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1 Business Cycle Status

The business cycle status identifies the stage of the business cycle that characterizes an area's recent performance. There are five categories: in recession, early expansion, mid-expansion, late expansion, and at risk. The evaluation of an area's status is based on a six-month test of either contraction or expansion. The six-month test compares the six-month moving average of the business cycle index in the current period with the six-month moving average in the period six months earlier. An area is "in recession" if the six-month test shows contraction. If a trough has been reached, the economy shifts from recession to "early expansion." Once the business cycle indicator reaches a peak, the area is in "mid-expansion" or "late expansion." If it appears that a local peak may have been reached and the business cycle indicator is increasing but at a decreasing rate, then the economy is placed "at risk." At risk indicates that the economy could slip from expansion or recovery to recession if the index has fallen but for less than six months.

The distinction between mid-expansion and late expansion is based on the short-term trend observed in the economy. This is calculated using a K-means clustering approach, in which changes in job growth, the unemployment rate, and the housing market are normalized using standard deviations and benchmarked against national trends at various points in the business cycle. For those areas that have been classified as being in mid- or late-cycle expansion, this index is used to differentiate between the two.

2 Employment Growth Rank

These numbers represent the ranking of all 410 metro areas and divisions of short-term employment growth (over the next two years, left) and long-term growth (over the next five years, right). The actual expected short-term and long-term employment growth rates can be found in the Metro Ranking Supplementary Files.

Depending on the distribution of the forecast growth rates, large differences in metro area forecast rankings may or may not indicate large differences in metro area forecast growth rates. For the current distribution of metro area employment growth rates, see the Metro Ranking Supplementary Files.

3 Relative Costs

Cost of Living

The cost of living index measures the relative cost to the average household in the nation to maintain its standard of living in each metropolitan area. The index is created by summing expenditures on various components of consumption in each metro area relative to average U.S. expenditures on the components. The components that vary across metro areas include housing, food and apparel, utilities, transportation, and auto insurance.

Cost of Doing Business

In order to better gauge regional economic prospects, Moody's Analytics has developed a cost of doing business index for each metro area. The relative business cost index is composed of labor costs, energy costs, tax burdens, and office rent costs. **Labor costs** are measured by unit labor costs, or earnings per dollar of output. Unit labor costs are determined for each three-digit NAICS industry for each metro area and compared with unit labor costs for the same industries nationally. **Energy costs** are measured by average cents per kilowatt-hour (Kwh) charged to commercial and industrial users. **Tax burdens** are measured by city and county revenues within the metro area and expressing their sum as a percent of total personal income in each metro area. Business contributions to unemployment and workman's compensation programs are also included in the tax measure because they represent costs for labor hired. **Office costs** are measured as the average price paid per square foot for class A office space. In the overall business cost index, a state-specific component weight system has been adopted to more accurately account for an area's business cost structure. State-specific weights were generated by analyzing inter-industry capital flows via IMPLAN modeling software. Metro areas within a state use the state's weight structure, which is modified to include metro area-specific office rent costs. On average across all metro areas, tax burdens have a 7% weight, energy a 15% weight, unit labor costs a 51% weight, and office rent costs a 28% weight. The index is configured so that the cost of doing business nationally equals 100. Thus, a metro area with a cost index of 110 has business costs 10% above the national average; an index of 90 means a metro area has business costs 10% below the national average.

Differences in the cost of doing business across regions are an important long-term determinant of regional economic performances.

4 Risk Exposure

Risk exposure represents the extent to which a metro area economy's employment growth forecast will be vulnerable to upside or downside fluctuations in the upcoming five-year period. The ranking reflects the expected employment volatility associated with a specific metro area, with a higher ranking—and higher quintile—denoting greater risk. It is important to keep in mind that the ranking represents the relative potential for variation from the forecast; this can be to the upside or downside. A metro area in the first quintile, for example, faces a much wider range of potential outcomes than one in the fifth quintile, which is unlikely to deviate significantly from the forecast.

There are seven determinants of metro area risk exposure: (1) investment income dependence, (2) metro area size, (3) the prior year's change in population, (4) education and healthcare share of output, (5) government share of output, (6) finance share of output, and (7) house price volatility, based on the change in the ratio of median house price to per capita income.

Risk exposure should be considered in combination with a metro area's expected growth rate in order to ascertain the level of certainty associated with an employment growth forecast. Metro areas with high growth rates and low volatility rankings represent those that are the safest in terms of expected growth, while those with low growth rates and high volatility are most exposed to highly negative results.

See Regional Financial Review,

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Indicator	Units	Source	Note
Gross Metro Product	Chain-weighted dollars	BEA, Moody's Analytics	GMP is the sum of all income produced in a metro area, including corporate profits. Thus, it does not necessarily track employment growth.
Total Employment	Ths	BLS Current Employment Statistics	Defined as sum of mining, construction, manufacturing, transportation/ utilities, trade, information, financial activities, professional and business, education and health, leisure and hospitality, and other services, and government.
Unemployment Rate	%	BLS Current Population Survey	
Personal Income Growth	% change previous yr	Bureau of Economic Analysis	Measures income received by households from employment (including self), investments and transfer payments.
Median Household Income	\$ ths	Census Bureau	
Population	Ths	Census Bureau	
Net Migration	Ths	Census Bureau	Calculated as number of domestic and international people moving into a metro area minus those leaving.
Single-Family Permits	Number of units	Census Bureau	
Multifamily Permits	Number of units	Census Bureau	
Existing-Home Price	1980Q1=100	FHFA	Index is not affected by mix of homes sold.

"Measuring Regional Uncertainty: An Update of Risk-Adjusted Return," March 2013, for more details.

5 Vitality Index

The Moody's Analytics vitality index can be used to assess a metro area's long-term economic potential. The index abstracts from business cycle fluctuations and near-term economic events. Only persistent forces of economic strength or weakness are considered. To maintain a long-term focus, the vitality index was created with the purpose of predicting the average annual growth rate in an area's gross domestic product over the next 10 years. This index presents a quantitative alternative to the Moody's Analytics regional forecasts, which are determined not only by econometric modeling but also by the qualitative judgment of regional analysts. The following four factors make up the vitality index: (1) industrial structure, (2) excess labor supply, (3) labor force quality, and (4) labor force growth. An index was generated for each of these components. A value of 100 indicates that the component in the metro area's economy matches the component's value nationally; values above 100 indicate that the component in the metro area's economy is above average, and those below 100 indicate the component is below average.

The index for industrial structure is called the industrial vitality index. The three labor inputs are reconciled into a single labor force vitality index in which values of 100 also correspond to the national average. The labor force vitality index is then combined with the industrial vitality index to produce the metro area's vitality index. Industrial vitality was assigned a 55% weight, and labor force vitality is assigned a 45% weight. These were assigned to achieve maximum correlation between predicted GDP growth and actual GDP growth as determined by regression analysis. A vitality index value of 100 is consistent with the

nation. Values above 100 suggest there is potential for faster growth, and those below 100 suggest the possibility for slower growth.

See Regional Financial Review, "U.S. Regional Diversity, Volatility and Vitality," November 2012 for a detailed explanation.

6 Quality of Life Index

These numbers represent the ranking of metro areas and divisions in quality of life, with 1 being best. The quality of life for each metro area is an index of characteristics that individuals and households appear to prefer, weighted in proportion to how much they affect people's demand to live in an area. The index is composed of metro area characteristics that predict the house price-to-income ratio and the net migration rate across metro areas.

The most influential variables fall under four categories: child welfare, walkability/bikeability, recreation and natural amenities. Child poverty rates were obtained from the U.S. Census Bureau's American Community Survey. Walkability/bikeability represents the percentage of residents who report in the ACS that they walk or bike to work. Per capita access to recreational facilities was calculated using data on the number of workers in a subset of leisure and hospitality industries from the U.S. Bureau of Labor Statistics Current Employment Statistics. This category includes arts, entertainment, recreation and food services.

Finally, a measure of natural amenities was obtained from the U.S. Department of Agriculture. The USDA's natural amenities scale quantifies the physical characteristics of a county area that enhance the location as a place to live. The scale was constructed by combining six measures of climate, topography and water area that reflect environmental qualities most people prefer. These measures include warm winter, winter sun, temperate

summer, low summer humidity, topographic variation, and water area. Metro areas containing multiple counties were weighted using a household-weighted average of the amenity score. All variables in both models were then standardized.

The U.S. average for each index component is zero. Thus, a metro area with an index score above zero has a quality of life above the national average; an index below zero means a metro area has a quality of life below the national average. Data limitations prohibited the use of Alaska and Hawaii. Incomplete data also necessitated assigning to metro divisions the scores and rankings of the metro areas in which they are located. Therefore, multiple metro areas and divisions have the same scores and rankings.

7 Moody's Bond Rating

This is the bond rating for general obligation bonds issued by a principal city or county government. Not all city and county governments issue GO bonds and thus some metro areas will have an "NA" here. The interpretation of the bond rating is as follows:

Aaa	Best quality, smallest degree of investment risk
Aa	High quality, margins of protection not as large as in Aaa
A	Upper medium grade obligations, adequately secured
Baa	Medium grade obligations, neither highly protected nor poorly secured
Ba	Speculative, future cannot be considered as well assured
B	Lacking characteristics of desired investment

The modifier 1 indicates that the issue ranks in the higher end of its generic category; the modifier 2 indicates a midrange ranking; and the modifier 3 indicates that the issue ranks in the lower end of its generic category.

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8 Economic Health Check

A heat map made up of high-frequency indicators provides insight into the factors that explain an area's recent performance. The indicators considered are all produced in monthly frequency. In order to smooth out month-to-month fluctuations, the three-month moving average is calculated and compared with the three-month moving average in the prior month. If the change is positive, the cell is shaded green, if no change took place, the cell is shaded yellow, and if the change is negative, the cell is shaded orange. The high-frequency indicators include the change in payroll employment; change in the unemployment rate, where a lower rate connotes improvement; the labor force participation rate, defined as the share of the working-age noninstitutional population older than 16 either looking for work or employed; industrial production; single-family residential permits; and multifamily residential permits. The metro industrial production index is estimated using national-level industrial production and metro-level industry employment.

9 Current Employment Trends

Employment is organized into three sectors: government, goods producing industries, and private service producing industries. Goods producing industries include natural resources and mining, construction and manufacturing. Private service producing industries include trade, transportation and utilities, information, financial activities, professional and business services, education and health services, leisure and hospitality and other services.

The year-over-year growth of payroll employment for the most recent month compared with six and 12 months prior enables the users to track how employment trends have changed over the preceding two years, and whether the pace of job creation has held steady, decelerated or accelerated. In addition to total payroll employment, data are available for all of the Bureau of Labor Statistics-defined "super sectors" listed above. In some smaller metro areas, some of the super sector data are estimated by Moody's Analytics because they are not released by the BLS.

10 Business Cycle Index

The Moody's Analytics business cycle index is a measure meant to gauge the current trend of underlying economic activity. The indicator is designed to pick up distinct shifts in the economy through its four underlying components: employment, housing starts, industrial production, and house prices. These variables are chosen for their timeliness, frequency and availability. Employment is provided monthly by the Bureau of Labor Statistics and house prices are provided quarterly by the Federal Housing Finance Agency. Housing starts are estimated by applying several adjustment factors to the Census Bureau's monthly permits data and industrial production is created by combining detailed in-house employment estimates with the Federal Reserve's monthly U.S. industrial production data.

When constructing the index, employment, housing starts, and industrial production are smoothed using

a three-month moving average in order to better grasp the underlying trends, while house prices are quarterly data that are converted into a monthly frequency and led by six months. Economic data—particularly at the metro area level—can often be volatile even when smoothed, and to control for sporadic movements in the data, the weights assigned to each component in the final index are inversely proportional to their volatility.

11 Diffusion Index

A diffusion index measures the breadth of private sector job creation in an area. A low diffusion index indicates that an area relies on just a few industries for growth. A high diffusion index indicates more balanced growth. The diffusion index is constructed by summing the share of three-digit NAICS industries that have added to payrolls in a given month and half of the share of those industries that



have neither added to nor subtracted from payrolls, where 50% indicates an equal balance between industries with increasing and decreasing employment. Because of volatility in month-to-month movements, a six-month moving average is used. Detailed industry employment data, for 274 industries as specified by the BLS, are used to compile the industry diffusion indexes for states and metro areas. The BLS does not publish payroll numbers for all three-digit industries for metro areas every month. Moody's Analytics estimates the data for any missing NAICS industries.

The following calculation is then used to compute the diffusion index, where the denominator is the total number industries in which employment data are available at the three-digit NAICS level.

$$((\text{positive}/\text{denominator}) + (.5 * (\text{unchanged}/\text{denominator}))) * 100$$

12 Relative Employment Performance

In order to compare the performance of a metro area's labor market with that of the U.S. and state, an index is calculated in which the value of the Bureau of Labor Statistics payroll employment in the first quarter of 10 years prior to the current year is set at 100. Forecast data for the next five years are also provided. The shaded gray bar represents the period of the 2008-2009 national recession.

In addition, we track how the two- and five-year employment forecasts for the metro area, state and U.S. have changed compared with six months prior. A dash indicates no change, an upward arrow indicates a more optimistic outlook and a downward arrow indicates a more pessimistic outlook. For the two-year forecast, a difference in average annual growth larger than 0.1 percentage point indicates a change. For the five-year forecast, a difference larger than 0.25 percentage point indicates a change.

13 House Prices

FHFA Conventional and Conforming Home Price Index. The Federal Housing Finance Agency (FHFA) estimates

and publishes quarterly house price indexes for single-family detached properties using data on conventional conforming mortgage transactions obtained from the Federal Home Loan Mortgage Corp. (Freddie Mac) and the Federal National Mortgage Association (Fannie Mae). These indexes use a repeat-purchase method, which is not affected by the mix of homes sold. For example, using traditional house price measures, a rise in the number of low-priced homes sold relative to higher-priced homes will bias house prices downward even though relative prices may not have changed. Because repeat-purchase house price indexes keep track of successive selling prices for the same property, they avoid this bias. Freddie Mac and Fannie Mae are private corporations with federal charters whose mandate is to provide liquidity to the nation's residential mortgage market. The FHFA was created by the Housing and Economic Recovery Act of 2008. The FHFA is the regulator of Fannie Mae, Freddie Mac, and the Federal Home Loan Banks. This law combined the staffs of the Office of Federal Housing Enterprise Oversight (OFHEO), the Federal Housing Finance Board (FHFB), and the GSE mission office at the Department of Housing and Urban Development (HUD).

The House Price Index is based on transactions involving conforming, conventional mortgages purchased or securitized by Fannie Mae or Freddie Mac. Only mortgage transactions on single-family properties are included. A conforming mortgage is one that both meets the underwriting guidelines of Fannie Mae or Freddie Mac and that does not exceed the conforming loan limit. The conforming limit for single-family homes is \$484,350 as of January 2019, with higher limits for high-cost metro areas. Conventional means that the mortgages are neither insured nor guaranteed by the FHA, VA, or other federal government entity. Because of the conforming limit, the FHFA repeat-purchase index is less reliable in those states, such as California, Connecticut and New Jersey, where many homes are typically priced above the purchase limits.

14 Vacancy Rates - Housing and Rental

The homeowner vacancy rate is the proportion of the homeowner housing inventory that is vacant for sale. It is

computed by dividing the number of vacant units for sale by the sum of owner-occupied units, vacant units that are sold but awaiting occupancy, and vacant units for sale and then multiplying by 100.

The rental vacancy rate is the proportion of the rental inventory that is vacant for rent. It is computed by dividing the number of vacant units for rent by the sum of renter-occupied units, vacant units that are rented but awaiting occupancy, and vacant units for rent and then multiplying by 100.

15 House Price Trends

This chart compares the observed value of the FHFA purchase only index (for states) or FHFA all transactions index (for metro areas and divisions) with the value Moody's Analytics projects if supply and demand in the housing market were in long-run equilibrium. When the observed value of house price index is greater than the equilibrium value, the average house price is overvalued; when the observed value is less than the equilibrium value, the average house price is undervalued. The primary factors that determine equilibrium include per capita disposable income, a measure of long-run demand, and construction costs, a gauge of long-run supply. These measures are updated monthly.

16 Housing Affordability

The housing affordability index is designed to measure the degree to which a family that earns the median income can afford the mortgage payments on a median price existing single-family home. The index uses a conventional 30-year mortgage with a 20% down payment and the FHFA composite mortgage rate. A value of 100 means that a family with the median income has exactly enough income to qualify for a typical mortgage. To qualify the mortgage debt service on the median price home can be no more than 25% of annual income. Higher index values indicate greater affordability. Any change in the index shows that homes are becoming more or less affordable based on changes in income, house prices and mortgage rates.

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17 Top Employers List

Moody's Analytics compiles top employers lists for every region for the most recent year available. Public sector employment, which is generally proportional to a metro area's population, is provided separately. However, the lists do include public establishments that are not found in every metro area such as military bases or specific federal agencies.

18 Diversity and Volatility

Industrial Diversity

Industrial diversity is defined as the extent to which a metro area's industrial structure approximates the U.S. industrial structure.

Diversity is derived using the following formula:

$$\text{Diversity} = 1 / \sum ((\text{EMP}_{ij} / \text{EMPUS})^2 * \text{EMP}_{ij})$$

Where EMP = share of employment in four-digit NAICS industry j during the past three years; i = metro area; US = U.S. The Diversity measure is bounded between 0 and 1. 1 means the metro area has the same industrial structure

as the U.S.; 0 means it has a totally different industrial structure than the U.S.

Formula derived from Hachman index, Bureau of Business and Economic Research, Univ. of Utah, December 1994.

Employment Volatility

Employment volatility is defined as the standard deviation in a metro area's monthly year-over-year percentage nonagricultural employment growth relative to the standard deviation in U.S. year-over-year percentage nonagricultural employment growth over the past 10 years. Volatility of 100 means that employment volatility in a metro area is equal to employment volatility in the nation. Metro areas tend to be inherently more volatile than states.

Employment Volatility Due to U.S. Fluctuations

Volatility due to U.S. fluctuations (also known as "systematic volatility") is defined as:

$$\text{SYSVOL} = (R^2)^{1/2}$$

where SYSVOL = systematic volatility; R^2 = is the

proportion of total variance in metro area i's growth rate that is associated with contemporaneous fluctuations in national growth.

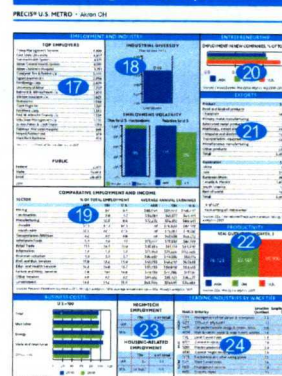
Volatility not due to U.S. fluctuations (also known as "nonsystematic volatility") is defined as:

$$\text{NONSYS} = 1 - (R^2)^{1/2}$$

where NONSYS = nonsystematic volatility in metro area i; R^2 is the proportion of total variance in metro area i's growth rate that is associated with contemporaneous fluctuations in national growth.

Formulas modified from "Assessing Regional Economic Stability: A Portfolio Approach," *Economic Review* (Federal Reserve Bank of San Francisco), Winter 1990.

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19 Comparative Income and Employment

The comparative employment and income table shows how the distribution of employment and annual earnings by super sector in a metro area compares with the state and U.S. distributions. Average annual earnings in an industry can differ significantly across metro areas, states and the U.S. Low relative earnings, for example, indicate that the industry has a higher concentration of lower-paying segments than the state or U.S. or that wages in the industry are lower than elsewhere. Low relative wages may give an area a competitive advantage. Combining employment and income provides a way of determining how much an industry contributes to overall income in a metro area. A relatively small number of jobs in high-paying industries may contribute more to income than a relatively large number of jobs in low-paying industries.

20 Entrepreneurship

The entrepreneurship index looks at the share of workers who were employed in firms that are less than 1 year old. This is based on annual data produced by the Census Bureau as part of the Business Dynamics Statistics (BDS). Because of underlying volatility in the data, especially during changes in the business cycle, a five-year rolling average is used. Areas with a large share of workers employed at relatively new firms are classified as having a favorable entrepreneurial environment.

It is worth noting that the data are available using only 2000 Core Based Statistical Area (CBSA) definitions. Therefore, the county footprint associated with an area may not match the definition used for other metrics. Additionally, for CBSAs that were created in 2010 and for which there is not a clear corresponding discontinued metro area that can be mapped to, this box is left blank.

21 Exports

Metro-level export data are compiled from the U.S. Census Bureau's Origin of Movement–ZIP code Based Series (OM–ZIP). Thus, the exported merchandise is not necessarily the production origin of the exported goods. Data are available only for merchandise.

The degree of exposure that a metro has to international markets is determined by calculating the export share of nominal gross metro product and then by ranking this share across all metro areas. A higher share of exports to GMP is generally positive for a metro area since it indicates that the metro area draws on a larger market for its goods than do areas with smaller shares. However, a higher share increases an area's vulnerability in the event of global disruptions, such as recessions and natural disasters, and fluctuating exchange rates.

22 Productivity

Productivity is measured as real output per worker in an area. High productivity incorporates the efficient use of labor, machines, and technological improvements. Generally, more productive areas will also have higher wages. However, higher wages do not necessarily reduce an area's competitiveness because the higher productivity may more than offset the higher wages. High productivity may also reflect the industry composition in a metro area, as a concentration of more productive industries will boost overall productivity.

23 High-Tech Employment

Moody's Analytics defines high-tech employment as the sum of employment in the following industries:

NAICS	Industry
3254	Pharm. & Medicine Manuf.
3341	Computer and Peripheral Equip. Manuf.
3342	Communications Equipment Manuf.
3344	Semi. & Other Elec. Comp. Manuf.
3345	Nav., Meas., Elec. and Control Instr. Manuf.
3391	Medical Equip. and Supplies Manuf.
5112	Software Publishers
5171	Wired Telecommunications Carriers
5172	Wireless Telecom. Carriers (except Sat.)
5174	Satellite Telecommunications
5179	Other Telecommunications
5182	Data Proc., Hosting, & Related Services
5191	Other Information Services
5415	Computer Sys. Design & Related Services
5417	Scientific Research and Dev. Services
5419	Other Prof., Scientific and Tech. Services
6215	Medical & Diagnostic Laboratories

23 Housing-Related Employment

Moody's Analytics defines housing-related employment as the sum of employment in the following industries:

NAICS	Industry
2361	Residential Building Construction
238	Specialty Trade Contractors
444	Building Material and Garden Equipment and Supplies Dealers
5617	Services to Buildings and Dwellings
5413	Architectural, Engineering and Related Services
522	Credit Intermediation and Related Activities
5312	Offices of Real Estate Agents and Brokers
4233	Lumber and Other Construction Materials Merchant Wholesalers
5313	Activities Related to Real Estate

24 Leading Industries by Wage Tier

To determine the high-, middle- and low-wage industries for a given geography, the average U.S. wage is calculated first by dividing total salary disbursements by total employment. Average wages by industry are calculated using U.S. level wage and employment data for all four-digit NAICS codes. Next, the standard deviation of the average wages across industries is calculated. One standard deviation centered at the mean defines the upper and lower bounds separating the high, middle and low tiers. The average wage in the given geography for each four-digit NAICS industry is calculated next. The industry is categorized as high, middle or low wage by comparing it with the national high and low cutoffs. The industries are then ranked by size.

For each industry, the location quotient is calculated. Location quotients are used to indicate whether the industry serves a market larger than that of the metro area or is an "export" industry. A location quotient greater than 1 likely indicates an export industry. Location quotients are calculated according to the formula:

$$LC_m^i = (E_m^i / E_m^t) / (E_{us}^i / E_{us}^t)$$

where LC = location quotient in metro area m for industry i; E = employment in industry i for metro area m or the U.S.; and t = total employment for metro area m or the U.S.

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25 Skills Mismatch

Skills mismatch is determined based on two components: the distribution of educational attainment of a population and the educational characteristics associated with jobs in an area. The two are compared along six dimensions, with each showing how closely aligned the educational attainment of the general population is with the requirements of an area's jobs. Although educational attainment is not a perfect proxy for skills, it can be quantified in a way that specific skills, such as trade, cannot, making it a useful window into whether an economy faces struggles to find qualified workers or if skilled workers may struggle to find opportunities locally and be forced to migrate elsewhere.

Educational attainment for residents is obtained directly from the American Community Survey. The skill requirements side is based on local occupational employment data from the BLS. This was used to construct a matrix of occupations by educational attainment in each place being examined; this is calculated by applying the national educational share for each occupation to the total number employed in each

occupation in a specific economy. The total for each educational level across all occupations was then summed to determine educational requirements for an area.

The single bar above the chart indicates whether an economy is overeducated or undereducated. This is calculated by using the difference between the population's educational attainment and requirements for the two highest education categories being examined. The differences are weighted so that mismatches for the highest level

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(graduate degree) are weighted most heavily. The final figure is indexed to 100 (the black line), such that anywhere over 100 features excess supply of skilled workers, while an economy below 100 does not have enough worker skills to fill all jobs.

26 Economic Disenfranchisement

Economic disenfranchisement indicators measure the degree to which income inequality plagues certain economies. To capture this, three measures are used.

The Gini coefficient and poverty rates are published by the American Community Survey (ACS), produced by the Census Bureau. The Gini coefficient measures income concentration, with 0 representing perfect equality and 1 representing an economy in which all the wealth is held by one individual.

The Palma ratio is a newer measure of income inequality that examines the total income held by earners in the top 10% of households and divides that by aggregate income held by the bottom 40%. This typically requires

household-level financial information, but Moody's Analytics uses a broader distribution of income by household from ACS data to approximate both the numerator and denominator.

A higher Palma ratio indicates that a larger share of wealth is concentrated in the wealthiest households in an economy. An advantage of this measure is that it is more sensitive to movements at the tails of the distribution, which typically better represent income inequality given that the middle 50% is typically more stable across history and geographies (for more information, refer to Jose Gabriel Palma's paper, "Why is inequality so unequal across the world?").

27 Migration Flows

IRS data. When a taxpayer notifies the IRS of a change in address, the IRS records the household's current county of residence, the county to which the household is moving, and the number of household members. Moody's Analytics aggregates these data by metro area into gross migration. The data are then sorted to show the 10 metro areas providing the largest number of new residents and the 10 metro areas to where the largest number of current residents moves. Subtracting the gross out-migration flows from the gross in-migration flows gives net out-migration.

The IRS migration data cover only households that file returns and thus do not provide a complete tally of domestic migration flows.

Census data. The Census measure of net migration attempts to capture all migration to and from counties. Unlike the IRS data, Census data cover all migrants, including international migrants. Moody's Analytics aggregates county net migration data to metro areas and to states. Domestic and international net migration were re-estimated for years 2001-2010, because the Census has no plans to do this. Pre-existing net migration estimates (derived from new census population estimates combined with constant birth and death rates) were used. The "weights" for domestic

and international migration are the same as those that existed before.

28 Per Capita Income

Per capita income is defined as personal income divided by population. It is not adjusted for inflation.

29 Commuter Flows

Metro area commuter flows are derived from county-level figures reported in the 2009-2013 American Community Survey (ACS) Journey to Work data. The ACS creates estimates based on where surveyed individuals worked in a given week and matched that against their place of residence. Moody's Analytics aggregated these counties to metro areas and examined flows at this higher-level geography.

The data are split into two sections. The first represents the commuting patterns of residents of an area; the second shows the commuting patterns of workers in an area. While these are correlated, there can be noticeable differences; for example, a large urban metro area likely attracts a material share of workers from elsewhere, with a smaller share of its residents commuting outside of the area.

The pie charts reflect the share of residents or workers whose commute does not extend beyond a metro area's borders. Not surprisingly, each figure averages higher than 80%, as metro areas are defined in large part by commuting patterns to begin with. The rank indicates how self-sufficient an area is. The tables below each chart show where residents work and where workers reside. This provides a glimpse of which places are most closely linked economically to the area.

30 Generational Breakdown

The distribution of an area's population into generations employs definitions from the Pew

Research Center. Generations are defined by the following birth years:

The Greatest Generation – 1901 to 1927
The Silent Generation – 1928 to 1945
The Baby Boom Generation – 1946 to 1964
Generation X – 1965 to 1980
The Millennial Generation – 1981 to 1998
Generation Z – 1999 to present

31 Educational Attainment

The Census Bureau provides data on the educational attainment of residents older than 25 years of age of metro areas and their component counties, states, and the U.S. Educational attainment reflects the industrial composition of an area as well as the prospects that an area has in expanding its industries.

32 Population by Age

The Census Bureau provides data on population by age for metro areas and their component counties, states, and the U.S. A distribution that differs significantly from the national distribution has implications for the labor, housing and consumer markets in an area. For example, a distribution skewed toward older cohorts implies higher than average demand for healthcare services and lower than average demand for single-family housing.

Region Definition

The Moody's Analytics definition of the Northeast differs from the Census Bureau's definition of the Northeast Census Region in that it includes Maryland, Delaware, and the District of Columbia in addition to Middle Atlantic and New England states. The Moody's Analytics definition of the South excludes Maryland, Delaware, and the District of Columbia. The Moody's Analytics definitions of the Midwest and West match the Census Bureau's definitions of the Midwest and West Census Regions, respectively.

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Maps

Population density.

This map illustrates the number of residents per square mile within each census block group of a state or metro area. A block group is a collection of adjacent census blocks and is the smallest geographic unit for which the Census Bureau publishes sample data. Population estimates by block group come from the U.S. Census Bureau's American Community Survey and are updated annually. The U.S. Census Bureau's Geography Division reports the area of each block in square meters every 10 years. Moody's Analytics converts the area in square meters to square miles and calculates the population per square mile for each block group.

Income distribution.

This map illustrates the median household income within each block group of a state or metro area. Median Household Income estimates by block group come from the U.S. Census Bureau's American Community Survey and are updated annually.

Travel time to work.

This map illustrates the average commute time to work for those employed outside of their place of residence within each block group of a state or metro area. The map indicates the areas within the MSA where employment and output are concentrated—areas with the shortest average commute times generate the most output. The aggregate commute time to work in minutes by block group and the number of employees who work outside of their place of residence by block group come from the U.S. Census Bureau's American Community Survey and are updated annually. Moody's Analytics calculates the average commute time to work for each block group.