Measuring Urban Condition and Performance: How Do We Know Urban Revitalization (or Distress) When We See It?

GWIPP Working Paper

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January 16, 2018

Introduction

What is meant by "urban condition" and "urban performance," and how can these terms – and related ones such as urban revitalization, resurgence, or distress - be operationalized and measured? The lack of conceptual clarity of these terms leads to use of a wide variety of measures or indicators, many of which may be unrelated to others. Indeed, in most of the literature terms such as urban revitalization, urban resurgence, revival, renaissance, health, or even growth or their opposites (decline, distress, deprivation) seem to be used synonymously.

The lack of clear definition matters because it hinders generalization across studies and sows confusion. For example, Wolman et al. (2004) surveyed urban experts (members of editorial boards of urban journals and of the executive boards of two urban oriented economic development organizations) and asked them to identify, from a list of the most distressed cities as of 1990, those cities that had undergone the greatest revitalization between 1990-2000. They then compared those cities selected as having successfully revitalized to those equally distressed cities in 1990 that were perceived to have failed to revitalize by 2000. They found very little difference between the two sets of cities in terms of several measures of residential well-being such as changes in per capita income, the poverty rate, and the unemployment rate.

In an effort to explain this lack of correspondence between perception of revitalization and actual improvement in indicators of well-being, they also asked the respondents to state what criterion (a) they had used (this was an open ended question for which multiple responses were permitted). After coding the responses, they collapsed them into four categories: development or downtown development (62 responses), improved local or regional economy (50 responses), housing or neighborhood revitalization (27 responses), and improved social conditions (26 responses). They write that (2004: 978):

"As a criterion for selection, the focus on development or downtown development (responses such as central business district development, redevelopment, retail development, entertainment development, tourism, high-profile events, and so on) would appear, prima facie, to have a less direct connection to improvement in the economic well-being of city residents than improvement in social conditions (better job market, lower unemployment, better amenities or public service, or lower crime). Since development criteria were used twice as often as criteria relating to social conditions, the rankings might therefore reflect a definition of revitalization that

is not directly connected to residents' well-being (although it might still be the case empirically that downtown development leads to improved well-being for residents)." They hypothesized that the focus on visible downtown development biased the results towards cities that had indeed undergone such rebuilding, even though such development may have had little impact on urban conditions as defined differently.

As this suggests, clarifying what is meant by terms used to describe urban condition or performance, such as urban revitalization or urban distress, is important in order to avoid confusion. In this paper, we begin by sorting out the various terms conceptually. We then examine the literature to set forth the various ways in which these terms have been operationalized and measured. Next, we select several commonly used variables measuring various aspects of urban condition (existing state at a specific point of time) and performance (change over time) for cities and metropolitan areas and examine the extent to which these measures are correlated with one another. If they are not well-correlated, then research that employs one of the measures to assess urban condition (or resurgence, distress, etc.) cannot necessarily be assumed to apply to the overall concept or to other measures of it. We then consider and test other means of measuring urban condition/performance more consistently, including index construction and factor analysis. Each of these solves some problems while creating others. Finally, we discuss the benefits and costs of using different types of measures and approaches and make suggestions on how to proceed.

Sorting Out Terms, Clarifying Concepts, and Setting Out Choices

In this section we set forth some critical concerns related to research on urban condition and performance.

First, what is the conceptual definition of the phenomenon under consideration? What do we mean by urban condition or performance? There are a variety of possibilities, which we list below without regard, at this point, to the question of whether and how each can be measured.

- The urban economy: the ability of the economy to generate jobs and income
- Residential well-being: the well-being of residents who live in the area.
- The quality of basic urban systems such as the area's infrastructure and the area's housing stock.
- Physical development (usually viewed over time), the physical redevelopment of the urban area, often the downtown area of the main city.
- The "dynamism" of the downtown area and of neighborhoods with respect to street activity, retail and commercial activity, and social interaction.
- City government fiscal health (which, perforce, applies only to individual local governments rather than the region as a whole since regions in the United States do not have fiscal institutions for general purpose government)

- The quality of local government provided services relative to the tax cost of providing them.

These elements are not necessarily correlated (that is an empirical question) with one another.

Second, is the concern urban *condition* or urban *performance*? Urban condition refers to the value of the urban phenomenon at a particular point in time (in measurement terms, it measures the *level* of one or more of the concepts set forth above), while urban performance implies urban *change* over time. In other words, it is analogous to the concepts of stock and flow. Nor is urban condition necessarily correlated with urban performance so a finding about the condition or performance with respect to one of the above does not imply that its condition is similar with respect to the others.

Third, regardless of whether urban condition or performance or one of its derivatives such as urban resurgence or urban decline is chosen, the implications of the conceptual definition needs to be clearly thought out. As an example, urban revitalization or, as it has been more popularly called recently, "urban resurgence", has been a major research theme in recent years (see, for example, Storper, 2004; Wolman et al., 2004; Glaeser and Gottlieb, 2006; Storper and Manville, 2006; Cheshire, 2006; Turok, 2008, Sutton, 2008; Kodrzycki and Munoz, 2014, 2015; Schragger, 2016.) The literature has focused on which cities have revitalized, how they have done so, how widespread the phenomenon is, and, indeed, whether the process is occurring at all. The term, however, is seldom defined. Cheshire (2006) in his introduction to a book consisting of chapters presented at a symposium on resurgent cities observes that the, "Contributions showed that city resurgence was a hard concept to define precisely…Emphasizing the difficulty of defining exactly what is meant by urban resurgence, the contributors to this Special Issue all have somewhat different versions." (pp. 1231-1232). In some cases, there is no distinction made between cities that are revitalizing (whose performance improves over time) and cities whose condition is "healthy, even though it has not necessarily improved."

Taken at face value, however, revitalization (or resurgence or any of the other "re") implies that a city was not vital previously (t_{-1}), though it was in the period prior to that (t_{-2}) and is now once again vital or becoming vital. In other words, urban revitalization or resurgence is concerned with urban performance (change over time) rather than urban condition. Hill et al. (2012), for example, compare cities whose population declined and then began to grow to cities whose population declined and subsequently did not grow. This contrasts with the term urban growth (or its opposite, urban decline), which indicates an increase in whatever is being measured, but it does not necessarily imply that the city is returning to some prior status after stagnation. Clearly, the concept that is of actual concern here will affect the cities chosen for analysis – for urban revitalization only cities that have faced a period of non-vitalization, while for urban growth cities that are growing, presumably compared to those that are not, or to all cities.

Fourth, what is the appropriate geographic unit to examine, i.e., what do we mean by "urban?" The answer to this question obviously ought to reflect the researcher's interests and objectives, but regardless, it needs to be made clear. Is the concern the metropolitan area (MSA), the central city, select suburban areas within the region, or neighborhoods within cities or suburbs? And how are the conditions of these various geographic scales related to one another are (e.g., are there any cases of revitalizing cities in distressed metropolitan areas or revitalizing cities in metropolitan areas that are not revitalizing? See Wolman et al., 2008).

Fifth, should a concern for urban condition/performance focus on the metropolitan area or central city aggregates or should distributional considerations also be taken into account? For example, with respect to geographical distribution, what about the condition or performance of subareas within a metropolitan area (e.g., suburbs) or neighborhoods within the city, subareas that may be experiencing adverse conditions or performance even within the context of a much better performing region or city? With respect to sub-groups, are there certain types of communities or residents (e.g., poor people, African-Americans, Latinos, etc.) for which revitalization is a particular concern, such as groups that are under threat of gentrification?

Sixth, are urban condition or performance descriptors such as urban regeneration, resurgence, health, growth, etc., the symmetrical opposite of urban decline, distress, etc.? Glaeser and Gyourko argue this is not necessarily the case. They contend (2005: 346), for example, that, "Because homes can be built quickly, but disappear slowly, urban decline is not the mirror image of growth. The housing market is characterized by a kinked supply curve that is highly elastic when prices are at or above construction costs and highly inelastic otherwise. Because housing is durable, a negative demand shock …leads to a large fall in price but little change in quantity. Given the extremely tight relationship between housing units and population, declining cities initially suffer price declines, not population losses. As long as housing is elastically supplied, a positive demand shock… will cause new housing units to be supplied at roughly constant cost so that there will be an increase in population accompanied by little change"

Seventh, how should urban condition or performance be reported and assessed? Should it be measured in absolute terms or relative to other urban areas, such as a national average? Or should urban areas be compared to peer areas at the beginning of the period (see, for example, Kodryzcki and Munoz, 2009, who identified a set of cities whose attributes were similar to those of Springfield, MA in 1960 and then compared the performance of these cities to that of Springfield from 1960 to the middle of the first decade of 2000)? Another possible approach is to compare urban areas to themselves, either simply by examining condition or performance in one period relative to the previous one, or, by asking whether, given the set of attributes (usually industrial structure) that an urban area had in an initial period, did the area perform better than it could have been expected to in the succeeding period. Erickcek and McKinney (2006) accomplished this through looking at residuals from a predictive model of performance that included the industry shift/share component. Wolman et al. (2015) use shift/share analysis to calculate the expected employment growth of an urban area would have if each of its industries

(two digit NAICs) had grown at the same rate as that industry grew nationally and then compare that to the area's actual employment growth over the period.

Finally, to what extent are different concepts and measures of urban condition or performance related to one another? Can findings about one of these concepts be assumed to hold for others? We return to this concern more intensively later in the paper.

Measures and indicators

What indicators/measures/variables should be used to operationalize the concept of urban condition and performance and specific outcomes such as urban resurgence, revitalization, decline or distress? The existing literature offers little guidance. In most cases the conceptual definition of these terms is not provided and has to be inferred from the indicators selected.

Bradbury et al (1982) distinguish between *descriptive* change and *functional* change. Writing in terms of urban decline they define descriptive decline as "any decrease in such measures of size as population or employment," and functional decline as "changes that somehow impair the functioning of a city." (1982: 18). Glaeser (2005: 147) states that, "There are three ways of measuring urban success: population growth, income growth, and housing price growth." He and Gottlieb (2006: 1277) elaborate: "Population growth captures the quantity side of popular demand to live in a city. Nominal income growth implies a rising productivity. Housing price growth indicates a greater willingness-to-pay for a city's bundle of wages and amenities." But this is more a case of selecting measures for an undefined concept (success). Erickcek and McKinney (2006: 235) conceive of urban condition in terms of quality of life, the "capacity to improve the quality of life within an area as well as improvements in the quality of life."

Many measures have been used, sometimes as a means of operationalizing explicitly defined concepts, but more often in the absence of explicit concept definition. These measures include population, employment, gross product or value added, investment, the well-being of residents or quality of life, city government fiscal health, and infrastructure quality.

Population (and population change), either on its own or as one of several indicators, is frequently used, presumably because, so it is argued, it is a measure of a city's overall desirability (see, for example, Bradbury et al., 1982; Cheshire et al., 1986; Glaeser and Shapiro, 2003; Inman, 2003; Glaeser and Saiz, 2004; Glaeser and Gyourko, 2005; Glaeser, 2005; Kodrrzycki and Munoz, 2009; Glaeser, Ponzetto, Tobio, NBER, 2011; Hill, Wolman et al., 2012; Chernick and Reschovsky, 2014) As Glaeser and Gottlieb (2006: 1277) state, "Population growth captures the quantity side of popular demand to live in a city." In its favor we should note that population change is surely the simplest, most readily understood, and most commonly used measure. Furthermore, some have argued that population change is closely related to other elements of urban condition. Some research has found, particularly over the longer term, a very high correlation between population change and employment change (James, 0.90 over 1970s), but Hill and Brennan (2005) found a lower correlation of 0.56 from 1998-2001. However, Fodor

(2012) finds that over the period 2000-2009, metropolitan area population growth was *inversely related* to per capita income and per capita income growth and positively related to increases in the unemployment rate and to the 2009 poverty rate (p. 226).

Employment (and employment change), i.e., the number of jobs located within the urban area's boundary, is another frequently used measure of urban condition (see Hill and Brennan, 2005; Markusen and Schrock, 2006; Wolman et al., 2008; Chernick and Reschovsky, 2014; and Ladd and Yinger, 1989, the last of which uses the number of private sector jobs per resident to measure "economic health"). Presumably job change measures economic health, the attractiveness of an area for business activity and the ability of an urban area's economy to generate jobs and income for area residents. Like population, employment by place of work is what Bradbury et al. would term a measure of descriptive change.

Gross product/value added, the value of the output produced by the area's economy, is another descriptive measure of an area's economic health (see Wolman et al., 2008). This measure is difficult to use since data are not routinely available on the city jurisdiction level and only recently (since 2001) on the metropolitan level from the Bureau of Economic Analysis. Prior data are available at a cost from private firms (such as Moody's Analytics) which use proprietary algorithms to estimate gross metropolitan product.

Investment or increase in the value of physical assets in the urban area is sometimes used as a proxy for physical development (or redevelopment) of the urban area or of a part of it, such as the downtown area. The primary logic is that it can be used as a measure of the willingness of residents and businesses to pay for the bundle of attributes the area possesses. Thus, Glaeser et al (2011) use the increase in value of residential and commercial property as a measure of urban condition. More typically housing price change is used as a measure of urban condition, since housing prices indicate a greater willingness to pay for an area's bundle of wages and amenities (see Glaeser, 2005a; Glaeser and Gottlieb, 2006; Inman, 2003)

Well-being of residents or quality of life are broader measures. These measures move from the descriptive to the functional. Although income is sometimes used as a stand-alone measure, the other variables are frequently employed as one of several measures or sometimes collapsed into an index or typology. They include levels or rates of change of:

- Income (Bradbury et al., 1982; Cheshire et al., 1986; James, 1990; Inman, 2003; Glaeser, 2005; Glaeser, Ponzetto, Tobio; Erickcek and McKinney, 2006; Glaeser and Gottlieb, 2006; Kodrrzycki and Munoz, 2009; Fodor, 2012; Chernick and Reschovsky, 2014)
- Poverty or concentrated poverty rate (Bradbury et al., 1982; James, 1990; Eggers, 2007; Wolman et al., 2008; Kodrrzycki and Munoz, 2009 ; Fodor, 2012;)
- Unemployment rate (Bradbury et al, 1982; Cheshire et al., 1986; James, 1990; Furdell et al., 2005; Eggers, 2007; Wolman et al., 2008; Fodor, 2012;
- Labor force participation rate (Wolman et al., 2008)

- Crime rate (Bradbury et al., 1982; Eggers, 2007; Chernick and Reschovsky, 2014
- Happiness. While the five above variables meant to measure resident well-being are relatively easy to collect or to calculate, there have also been attempts to measure broader concepts such as happiness. Glaeser, Gottlieb, and Ziv (2014) employed self-reported data on happiness from two sources, one a large cross-sectional survey and the second a longitudinal panel study. The first is the Behavioral Risk Factor Surveillance System (BRFSS) conducted by the Centers for Disease Control and Prevention (CDC). That survey asks individuals to report on their own life satisfaction using a discrete response scale. Since 2005, CDC has asked all respondents "In general, how satisfied are you with your life?" Respondents were given four possible categories: very satisfied, satisfied, dissatisfied, and very dissatisfied. In each year between 2005 and 2010, around 300,000 subjects answer this question. The second consists of panel data from the much smaller National Survey of Families and Households (NSFH). The NSFH is a longitudinal study with three waves, the first between 1987 and 1988, the second between 1992 and 1994, and the third wave between 2001 and 2002. The NSFH asks: "First taking things all together, how would you say things are these days?" Respondents respond on a 1 to 7 scale, 1 being very unhappy and 7 being very happy. Glaeser et al. (2014: 3) note that people in places with lower levels of population and income growth, controlling for other factors, are less happy.

City government fiscal health is also sometimes used as an indicator of urban condition. Unlike the above measures, fiscal health is a function of the local government and its condition and performance, and is therefore not a relevant measure for an entire metropolitan area. There are a wide range of measures in the literature on fiscal health, far too many to set forth in this paper (but see, for example Bradbury, 1982; Chernick and Reschovsky, 2014; Jacob and Hendrick, 2013; Ladd and Yinger, 1989; Rivenbark et al., 2010; and Skidmore and Scorsone, 2011;).

Infrastructure quality is sometimes cited as a measure of urban condition or performance. Unfortunately, there are no national data available on urban infrastructure condition.

Data Presentation and Analysis

How should data on urban condition or performance be presented and analyzed and how should urban areas be compared? The simplest approach is to present data for each urban area on a continuum providing the value for each area on a specific measure (from high to low or low to high, depending on the purpose) or ranking the area without presenting the value, thus forming either an interval variable, if each city has a specific score (See Bradbury, Downs, and Small, 1982; Eggers, 2007) or an ordinal variable (if urban areas are simply ranked regardless of score).

Alternatively the urban areas could be placed in discrete groups (e.g., distressed vs. not distressed). Placing in discrete groups results in a nominal variable – the city is in one of several

specific groups. It also provides the possibility for typology development, utilizing data for two or more measures. Typologies are classification schemes involving two or more measures where each unit of analysis is placed in one and only one of the classifications. James (1990), for example, develops a typology based on whether a city was above or below the mean for resident need (measured by poverty rate, unemployment rate, and per capita income growth) and population growth from over the previous decade. Wolman et al. (2008) develop a typology of cities based on two categories: city resident economic well-being and city economic condition. In each case cities are placed in the appropriate cell based on whether they scored in the top, medium, or lower third of the distribution.

While some researchers rely on one or several of the above indicators, each presented and analyzed separately or on typologies, others have attempted to combine the variables, in order to provide a more comprehensive measure of the concept. The most common way of accomplishing this is through index creation. Indexes combine variables into a single score through some mechanism that aggregates multiple indicators. The simplest method is to create a Z score for each urban area for each of the variables and then add the Z scores for each area across the variables. Usually, absent any strong reason to do otherwise, the variables are weighted equally (see, for example Wolman, Hill, and Furdell, 2004). Hill et al. (2014) argued that a score using distance from the median (an "mscore") rather than a Z score utilizing the mean provided a better index since it adjusts for extreme outliers.

There are also more complex means of index creation through discriminant analysis or factor analysis. Cheshire et al.(1986) construct an index of urban decline using income/income growth; unemployment/unemployment change; net migration; and a travel demand index (number of quality adjusted hotel bedrooms). They weight the variables through use of discriminant analysis scores. Eggers (2007) develops a community needs index from 26 variables through use of factor analysis. The analysis yields three factors: 1) Needs associated with poverty and structural problems, 2) Needs associated with immigration and lack of affordable housing, and 3) Needs arising from limited economic prospects (Factor 3). He then computes factor scores for each city for each factor and creates a composite index by weighting the factor scores from each of the three factors equally.

How to Proceed

Obviously there is no single "correct" answer. The right approach depends on the purpose of the analysis, the data available, and the audience. If generalization across studies is an important objective, then use of a common approach is highly desirable. However, consistent cross-study generalization so far has not been the case, although, as noted, population change has probably been the most frequently employed indicator of urban condition.

Single indicator measures: One way of approaching this is to ask whether there is a single variable that can be used because it has a high correlation with many or most other indicators of urban condition. To that end we first gathered data on eight variables measuring various aspects of urban condition for cities and nine variables for metropolitan areas for both 2000 and 2010. The measures were selected based on a review of those commonly used in the literature discussed in the *measures and indicators* section above. For city condition the measures were per capita income, labor force participation rate, unemployment rate, poverty rate, median housing value for all owner occupied housing units, violent crime rate, property crime rate, and population growth (population change over the prior 10 years[1]). For metropolitan condition gross metropolitan product per capita was added as the ninth measure.

We then constructed a correlation matrix separately for city condition and performance and metropolitan condition and performance for each of those years. The city matrix using 2010 indicators yielded only seven (out of a possible 28) correlations that exceeded 0.5 (an admittedly arbitrary, but, we believe, reasonable standard), while the city correlation matrix for 2000 yielded only six (See Table 1). The highest correlation for both years was between unemployment rate and poverty rate in 2000 (0.77) and per capita income and median home value in 2010 (0.73).

The 2010 metropolitan area correlation matrix yielded four (out of a possible 36) correlations in excess of 0.5, while the 2000 matrix yielded six (see Table 2). The highest correlation for both years was between per capita income and per capita GMP (above 0.70 in both years).
Of particular interest, the correlations between population change – one of the most frequently utilized stand-alone measures of urban condition - and the other variables were extremely low for both city condition and metropolitan condition. The highest such correlation for city condition in 2000 was 0.32 between city population change and 2000 labor force participation rate; the highest for 2010 was between city population change and violent crime rate (0.33). The correlations between population change and the other measures were even lower at the metropolitan level, never exceeding 0.20 for either 2000 or 2010.

Correlation of performance measures[2] (change from 2000-2010) for the same eght variables for cities yielded much the same findings (See Table 3). Only four of the correlations exceeded 0.50, led by change in per capita income and change in the poverty (-0.76). For the metropolitan area correlation matrix, only four correlations exceeded 0.50, the largest of which was the correlation between per capita income and labor force participation rate (0.57)
In short, for both condition and performance, knowing the value of one measure would tell one little about the value of other measures. Furthermore, the measure utilized had substantial effects

[1] We do not view urban population size per se a measure of urban condition. Instead we view urban population *growth* as evidence of a healthy urban area and an indicator of urban condition.
[2] Change in population growth is measured as the percentage point difference in percent population change from 2000-2010 compared to the percent population change from 1990-2000.

on the order in which cities and metropolitan areas were ranked[3]. Using spearman's rho rank order correlation coefficient, we correlated the ranking order of each of the eight city variables with each other. Here the results were modestly better (See Table 4). For city condition in 2000, eight of the 28 correlations were above 0.50; for 2010 nine of the 28 possible correlations exceeded 0.50. Intercorrelations for rankings were particularly high for per capita income, poverty rate, and unemployment rate.

Nonetheless, the rankings of cities for urban condition variables bounced around considerably, suggesting relatively poor correlation among variables ranking urban condition. For 2010, for example, New York ranked 135th in per capita income, but 412th in poverty rate and 379th in unemployment rate. Phoenix ranked 294th in per capita income but ranked 413th in poverty rate (see Table 5).

For metropolitan area condition, eight of the 36 correlations in 2000 exceeded 0.50, and five of the 36 did so in 2010, with the highest being the correlation between per capita income and per capita gross metropolitan product (see Table 6). Percentage population change had very low correlations with all of the other variables (less than 0.25) with the exception of median house value (0.41 in 2000 and 0.35 in 2010). Again, there were substantial differences in the rankings on variables for individual metropolitan areas. For example, in 2010, New York-Newark-Jersey City, NY-NJ-PA metro area ranked in 11th in median home value and 8th in per capita income, but 184th in unemployment rate and 211th in violent crime rate. The Houston metropolitan area ranked 32nd in population growth and 35th in per capita income, but 327th in violent crime rate and 178th in median home value.

Nor did urban condition predict urban performance. We correlated urban condition in 2000 with urban performance from 2000-2010 for each of the eight city level variables (See Table 7). We found only one case for which condition in 2000 for an indicator was correlated with performance from 2000-2010 for that indicator at a level above 0.5 (population change from 1990-2000 was correlated with percentage point difference in population change between 2000-2010 and 1990-2000 at -0.75) For metropolitan areas we found three instances where urban condition in 2000 was correlated with urban performance from 2000-2010, all negatively (violent crime rate and property crime rate as well as population change). These relationships likely suggest a regression to the mean effect, with high values at an initial stage moderating over the next decade.

Despite the relatively low correlation between condition and performance, urban condition and metropolitan condition over time were closely related. We asked whether 2000 condition for

[3] Lower rankings on each variable indicate more positive conditions, e.g., a 1 rating on per capita income means the city or metropolitan area has the highest income, while a 1 ranking on violent crime rate means the city or metro has the lowest violent crime rate.

each of the variables was correlated with its condition in 2010. Indeed, the correlation was very high, above 0.70 for each of the nine metropolitan variables and 0.60 for each of the city variables. This indicates that there is a strong path dependence for urban condition.

Multiple measures and indexes: The fact that there is relatively low correlation among the various measures of urban condition (performance) clearly means that single-indicator operationalizations should be employed with caution and that an urban condition/performance score derived from one measure should not be assumed to hold for other measures. Common statistical procedure suggests that multiple measures of a concept are better than a single measure or indicator, and this is particularly the case when the concept is complex and multi-faceted as "urban condition" surely is. Multiple indicators can, of course, be examined separately, but for many purposes an overall summative measure is more useful.

As noted above, researchers have utilized a variety of methods to develop multi-indicator indexes that capture the overall concept of urban condition/performance. The most common is to develop an index based on Z scores, where the individual values for each unit of analysis (urban area) for each indicator are recast as the number of standard deviations from the mean of that indicator. The Z scores for each urban area are then summed across all of the indicators to yield a composite score. In most cases the indicators are weighted equally as a default, but if there is some conceptual or theoretical reason to believe that one (or more) indicators are more important than others, they can be weighted to reflect that.

Using the Z score method, we created an urban condition index utilizing the eight variables for city condition and the nine for metropolitan condition[4]. The resulting index for cities was considerably more robust than were the correlations of the individual variables. The average inter-variable correlation among the eight variables was 0.33 in 2000 and 0.34 in 2010. However, for both 2000 and 2010 the correlation between the overall index and each of the eight indicators was above 0.50 for all of the indicators with the exception of population change over the prior 10 years (See table 8). The correlation coefficients were above 0.50 for seven of the eight indicators (again, all but population change) for city condition in 2000 and in 2010.

As this clearly suggests, an index consisting of a large number of indicators provides a better measure of the concept of urban condition than does any single measure. Furthermore a

[4] After converting each of the variables to Z-score, we add them up so that each metropolitan area or city has a Total Z-score. In order to make the sum of each variable's Z-score meaningful for interpretation, we conducted the following steps. First, we inverted the following variables' Z score: 1) unemployment rates, 2) poverty rates, 3) violent crime rates, and 4) property crime rate. Inverting the Z score was necessary so that a higher Z score means a positive urban condition. The Total Z-score assumes that all nine measures (eight measures for the city level) are of equal importance; that means we did not assign greater weights to any variable.

Cronbach's alpha test[5] indicates that the index is comprised of a set of items that are internally consistent[6], i.e., they are measuring the same concept. However, the item-rest correlation test shows that percent population change over the prior ten years has the lowest correlation with a composite index consisting of the other seven variables, suggesting an index that did not include percent population change would be an even more internally consistent representation of urban condition.

Much the same was true for metropolitan areas. While the average inter-item correlation among the nine variables was 0.24 for both years, the correlation between the overall index and each of the individual measures was above 0.50 for six of the nine measures in 2000 and for seven of the nine measures in 2010. Cronbach's alpha was slightly lower (0.74) than was the case for city-level alpha result for both years. However, as Williams (2015) notes, the alpha increases with the number of variables, and nine variables constitute a relatively small number, so that a score of nearly 0.75 still indicates an internally consistent index. The item-rest correlation test also indicates relatively low correlations between percent population change over the prior 10 years and an index consisting of the remaining eight variables.

An objection to an index that simply sums the Z scores of the variables is that such an index might hide relationships among some of the variables and thus cover up concepts of urban condition or performance that are relatively distinct. The low inter-item test scores for a few variables in the Cronbach's alpha test for both city and metropolitan area condition indicate that this may very well be the case. This suggests the need to extract a smaller number of distinct dimensions of variables which can indicate urban condition or performance consistently by regrouping variables. Since our purpose in this article is not to engage in hypothesis testing and because we have no a priori expectations about the nature of the factors that will arise, we employ exploratory factor analysis as a means of discerning these distinct concepts.

Factor analysis: Factor analysis provides a means of summarizing data and creating two or more clusters (factors), each consisting of components of the original variables that are minimally correlated to each other. Factor analysis is especially useful when researchers think that "measurable and observable variables can be reduced to fewer latent variables that share a common variance and unobservable (Bartholomew, Knott, & Moustaki, 2011)." In our case we want to identify common clusters of indicators on urban condition. We employ exploratory factor analysis (EFA), which is appropriate when there is no specific hypothesis but the

[5] Cronbach's alpha is a measure of internal consistency among a set of items. It represents a coefficient of reliability, which provides information on the extent to which a group of items measure the same construct. Cronbach's alpha ranges in value between zero and one; if values are closer to one, the group of items is viewed to have a higher internal consistency (Brcka, Lorenz et al., 2013).

[6] The alpha for city condition is 0.80 for both 2000 and 2010. Common usage is that alphas above 0.80 indicate a high degree of internal consistency.

researcher nonetheless believes that the observed variables are "linear combinations of some underlying factors." (Kim & Mueller, 1978).

We conducted a factor analysis[7] of urban condition for 2000 and 2010 for the eight city variables. The analysis yielded three factors[8] which together accounted for 89% and 94% of variance in the variables for 2000 and 2010 respectively (See Table 9), although the composition of the factors for 2000 and 2010 was slightly different. For 2010 urban condition at the city level, the first factor, accounting for 32% of the variation, we term "poverty and labor market conditions," based on the variables loading[9] most highly on it. These are labor force participation rate, unemployment rate, and poverty rate (all above 0.50). The second factor, accounting for an additional 31% of the variation, we name "crime and population change." The variables loading highly on factor 2 are property crime rate, violent crime rate, and population change over the previous 10 years. The third factor, accounting for 31% of the variation is "income and assets." The two variables with high loadings for this factor were median home value for owner-occupied housing and per capita income. (See Table 9

For 2000 urban condition the factors and factor loadings were slightly different. The first factor, accounting for 35% of the variance was similar to the poverty and labor market condition factor, but with the addition of percent population change which also loaded highly on the factor. The second factor, accounting for 30% of the variance consisted of the same two variables that comprised the income and assets factor, similar to the 2010 urban condition, while the third factor, accounting for 24% of the variance, was the same as the crime and violence factor in the 2010 urban condition analysis but without the population change variable.

Next, we conducted the same analysis for urban condition at the metropolitan level in 2000 and 2010 (see Table 10). At the metropolitan level we identified four factors accounting for 86% of the total variance in 2010 urban condition. Based on the factor loadings, we named the four factors 1) "income and assets" (high factor loadings for per capita income, median home values, poverty rate, and per capital gross metropolitan product), 2)" labor market condition" (unemployment rate and labor force participation rate), 3) "crime" (violent crime rate and property crime rate), and 4) "population change" (percent change in population 2000-2010). (See Table 10). These results suggest not only that the concept of urban condition at the metropolitan

[7] Using oblique rotation, we allow for some minimal correlation among the factors. We conducted a sensitivity test using orthogonal rotation and found little substantive difference.

[8] While the standard criterion for choosing factors is to select all factors whose eigenvalue exceeds one, we chose a three factors solution, even though the eigenvalue for the third factor was slightly less than one (0,94). We did so because the variables loading on the third factor made sense theoretically and adding that factor increased the cumulative variance explained from 61% to 73%, an increase that we deemed substantial.

[9] Factor loadings are the correlation between each of the individual variables and the factor. The higher the loadings are, the more relevant in defining the factor. A factor is identified and named based on those variables that load most highly on it.

level consists of four separate constructs, but that these constructs are somewhat different at the metropolitan level from those of urban condition at the city level.

Urban condition at the metropolitan level in 2000 demonstrated a somewhat different pattern, with three factors accounting for 73% of the variance. The first factor accounted for 37% of the total variance, but had six of the nine variables loaded highly on it, all with correlations to the factor above 0.60 (per capita income, per capita gross metropolitan product, poverty rate, labor force participation rate, unemployment rate, and median home value). We term this factor "regional economic and labor market condition. The second factor, accounting for 22% of the variance consisted of the property crime and violent crime variables, while the third factor, accounting for 14% of the variance, consisted of two highly loading variables, population change and median home value.

The inference we draw is that rather than a single coherent concept urban condition actually consists of at least three (or four in the case of metropolitan urban condition in 2010) distinct constructs. While the rather small differences in the city urban condition factors between 2000 and 2010 could result simply from reliability concerns that might be expected to occur when data are measured at two points in time, the more substantial differences in metropolitan urban condition more likely reflect an actual change in the metropolitan structure and the relationship of the variables to each other as well as reliability differences.

The factors derived through factor analysis can be used to construct typologies based on the factors, with cities (or metropolitan areas) assigned to the categories based on their factor scores for each of the factors. Thus, for example, a typology could be constructed based on cities whose factor scores were above the median and below the median on each of the three factors. In addition, city factor scores on any or all of the three factors could be utilized as a variable for research.

Conclusion: What Have We Learned and Guidance for Research and Policy

1) The urban literature suffers from substantial confusion about critical concepts relating to urban condition and performance and various terms associated with these such as urban renaissance, urban revitalization, urban resurgence, urban decline, urban distress, etc. This confusion matters because it obscures divergence in research results and makes generalization across studies difficult.
2) Frequently utilized measures of urban condition cannot be assumed to be highly correlated with one another. Rankings of urban areas based on different indicators exhibit substantial variation. As a result research results and conclusions about urban condition or performance based on one or a small number of indicators ought not to be generalized to other measures.

3) A standardized index of indicators of urban condition is better correlated with the measures comprising it than are the correlations of the individual indicators with each other.
4) Despite showing higher correlations of measures with the composite index, analysis of the standardized index utilizing Cronbach's alpha suggests that the index may consist of more than a single concept.
5) Factor analysis confirms that urban condition, at least as measured by the variables we utilized is not a single coherent concept, but actually consists of several distinct constructs.

What does this suggest about how researchers should proceed?

1) Carefully clarify concepts and the way they are being measured and distinguish, in reviews of the literature setting up the research and in research conclusions, the relationship of the research to previous research and findings. Basic concepts such as urban condition and urban performance need to be clarified. In our work (above), we distinguish between condition (level at a specific point in time) and performance (change over time). The implications of specific terms such as urban revitalization or urban resurgence should be reflected in hypotheses and research designs.
2) If the main interest is in a specific condition (e.g., poverty), by all means poverty rate (and/or other variables directly related to poverty such as the number of children living in households with incomes below 125% of the poverty rate) should be chosen as the research variable. But it should not be used as a proxy for overall urban condition or performance.
3) If the focus is an overarching assessment or measurement of urban condition, an index comprised of several measures provides better understanding than does use of any one or two measures. Nonetheless indexes can present problems. First, the default condition of most indexes is equal weighting of the variables. But if the researcher has reason to believe that one or more variables are more or less important to an overall assessment of urban condition, then differential weighting may make sense, provided the weighting is explicit and the reasons for it are explicitly laid forth. In addition, any set of indicators can be made into an index, but an index may not necessarily be a consistent or coherent measure of the main concept, urban condition or performance. Internal consistency checks such as Cronbach's alpha should be utilized to test consistency and to identify variables that might be dropped in order to get a more coherent index.
4) Typology creation is a useful means of distinguishing different types or levels of urban condition along dimensions important to the research. Typologies can be composed based on levels of individual measures (e.g., high/low) or on types of indicators (e.g., economic/social). But while typologies can be useful in distinguishing among units by placing them in common categories, they are in many ways blunt instruments since they

diminish the use of available information and, at the margins, make distinctions among units that may be quite similar but vary by just enough to place them in separate categories.

5) As a means of exploring the consistency of the concept, factor analysis is a particularly well-suited means, since it identifies the latent variables underlying the concept and thus whether a set of variables encompasses a single concept or whether there are two or more separate concepts reflected in the measures. In the factor analysis we conducted, we found three separate constructs underlying the concept of urban condition at the city level and four at the metropolitan level. These individual factors can then be utilized to derive a factor score for each city and can be employed as a variable for research.

In the course of our analysis, we also uncovered several important substantive findings.

1) The most commonly employed measure, population change, is, in particular, poorly correlated with other measures. Population change, by itself, is not a good measure of urban condition.
2) Variables measuring urban condition (level) are not highly correlated with variables measuring urban performance (Change over time), probably suggesting a regression to the mean effect.
3) Nonetheless, correlating variables reflecting 2000 urban condition with the same variables reflecting 2010 urban condition indicates very substantial path dependence. This suggests that the regression to the mean effect is not powerful enough to overcome path dependencies.
4) At the city level, we identified three distinct constructs measuring urban condition: poverty and labor market conditions, crime and decline, and income and assets. At the metropolitan level we identified four distinct constructs: income and assets, labor market condition, crime, and population change in 2010 and three distinct constructs, regional economic and labor market, crime; and population change and housing value in 2000.
5) The difference in the number and composition of factors for metropolitan urban condition between 2000 and 2010 suggests a change in the structure and relationship of the components of metropolitan condition over that time period.

Tables

Table 1

City Condition Correlation Matrices, 2000 and 2010

Year 2000	Population change	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (1990-2000)	1							
Per Capita Income	0.08	1						
Labor Force Participation Rate	0.32	0.31	1					
Unemployment Rate	-0.16	**-0.54**	**-0.51**	1				
Poverty Rate	-0.23	**-0.58**	**-0.59**	**0.77**	1			
Violent Crime Rate	-0.23	-0.18	-0.31	0.47	0.48	1		
Property Crime Rate	0.07	-0.18	-0.18	0.21	0.28	0.40	1	
Median Home Value	0.15	**0.73**	0.26	-0.29	-0.32	-0.17	-0.28	1

Year 2010	Population change	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (2000-2010)	1							
Per Capita Income	0.05	1						
Labor Force Participation Rate	0.24	0.28	1					
Unemployment Rate	-0.21	**-0.51**	-0.44	1				
Poverty Rate	-0.22	**-0.65**	**-0.52**	**0.59**	1			
Violent Crime Rate	-0.33	-0.26	-0.21	**0.54**	0.47	1		
Property Crime Rate	-0.29	-0.17	-0.20	0.27	0.36	**0.58**	1	
Median Home Value	0.09	**0.73**	0.21	-0.27	-0.43	-0.19	-0.25	1

Bolded cell entries represent correlations above 0.50.

Table 2

Metropolitan Condition Correlation Matrix, 2000 and 2010

Year 2000	Population change	Per Capita GMP	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (1990-2000)	1								
Per Capita GMP	0.06	1							
Per Capita Income	-0.01	**0.76**	1						
Labor Force Participation Rate	0.07	0.49	0.39	1					
Unemployment Rate	0.11	-0.38	-0.41	-0.39	1				
Poverty Rate	0.08	-0.42	**-0.62**	**-0.53**	**0.54**	1			
Violent Crime Rate	0.09	0.07	-0.02	-0.22	0.15	0.32	1		
Property Crime Rate	0.18	0.01	-0.17	-0.1	0.14	0.34	**0.64**	1	
Median Home Value	0.2	0.45	**0.69**	0.27	-0.11	-0.30	-0.03	-0.14	1

Year 2010	Population change	Per Capita GMP	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (2000-2010)	1								
Per Capita GMP	-0.03	1							
Per Capita Income	-0.13	**0.73**	1						
Labor Force Participation Rate	0	0.45	0.34	1					
Unemployment Rate	0.09	-0.37	-0.24	-0.39	1				
Poverty Rate	0.11	-0.49	**-0.58**	-0.45	0.3	1			
Violent Crime Rate	0.04	0.03	0.02	-0.15	0.19	0.22	1		
Property Crime Rate	0.07	-0.07	-0.22	-0.13	0.06	0.36	**0.55**	1	
Median Home Value	0.1	0.45	**0.62**	0.24	0.03	-0.39	-0.05	-0.28	1

Bolded cell entries represent correlations above 0.50.

Table 3

City Performance matrix, 2000-2010

% Change between Year 2000 - 2010	**Population Growth Rate(%-point)**	**Per Capita Income**	**Labor Force Participation Rate (%-point)**	**Unemployment Rate (%-point)**	**Poverty Rate (%-point)**	**Violent Crime Rate (%-point)**	**Property Crime Rate (%-point)**	**Median Home Value**
Population Growth Rate(%-point)	1							
Per Capita Income	-0.07	1						
Labor Force Participation Rate (%-point)	0.05	0.43	1					
Unemployment Rate(%-point)	-0.05	**-0.52**	-0.14	1				
Poverty Rate (%-point)	0.01	**-0.76**	-0.47	0.48	1			
Violent Crime Rate (%-point)	-0.01	-0.21	-0.16	0.1	0.27	1		
Property Crime Rate (%-point)	-0.03	-0.04	0.04	0.19	0.06	-0.30	1	
Median Home Value	0	**0.59**	0.41	-0.17	**-0.58**	-0.2	0.05	1

Metropolitan Performance matrix, 2000-2010

% Change between Year 2000 - 2010	Population Growth Rate(%-point)	Per Capita Gross Metropolitan Product (GMP)	Per Capita Income	Labor Force Participation Rate (%-point)	Unemploy-ment Rate(%-point)	Poverty Rate (%-point)	Violent Crime Rate (%-point)	Property Crime Rate (%-point)	Median Home Value
Population Growth Rate(%-point)	1								
Per Capita Gross Metropolitan Product (GMP)	0.15	1							
Per Capita Income	0.22	0.35	1						
Labor Force Participation Rate (%-point)	0.07	0.3	**0.57**	1					
Unemployment Rate(%-point)	-0.17	-0.44	**-0.53**	-0.33	1				
Poverty Rate (%-point)	-0.18	-0.28	**-0.51**	-0.31	0.43	1			
Violent Crime Rate (%-point)	0.03	0	-0.01	0.04	-0.03	0.1	1		
Property Crime Rate (%-point)	0.09	-0.05	0.01	0.1	0.04	0.01	**0.56**	1	
Median Home Value	0.03	0.18	0.31	0.27	-0.18	-0.46	-0.1	-0.04	1

Bolded cell entries represent correlations above 0.50.

Table 4

Correlation Matrix for the Ranking Variables in 2000, Principal Cities, Obs= 391

Year 2000	Population change	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (1990-2000)	1							
Per Capita Income	0.30	1						
Labor Force Participation Rate	0.42	**0.57**	1					
Unemployment Rate	0.34	**0.66**	0.57	1				
Poverty Rate	0.38	**0.68**	0.65	0.77	1			
Violent Crime Rate	0.20	0.20	0.32	0.44	0.48	1		
Property Crime Rate	-0.07	0.15	0.19	0.27	0.33	0.51	1	
Median Home Value	0.47	**0.63**	0.49	0.37	0.40	0.18	0.30	1

Correlation Matrix for the Ranking Variables in 2010, Principal Cities, Obs= 422

Year 2010	Population change	Per Capita Income	Labor Force Participation Rate	Unemployment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (2000-2010)	1							
Per Capita Income	0.21	1						
Labor Force Participation Rate	0.32	**0.54**	1					
Unemployment Rate	0.27	**0.58**	0.44	1				
Poverty Rate	0.27	**0.71**	**0.58**	**0.52**	1			
Violent Crime Rate	0.33	0.29	0.25	**0.55**	**0.51**	1		
Property Crime Rate	0.27	0.20	0.25	0.30	0.44	**0.63**	1	
Median Home Value	0.34	**0.65**	0.41	0.3	0.48	0.24	0.30	1

Bolded cell entries represent correlations above 0.50.

Table 5

Top ten populous cities, Urban Condition Ranking, Cities, 2010

City Name	Population change (2000-2010)	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
NEW YORK	305	135	438	379	412	351	112	53
LOS ANGELES	274	188	265	409	422	486	210	47
CHICAGO	409	197	294	548	462	548	475	157
HOUSTON	199	241	188	306	465	577	400	492
PHILADELPHIA	337	476	564	612	567	591	371	450
PHOENIX	139	294	197	250	413	456	474	234
SAN ANTONIO	105	444	355	217	403	432	461	546
SAN DIEGO	212	100	248	237	230	264	166	56
DALLAS	323	207	206	336	504	559	545	470
SAN JOSE	239	94	182	368	146	226	51	31

Table 6

Correlation Matrix for the Ranking Variables in 2000, Metropolitan Areas, Obs= 360

Year 2000	Population change	Per Capita GMP	Per Capita Income	Labor Force Participation Rate	Unemploy-ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (1990-2000)	1								
Per Capita GMP	0.10	1							
Per Capita Income	0.03	**0.75**	1						
Labor Force Participation Rate	0.21	**0.53**	**0.51**	1					
Unemployment Rate	0.09	0.45	0.47	0.49	1				
Poverty Rate	-0.01	0.44	**0.72**	**0.58**	**0.53**	1			
Violent Crime Rate	-0.14	-0.09	0.02	0.23	0.23	0.34	1		
Property Crime Rate	-0.23	-0.04	0.15	0.09	0.23	0.33	**0.63**	1	
Median Home Value	0.41	0.42	**0.63**	0.41	0.29	0.44	0.04	0.11	1

Bolded cell entries represent correlations above 0.50.

Correlation Matrix for the Ranking Variables in 2010, Metropolitan Areas, Obs= 304

Year 2010	Population change	Per Capita GMP	Per Capita Income	Labor Force Participation Rate	Unemploy -ment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Population change (2000-2010)	1								
Per Capita GMP	0	1							
Per Capita Income	-0.11	**0.76**	1						
Labor Force Participation Rate	0.06	**0.51**	0.49	1					
Unemployment Rate	0.02	0.42	0.33	0.43	1				
Poverty Rate	-0.06	0.49	**0.69**	0.48	0.30	1			
Violent Crime Rate	-0.08	-0.08	-0.05	0.12	0.19	0.29	1		
Property Crime Rate	-0.13	0.02	0.17	0.13	0.08	0.36	**0.57**	1	
Median Home Value	0.35	0.37	**0.53**	0.35	0.04	0.46	0.08	0.29	1

Bolded cell entries represent correlations above 0.50.

Table 7

Correlation for urban condition in 2000 and urban performance between 2000 and 2010, Cities, Obs = 372

	Performance (% Change between Year 2000 - 2010)
Population Growth Rate (1990-2000) *	**-0.75**
Per Capita Income	0.17
Labor Force Participation Rate*	-0.32
Unemployment Rate*	-0.21
Poverty Rate*	-0.08
Violent Crime Rate*	-0.42
Property Crime Rate*	-0.06
Median Home Value	0.29

Bolded cell entries represent correlations above 0.50 and variable marked with * indicate percentage-point difference.

Correlation for urban condition in 2000 and urban performance between 2000 and 2010, Metropolitan Areas, Obs = 304

	Performance (% Change between Year 2000 - 2010)
Population change (1990-2000) *	**-0.65**
Per Capita Gross Metropolitan Product (GMP)	-0.02
Per Capita Income	-0.30
Labor Force Participation Rate *	-0.41
Unemployment Rate *	0.09
Poverty Rate *	-0.27
Violent Crime Rate *	**-0.64**
Property Crime Rate *	**-0.72**
Median Home Value	0.26

Bolded cell entries represent correlations above 0.50 and variable marked with * indicate percentage-point difference.

Table 8

Correlation of individual indicators with composite index, city condition

2000

Year 2000	Population change (1990-2000)	Per Capita Income	Labor Force Participation Rate	Unemployment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Total Z score	0.31	**0.73**	**0.66**	**-0.78**	**-0.83**	**-0.65**	**-0.51**	**0.64**

2010

Year 2010	Population change (2000-2010)	Per Capita Income	Labor Force Participation Rate	Unemployment Rate	Poverty Rate	Violent Crime Rate	Property Crime Rate	Median Home Value
Total Z Score	0.49	**0.67**	**0.58**	**-0.74**	**-0.80**	**-0.72**	**-0.62**	**0.58**

Table 9

Factor Loadings, City Condition, 2010

Year 2010	Factor1	Factor2	Factor3
% of total variance each factor explains	32%	31%	31%
Population change (2000-2010)	0.2988	-0.5351	-0.3266
Per Capita Income	0.1622	0.0613	0.8903
Labor Force Participation Rate	0.9764	0.1954	-0.0626
Unemployment Rate	-0.5831	0.1789	-0.2279
Poverty Rate	-0.5395	0.1394	-0.4236
Violent Crime Rate	-0.0427	0.8306	-0.0424
Property Crime Rate	0.2274	0.9248	-0.0821
Median Home Value for owner-occupied housing	-0.1396	-0.0825	0.9063

Factor Loadings, City Condition, 2000

Year 2000	Factor1	Factor2	Factor3
% of total variance each factor explains	35%	30%	24%
Population change (1990-2000)	-0.793	-0.1175	0.4358
Per Capita Income	-0.1161	0.9199	0.057
Labor Force Participation Rate	-0.7437	0.079	-0.0088
Unemployment Rate	0.6002	-0.2552	0.225
Poverty Rate	0.6471	-0.2711	0.2333
Violent Crime Rate	0.5213	0.2442	0.6135
Property Crime Rate	-0.1084	-0.0258	0.8777
Median Home Value for owner-occupied housing	0.0375	0.9067	0.0379

TABLE 10

Factor Loadings, Metropolitan Condition, 2010.

Year 2010	Factor1	Factor2	Factor3	Factor4
% of total variance each factor explains	32%	22%	20%	12%
Population change (2000-2010)	-0.0339	-0.0312	0.0173	0.9801
Per Capita Gross Metropolitan Product (GMP)	0.7279	-0.3421	0.2101	-0.0004
Per Capita Income	0.9077	-0.0385	0.076	-0.1451
Labor Force Participation Rate	0.2429	-0.665	-0.0502	0.176
Unemployment Rate	0.1126	0.8932	0.0229	0.0506
Poverty Rate	-0.562	0.2672	0.2647	0.0956
Violent Crime Rate	0.2281	0.1877	0.8835	-0.0333
Property Crime Rate	-0.1827	-0.143	0.857	0.0498
Median Home Value for owner-occupied housing	0.8828	0.3061	-0.1071	0.1738

Factor Loadings, Metropolitan Condition, 2000.

Year 2000	Factor1	Factor2	Factor3
% of total variance each factor explains	37%	22%	14%
Population change (1990-2000)	0.0465	0.0257	0.7498
Per Capita Gross Metropolitan Product (GMP) in 2001	0.8798	0.2512	0.0855
Per Capita Income	0.9055	0.0284	0.1807
Labor Force Participation Rate	0.6578	-0.0795	-0.048
Unemployment Rate	-0.6237	-0.0356	0.4799
Poverty Rate	-0.698	0.2794	0.18
Violent Crime Rate	0.0792	0.9159	-0.0116
Property Crime Rate	0.0173	0.9019	-0.0427
Median Home Value for owner-occupied housing	0.6166	-0.1144	0.6153

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