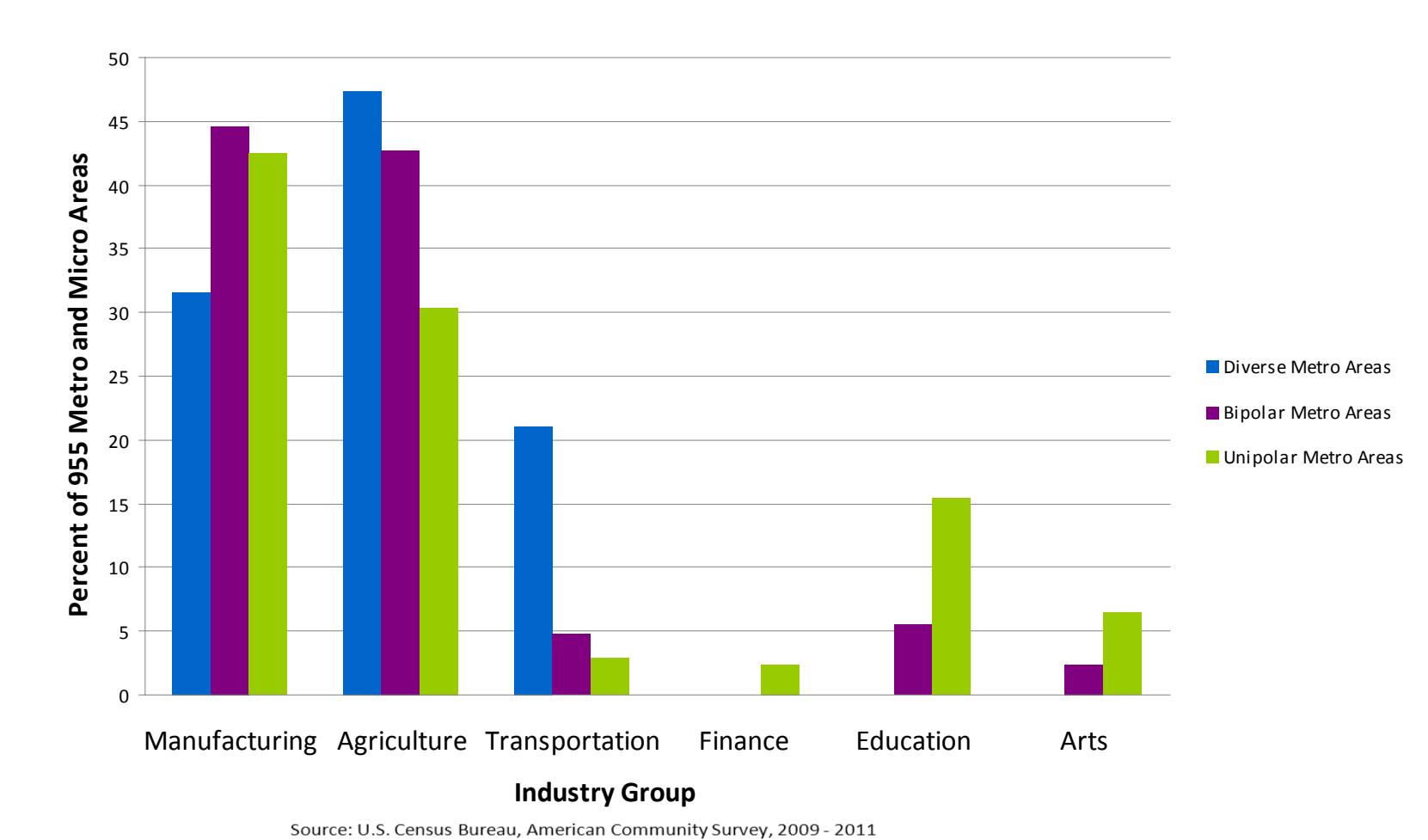**Of course, a person's own characteristics also strongly affect their likelihood of being employed...**

Better educated individuals enjoy an employment advantage; having a 90% likelihood of being employed, compared to an 81% likelihood of being employed for people without a bachelor's degree.

However, living in a local area concentrated in an industry other than Manufacturing weakens the education advantage for being employed.

Living in a diverse metro area increases the education advantage for being employed.

However, even for diverse metro areas, the education advantage for being employed is smaller when the metro area's primary concentration is in certain industries.
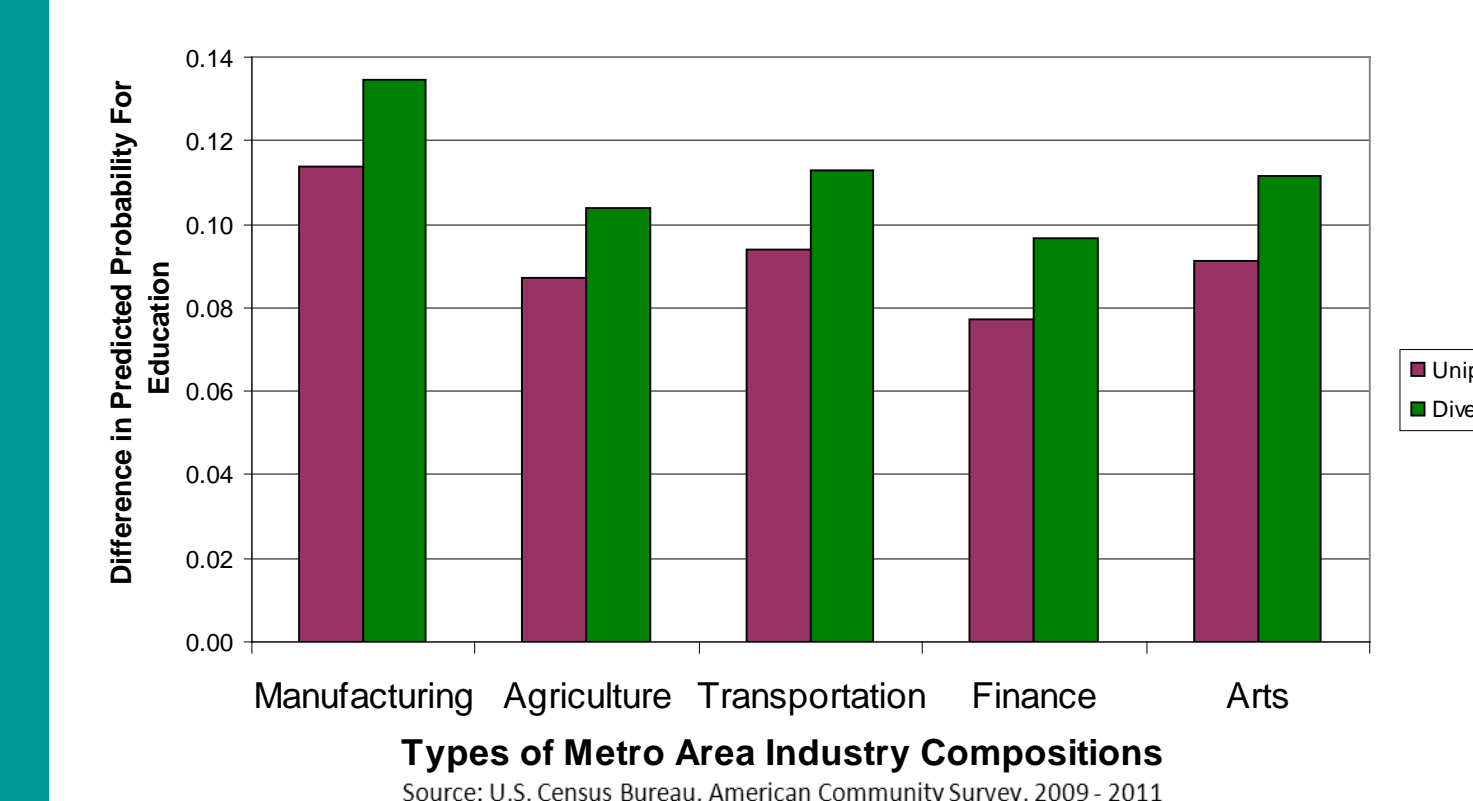
Model 4: Coefficient Values for Difference in Predicted Probability for Primary Industry Concentration and Industry Diversity Interaction Effects						
	Effect	Manufacturing	Agriculture	Transportation	Finance	Arts
Bachelor's Degree or Higher						
Primary Industry Concentration						
Manufacturing	Reference	X / X	X	X	X	X
Agriculture	+		X / X			
Transportation	+			X / X		
Finance	+				X / X	
Education	+					
Arts	+					X / X
Industry Diversity						
Unipolar	Reference	X	X	X	X	X
Unspecialized						
Bipolar						
Diverse	Not Significant					
Primary Industry - Education Interaction						
Agriculture			X / X			
Transportation				X / X		
Finance					X / X	
Education	Not Significant					
Arts						X / X
Industry Diversity - Education Interaction						
Unspecialized	Not Significant					
Bipolar						
Diverse	+	X	X	X	X	X

Conclusions

Discussion

- Where a person lives affects the likelihood of being employed.

- The local economy's industry composition strongly affects a person's likelihood of being employed.

- Industry composition also affects the employment advantage for better educated individuals.
  - Living in a metro area concentrated in the Agriculture, Transportation, Finance, or Arts industry weakens this education advantage.
  - However, living in a diverse metro area increases the education advantage.

- When developing local economic policy, we should consider the varying effects of industry composition on employment.

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For more information on the American Community Survey (ACS), see:
http://www.census.gov/acs/www

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