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User Guides

Metrics for Development

Introduction

The Metrics for Development (M4D) data set and tools consist of more than 70 county-level variables to give economic development practitioners, policymakers and the general public a sense of the development capacity of their region. The variables are organized into 13 indexes to enhance the accessibility and interpretive power of the data. This guide is intended to provide an introduction to the data and tools so users can understand which variables the indexes are comprised of and how practitioners and policymakers can use them in their day-to-day work.

Each county in the United States has three "levels" of data that provide information about its development capacity in three complimentary ways: (1) a headline M4D Index made up of the scaled averages of the component indexes; (2) 13 sub-indexes organized around certain topics related to development capacity; and (3) over 70 variables culled from various data sources from which the indexes are derived. The indexes are constructed relatively simply. First, each variable was scaled using a min-max method of feature scaling to represent each data item on a scale from 0 to 1, where 0 = worst and 1 = best in the nation for any given measure. For those measures that would, in theory, negatively impact development (e.g., poverty rate), the inverse was used to ensure the "0 = worst, 1 = best" dichotomy was upheld. Then, each variable making up an index was summed and feature scaling was applied again so that, for each index, 0 represents the worst-scoring county and 1 represents the best-scoring county.

How to use the data

The principal reason for creating indexes as opposed to only presenting the raw data is the ease with which users can compare regions of different sizes. That Middlesex County, MA, has 69 percent of its workers driving alone, 5 percent walking, 12 percent taking public transit and 7 percent carpooling to work isn't very useful information in isolation. But when you consider that the county's Commuting to Work Index (a proxy for public transit infrastructure and, indirectly, urban sprawl) is 0.32, which is in the 97th percentile of all counties along this index, then you have a much better idea of how it stacks up to others.

The indexes provide summaries of counties' development capacity along any of the 13 "topics" and overall. The summaries are useful for an at-a-glance, topline idea of each county's performance, especially if the main consideration is ease of comparison between counties. Users can interact with a mapping tool and draw custom regions made up of two or more counties to see how counties within regions compare with one another. We also present the raw data for users who wish to dig into the

index components. Both the raw data and the indexes are available for download so more advanced users can conduct their own analyses.

There are a variety of cases for which the M4D indexes could be used to guide decision-making for economic development practitioners and policymakers, both in day-to-day work and in strategic planning. The following examples are just a few to get you started.

1. **Ranking**
   The simplest use of the M4D indexes is for ranking counties based on their scores across the 13 sub-indexes and the headline M4D Index. Ranking could be used in policymaking and planning, like when developing Comprehensive Economic Development Strategies (CEDS). In a CEDS, an economic development agency could present a table of their rankings, highlighting strengths and considering strategies to address weaknesses. It could compare itself with nearby counties or the state average.

2. **Making development decisions**
   With a name like Metrics for Development, it's obvious the indexes can be used to inform a municipality's development decisions. Not only does the headline index show the county's capacity for development generally, some of the sub-indexes directly relate to different kinds of development. The Industry Mix Index is concerned with the diversity of industry in the county, with low values indicating that employment is concentrated in a small set of industries and/or only local industries. So counties with a low score on this index may want to prioritize diversifying their industrial structure and, potentially, attracting more traded industry clusters (like financial services, software development and IT, manufacturing, etc.), which are regarded as being more beneficial because they generate higher wages and greater innovation than local clusters. Other indexes are also indirectly related to specific kinds of development. The Food Access Index can indicate whether there's a lack of grocery stores; the Commuting to Work Index is a marker of the strength of a county's public transit infrastructure; and the Creative Class Index can show the extent to which a county's economy is made up of creative and knowledge-based occupations and industries. These sub-indexes can be used in tandem to get an idea of what county officials should prioritize when considering developments or attracting businesses.

3. **Allocating financial resources**
   Though only the School Funding Index is explicit about it, many of the indexes are at least indirectly related to the principal function of municipal governments: allocating scarce financial resources in an efficient and equitable manner. A low score for the School Funding Index could show that public schools are inadequately funded, rely too heavily on state and federal dollars, and/or overuse debt financing. Though variables related to expenditures aren't included in the Health Index, a low score could indicate the need for greater investments in public health in, for example, education campaigns, public-use exercise and recreation facilities, walk-in health clinics, or mental health initiatives. Similarly, low scores for the Crime Index may highlight the need for public safety investments, and low scores for the Full-Time Work index may indicate the need for workforce development investments like apprenticeships and displaced worker retraining to help workers enter (or re-enter) the labor force.

Variables in the M4D indexes

Index	Variable	Inverse?	Source
Food Access	Percent of population that has low access to grocery stores	Y	USDA Food Environment Atlas, 2017
	Percent of population that is low income and has low access to grocery stores	Y	
	Grocery stores per capita	N	
	Farmers' markets per capita	N	
	SNAP benefits per capita	N	
School Funding	Interest on debt per pupil	Y	U.S. Census Bureau Annual Survey of School System Finances, 2016
	Long-term debt outstanding per pupil	Y	
	Percent of revenue from federal sources	Y	
	Percent of total expenditures for current spending	N	
	Percent of current spending for instruction	N	
	Capital outlays per pupil	N	
	Percent of current spending spent on support services	N	
Commuting to Work	Percent of working population that carpooled to work	N	U.S. Census Bureau American Community Survey (ACS) five-year estimates, 2016
	Percent of working population that took public transit to work (excludes taxicabs)	N	
	Percent of working population that walked to work	N	
	Percent of working population that drove to work alone	Y	

Index	Variable	Inverse?	Source
Health	Percent of population aged 18-64 that is insured	N	ACS five-year estimates, 2016
	Percent of adults that have diabetes	Y	USDA Food Environment Atlas, 2017
	Percent of adults that are obese	Y	
	Poor physical health days per month	Y	County Health Rankings, 2018
	Poor mental health days per month	Y	
	Years of potential life lost to premature death (age-adjusted)	Y	
	Suicide rate	Y	Calculated from CDC Wonder Database, 2016
Industry Mix	Share of employment in top five traded industries	N	Calculated from BLS Quarterly Census of Employment and Wages (QCEW), 2016; local and traded industry definitions from Porter
	Share of employment in top two local industries	Y	
	Ratio of employment in local industries to traded industries	Y	
	Share of employment in top three industries	Y	
	Share of employment in all local industries	Y	
Creative Class Occupations and Creative Industries	Share of employment in creative class occupations, 2007-11 average	N	USDA Economic Research Service (ERS), 2011, from Florida's definitions of the creative class
	Share of employment in arts occupations, 2007-11 average	N	
	Share of employment in the business services and support industry supercluster (SC)	N	IBRC industry superclusters, 2016
	Share of employment in the tech and knowledge services industry SC	N	
	Share of employment in the high intellectual property	N	

Index	Variable	Inverse?	Source
	manufacturing industry SC		
	Share of employment in the business and other white-collar occupation SC	N	IBRC occupation superclusters from BLS QCEW, 2016
	Share of employment in the manufacturing, technology and engineering occupation SC	N	
	Share of employment in the college occupation SC	N	
	Share of employment in the arts and entertainment occupation SC	N	
Natural Amenities	Standardized score of January mean temperature	N	USDA ERS Natural Amenities Scale, 1999
	Standardized score of January mean sunlight	N	
	Standardized score of July mean temperature	N	
	Standardized score of July mean humidity	N	
	Standardized score of topographical features	N	
Charitable Giving and Civil Society	Itemized contributions as share of total adjusted gross income	N	IRS Statistics of Income, 2016
	Intensity of volunteerism	N	NBER from Census CPS, 2013-15
	Non-rent-seeking organizations per 10,000 population	N	IBRC from Penn State's Northeast Regional Center for Rural Development county-level measures of social capital, 2014
Full-Time Work	Percent of working-age population that works 48-52 weeks per year	N	ACS five-year estimates, 2016
	Percent of working-age population that works full-time (35+ hours/week) year-round	N	

Index	Variable	Inverse?	Source
	Percent of population that didn't work over the past year	Y	
	Percent of population that works part-time (less than 35 hours a week)	Y	
Crime	Violent crime events per 1,000 population	Y	FBI Uniform Crime Reporting Data Series, 2014
	Property crime events per 1,000 population	Y	
Jobs, Earnings and Productivity	Employment growth, 2001-2016	N	IBRC from U.S. Bureau of Economic Analysis, 2016
	Average earnings per worker growth, 2001-2016	N	
	GDP per worker growth, 2001-2016	N	
	Per capita income growth, 2001-2016	N	
	Poverty rate	Y	ACS five-year estimates, 2016
Literacy and Education	Percent of population 16 and older not lacking basic prose skills	N	Calculated from NCES National Assessment of Adult Literacy, 2003
	Percent of population 25 and older that have completed more than 8th grade	N	ACS five-year estimates, 2016
	Percent of population 25 and older with a high school diploma or equivalent	N	
	Percent of population 25 and older with at least a bachelor's degree	N	
Population Dynamics	Population growth, 2010-2016	N	ACS five-year estimates, 2016
	Population density	N	
	Net migration rate	N	

Food Access

This index captures the extent to which a county's residents have access to healthy foods. It includes the number of grocery stores and farmers' markets per capita, the monetary value of SNAP benefits (also

known as food stamps) per capita, the percent of the population with low access to grocery stores and the percent of the population that is low income *and* has low access to grocery stores. The latter two measures are inverted to penalize counties with a lack of grocery stores. "Low access" is defined as living farther than one mile from a grocery store in an urban county and farther than 10 miles in a rural county.

School Funding

This index captures a county's investments in human capital by evaluating its funding of public schools. It includes indicators for capital outlays, debt, revenue from federal and local sources, and the percentage of funds dedicated to instruction, current spending and support services. Interest on debt per student, long-term debt outstanding per student and the percent of revenue from federal sources are inverted to penalize those counties which draw more heavily from the federal government and debt to fund operations.

Commuting to Work

This index captures the modes by which a county's residents use to get to work, and, indirectly, the strength of a county's public transportation infrastructure. It includes measures for the percentage of workers who drive alone, carpool, walk or take public transit to work. Companies often cite strong transit infrastructure as being important to their location decisions (see Amazon's "HQ2" search), so the latter three measures factor positively into this index, while the percent of workers who drive alone to work is inverted to penalize counties with weaker public transportation.

Health

This index measures the health and well-being of a county's residents. It includes the percentage of the population with diabetes or obesity, the percentage of the population aged 18-64 that is insured, the average number of poor physical and mental health days that residents report experiencing, the years of potential life lost to premature death (e.g., due to preventable disease, suicide, etc.) and the county's suicide rate. All of the measures besides the percentage of the population with health insurance are negative indicators of health, so they are inverted in the index calculation.

Industry Mix

This index measures the degree to which a county achieves two desirable aims: a diverse industrial structure and a high level of employment in traded industries, which are industries that provide products or services primarily to non-residents, as opposed to local industries, which provide products and services to residents. Traded industries are considered more desirable because they produce higher wages, demonstrate greater innovation and positively influence local wages. This index includes the share of employment in the top five traded industries, top three local industries, the top three overall, and all local industries, as well as the ratio of employment in traded to local industries. All but the first of these are inverted in the index calculation.

Creative Class

This index draws from Richard Florida's "Creative Class Theory" from his 2002 book *The Rise of the Creative Class* to measure the degree to which a county has "creative" occupations and industries. It includes the share of employment in creative class and arts occupations, as well as the share of employment in occupation and industry clusters that IBRC has identified as being aligned with Florida's conception of "creative," like science, technology and math (STEM), arts and entertainment, university

instruction and others. See Florida's book or his multitude of other writings on the subject for more information.

Natural Amenities

This index measures the relative desirability of a county's natural environment. It includes factors such as January temperature and sunlight, July temperature and humidity, and topographical features. These factors were standardized by the U.S. Department of Agriculture (USDA) so that desirable features (e.g., high January temperatures, low July humidity, etc.) are scored higher than less-desirable features.

Charitable Giving and Civil Society

This index measures the degree to which a county has charitable organizations and how residents volunteer their time or funds to charitable causes. It includes the monetary value of itemized contributions as a share of total adjusted gross income, the intensity of volunteerism and the number of non-rent-seeking organizations per 10,000 population. Organizations considered non-rent-seeking include recreational facilities, civic and social organizations, and religious organizations.

Full-Time Work

This index quantifies the extent to which a county's residents are employed in full-time occupations. It includes the percentage of the population that works full-time year-round, part-time or not at all. A heavy reliance on part-time work and a high percentage of non-participation in the labor force are considered drains on a region's productivity, so these measures are inverted in the index calculation.

Crime

This index assesses the amount of crime that occurs in a county. It's made up of two measures, property crime and violent crime events per 1,000 people, which are both inverted in the index calculation.

Jobs, Earnings and Productivity

This index captures the extent to which a county's productivity, earnings and jobs have grown over the past 16 years. It includes growth in employment, GDP per worker, earnings per worker and per capita income since 2001, as well as the poverty rate. Since high poverty isn't a desirable trait, it's inverted in the index calculation.

Literacy and Education

This index incorporates multiple factors to gauge the county's overall attainment in literacy and education. It includes measures for formal education such as the percent of the population over 25 that has completed eighth grade or high school, has a bachelor's degree, and the percentage of the population 16 and older that does not lack basic prose skills.

Population Dynamics

This index measures several components of a county's population, including population change since 2010, average net migration (in-migration minus out-migration) since 2001 and population density.