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**AN UPDATE OF THE REGIONAL GROWTH MODEL FOR LARGE
AND MID-SIZE U.S. METROPOLITAN AREAS:
NORTHEAST OHIO DASHBOARD INDICATORS**

EXECUTIVE SUMMARY

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Prepared for

The Fund for Our Economic Future

August 2007

**This report follows *Dashboard Indicators for the Northeast Ohio Economy* by
Randall Eberts, George Erickcek, and Jack Kleinhenz, April 2006.**

**The report was reviewed by the Northeast Ohio Council of
Regional Economic Policy Advisors**

EXECUTIVE SUMMARY

Introduction

This study develops a set of dashboard indicators that best explains the dynamics of regional economic growth for large and mid-size metropolitan areas in the U.S. Dashboard indicators help monitor the economic performance of Northeast Ohio and provide policy makers with a sound information base that can be used to design effective strategies and policy interventions.

This paper presents factors of economic growth and establishes a set of dashboard indicators and the variables that underlie each indicator. The study shows the degree to which the dashboard indicators are associated with economic growth and ranks the performance of Northeast Ohio metropolitan areas in comparison to other regions. It builds upon an earlier study of dashboard indicators (Eberts, Erickcek, and Kleinhenz, 2006) that laid the foundation for the methodology used in this paper.¹ It is expected that these indicators, as well as the measures of economic growth, will be updated annually so that policy makers, economic development planners, and political and civic leaders can track the progress that Northeast Ohio is making over time and adjust their strategies as needed.

This executive summary emphasizes the performance of the four Northeast Ohio metropolitan areas including Akron, Canton-Massillon, Cleveland-Elyria-Mentor, and Youngstown-Warren-Boardman. These four metropolitan areas combined represent Northeast Ohio as a region and are linked through a common history and industrial structure. However, the economic analysis is conducted at the metropolitan area level to allow for comparison with other metropolitan areas across the country. Northeast Ohio metropolitan areas are being analyzed as part of a group of 136 metropolitan areas across the U.S. with a population between 300,000 and 3.5 million. The analysis ranks all metropolitan areas in the study and assigns them to quartiles based on the ranking.²

¹ *Dashboard Indicators for the Northeast Ohio Economy: Prepared for the Fund for Our Economic Future* by Randall Eberts, George Erickcek, and Jack Kleinhenz, April 2006. The report was published as working paper 06-05 by the Federal Reserve Bank of Cleveland.

² Metropolitan areas that are ranked between #1 and #34 are part of the first quartile, those ranked between #35 and #68 are in the second quartile, those ranked between #69 and #102 are in the third quartile, and those ranked between #103 and #136 are in the fourth quartile.

Northeast Ohio (NEO) and Measures of Economic Growth

To estimate regional economic performance, this study uses four measures of economic growth: percentage change in per capita personal income, employment, gross metropolitan product, and productivity. Per capita income approximates the regional standard of living and is often used as a critical gauge in assessing a region's economic performance.³ Employment measures job opportunities available to people in the regional labor force, but it does not differentiate between low-skill, low-paying jobs and high-skill, high-paying jobs. Gross metropolitan product (GMP) measures value-added output produced in the region approximating the scale of the regional economy and is the regional counterpart to the national gross domestic product. Productivity measures GMP per employee and provides a proxy for a critical measure of regional competitiveness. The four NEO metropolitan areas are compared to the other metropolitan areas as well as the average of all 136 areas.⁴

The study shows that Northeast Ohio metropolitan areas grew at modest rates in all four measures and always below the sample average. For example, between 1995 and 2004, per capita personal income grew by 8.9 percent in the Cleveland metro area and 12.7 percent in the Akron area in comparison to the sample average growth rate of nearly 14 percent. NEO's performance was even worse when measuring growth by employment. Employment growth rates between 1995 and 2005 ranged from an 8.4 percent gain in Akron to less than one percent growth in the Cleveland metro area and a two percent decline in the Youngstown area; this is in comparison to a sample average growth rate of 15.9 percent. The relatively poor economic performance of NEO's metropolitan areas is attributed to slow growth during the expansionary years of the late 1990s and a more severe and lengthier decline during the recession of the early 2000s.

There were different growth patterns among NEO's four metropolitan areas. Akron had the highest rank among NEO's metro areas in all four measures. Anecdotal evidence suggests that strong and consistent political leadership, strong institutions (two large universities, two hospital systems, and several large corporations), and the relatively small size of the metropolitan area contributed to stronger economic performance in the Akron area.

Analysis of a more recent time period (2002-2005) suggests that NEO's metro areas grew faster in the past three years than they did over the longer time period (1995-2005) and improved their relative ranking. Moreover, some of NEO's metropolitan areas jumped quartiles in their ranking among all metro areas when comparing longer-term and shorter-term growth patterns. The Akron metropolitan area jumped to the second quartile in growth rates of per capita income and employment; however, it dropped from the third to the fourth quartile in productivity growth. The Cleveland and Youngstown metropolitan

³ Per capita personal income is calculated as the personal income of the residents of an area divided by the population of that area. Per capita income gives no indication of the distribution of that income within the region.

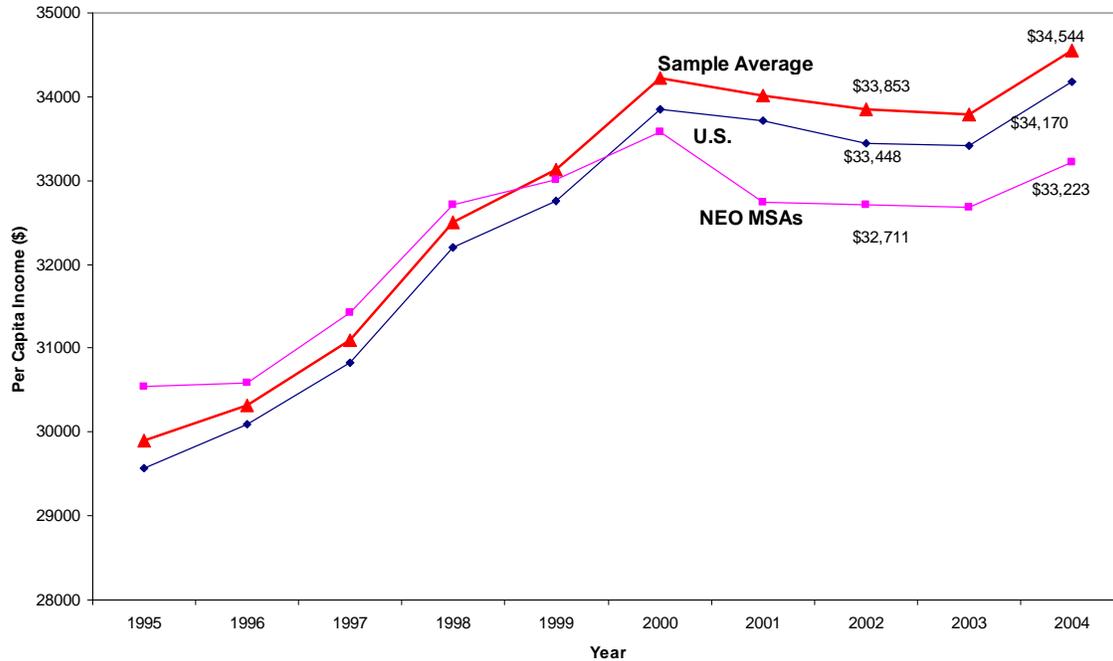
⁴ The average of the 136 metropolitan areas included in the study is referred to as the sample average.

areas improved their quartile rankings in growth of per capita income, while the Canton metropolitan area improved in productivity growth.

How does the Cleveland metro area compare to other large Midwest areas? Analysis of regional economic growth between 1995 and 2005 in the Cleveland metropolitan area and seven other large Midwest metro areas reveals that Cleveland experienced the lowest growth rates in three measures of economic growth: per capita income, employment, and GMP. The only measure of economic growth in which the Cleveland metropolitan area performed better is productivity growth, where it ranked in the middle among the group of Midwest metro areas. During the expansionary portion of the most recent business cycle, 2002-2005, Cleveland still had the lowest rate of growth in per capita income and employment among the Midwest metropolitan areas and again ranked in the middle in productivity growth. The Cleveland metropolitan area's growth rates in all four measures of regional economic growth were lower than the sample average of the 136 MSAs.

How does Northeast Ohio, defined by the four metro areas combined, compare to the national average and the average of the 136 MSAs included in this study? Trends in per capita income between 1995 and 2004 reveal that per capita income in Northeast Ohio was higher than the national average through the year 1999, after which it fell and remained below the national average. *The year 1999 was the first time in the region's history that its per capita income dropped below the national average.* In 1995, NEO's per capita income was 3.3 percent higher than the national average; by 2004, it was 2.8 percent below the national average. In this 10-year period, the gap between the national and NEO average per capita income deteriorated by six percentage points. The latest recession had a more severe impact in Northeast Ohio and lasted much longer than in other regions of the country. The decline in Northeast Ohio's per capita income between 2000 and 2001 was substantial; Northeast Ohio saw a 2.5 percent decline in per capita income in one year, a loss about five times larger than the average loss in the sample MSAs and the nation. Future updates will show whether the gap between the national and NEO per capita income continues to increase or whether efforts to transform the economy are effective.

Per Capita Income in Northeast Ohio, the U.S., and the Sample Average, 1995 – 2004*



*Per capita income is adjusted for inflation.

What would it mean if NEO's metropolitan areas grew at faster rates, such as the average growth rates of the third or second quartile? The Cleveland metro area ranked in the fourth quartile in per capita income growth between 1995 and 2004. Its per capita income of \$35,425 in 2004 grew by 8.9 percent, while the average growth rate of per capita income for third quartile metro areas was 13 percent. Every person in the Cleveland metropolitan area would have an additional \$1,238 in 2004 if per capita income grew at the average growth rate of third quartile metropolitan areas. Moreover, every person in the Cleveland metropolitan area, on average, would have an additional \$2,184 if the metropolitan area had grown at the average growth rate of second quartile metro areas (16%).

By 2005, there were 1.1 million people working in the Cleveland metropolitan area. However, fewer than 8,900 jobs were added (net growth) since 1995, for a very slow job growth rate of less than one percent (0.8%). If employment in the Cleveland metro area would have grown at the average rate of third quartile metro areas (11%), there would have been an additional 108,140 jobs in the Cleveland metropolitan area in 2005.

Dashboard Indicators

What determines regional economic growth? Why do some regions accelerate while others grow at a slow pace or remain stagnant? This study offers a framework for understanding the factors associated with regional economic growth. It identifies statistical correlations between nine indicators and economic growth in income, employment, output, and worker productivity. These dashboard indicators are derived from a statistical analysis of 38 variables for 136 metropolitan areas in the U.S.⁵

The dashboard indicators include:

- Skilled Workforce and R&D
- Technology Commercialization
- Racial Inclusion & Income Equality
- Urban Assimilation
- Legacy of Place
- Business Dynamics
- Individual Entrepreneurship
- Locational Amenities
- Urban/Metro Structure

Skilled Workforce and R&D

This indicator primarily describes the quality of the regional labor force and the region's advanced research activities. As the primary indicator for human capital, it is one of the critical components of economic growth. It includes variables that describe high educational attainment and high-level occupations (percentage of population with bachelor's and graduate degrees and professional occupations). This indicator also describes the ability of a region to be engaged in technology-driven economic development based on industrial and university R&D and technology-related small business entrepreneurship (Industry R&D, University R&D, and Small Business Innovation Research awards). This factor confirms that there is more scientific and technological research in metropolitan areas with large concentrations of highly educated residents—a characteristic that does not change quickly over time and requires years of development and persistent investment.

Technology Commercialization

Many regions and communities are adopting strategies to foster innovation. Successful production of innovation requires investments in research and development that can lead to the introduction of new products and more efficient production processes. Traditionally, innovation was dominated by large companies with substantial R&D budgets. However, in more recent years smaller firms, some which started as spin offs from university-based research, are commercializing new technologies.

⁵ Factor analysis is a statistical tool that reduces an initial number of variables to a smaller set of factors. The statistical method, not the researcher, determines the set of variables that are included in each factor. In this study, the factors became the dashboard indicators.

The Technology Commercialization indicator includes three variables—venture capital per employee, number of patents per employee, and cost of living. The patents and venture capital variables represent the process of innovation commercialization. Number of patents indicates successful research and the potential for commercialization, while venture capital shows that investors believe in the possible transformation of these innovations into marketable products. The cost of living variable is also included with this factor, suggesting that many research facilities producing patents and many startup companies that are funded by venture capital are located in metropolitan areas with a high cost of living, primarily along the eastern and western coasts of the U.S.

Racial Inclusion & Income Equality

Poverty and segregation are often found in conjunction with high rates of crime and social welfare. Two variables included in this factor directly relate to racial patterns (percentage blacks and Black Isolation Index).⁶ Two other variables relate to poverty and distribution of income. These variables are percentage of children living in high-poverty neighborhoods (approximated by the share of students in schools where more than 70 percent of students receive free lunch) and income inequality. A fifth variable is violent crime rate, suggesting that areas that have high racial isolation and high poverty and income inequality are likely also to have high rates of violent crime. Although this indicator includes some social and demographic variables, racial inclusion and income equality are thought to be related to economic growth.

Urban Assimilation

Assimilating minority and immigrant populations into the economy and social fabric of regions enhances regional growth. Separate from the previous indicator, this indicator describes ethnic diversity (percentage Hispanic, percentage foreign born, and percentage Asian), as well as percentage employed in minority-owned businesses and productivity in the information sector. The distribution of productivity in the information sector varies across metropolitan areas in a similar pattern as the four urban assimilation variables.

Legacy of Place

This indicator reflects business churning (approximated by the rate of business openings and closings), and the demographic, social, and economic history of metropolitan areas. It includes variables that may suggest old physical infrastructure (approximated by the percentage of houses built before 1940), industrial heritage (share of manufacturing employment), and racial and poverty concentrations in central cities (Black Dissimilarity Index and the core city's share of poverty relative to its share of the metropolitan population). Other variables included in this indicator are climate and the number of governmental units per capita. Regions with high legacy costs and high poverty also have low business churning and slower economic growth.

Business Dynamics

This indicator includes one variable that measures business dynamics in a metro area. It is calculated as the ratio between business openings and business closings of single-site

⁶ The Isolation Index estimates the degree to which a minority group is exposed to a majority group in its neighborhood. Higher values of isolation indicate higher segregation.

companies. Metro areas with more business openings than closings have a healthier and more dynamic economy.

Individual Entrepreneurship

This indicator describes the small business sector of regional economies. The Individual Entrepreneurship indicator includes two variables: percentage of self employed and the share of business establishments with fewer than 20 employees. It confirms researchers' projections for the increased role of small and personal businesses in the economy.

Locational Amenities

Locational amenities reflect the quality of life in a region and influence people's decisions about the places they want to live, work, and play. Four measures define the Locational Amenities indicator, including transportation, arts, recreation, and healthcare indices; each index is calculated based on several variables. This factor is important because regional quality of life characteristics may affect people's decisions on where to live, work, or start their businesses.

Urban/Metro Structure

Economic development literature suggests that metropolitan areas with healthy central cities have stronger economic growth over time. This indicator includes two variables: central city population as a percentage of metro population and the rate of property crime. This factor is more difficult to interpret since the larger share of population in a central city is considered a positive characteristic of metropolitan areas. At the same time, this variable is highly correlated with a high property crime rate. Having these two variables in the same factor suggests that they vary in similar patterns across metropolitan areas so that larger cities (relative to their metro area) are likely to have higher property crime rates compared to smaller cities.

Relationships of Dashboard Indicators to Economic Growth

The nine dashboard indicators vary in their relationship to the four measures of economic growth, and not all indicators are associated with every measure of economic growth. Based on a regression analysis, the table below shows the indicators that explain each measure. It should be noted that the relationships depicted in the table describe the association between each of the indicators and a measure of economic growth but do not indicate causality. For example, the table suggests a statistical association between Technology Commercialization and growth in per capita income; it does not mean that an increase in technology commercialization will cause an increase in regional per capita income.⁷

⁷ In addition, the indicators account for only a proportion of the variation in the measures of economic growth. Based on adjusted R^2 of the regression models, the indicators explain 47.1% of the variation in per capita income growth; 61.8% of the variation in employment growth, 67.6 % of the variation in GMP growth, and 22.2% of the variation in productivity growth.

Indicators' Impact on Regional Economic Growth

Per Capita Income	Employment	GMP	Productivity
Skilled Workforce and R&D			Skilled Workforce and R&D
Technology Commercialization		Technology Commercialization	Technology Commercialization
Racial Inclusion & Income Equality			
	Urban Assimilation	Urban Assimilation	Urban Assimilation
	Legacy of Place*	Legacy of Place*	Legacy of Place*
	Business Dynamics	Business Dynamics	
	Individual Entrepreneurship	Individual Entrepreneurship	
Locational Amenities			
	Urban/Metro Structure	Urban/Metro Structure	

* Denotes that the indicator is negatively related to the measure of economic growth.

The association between the indicators and economic growth reveals two patterns. The first pattern shows that some of the indicators that affect the growth of per capita income are also significant in productivity growth. More specifically, three indicators are significant for the growth of both per capita income and productivity: Technology Commercialization, Skilled Workforce and R&D, and Racial Inclusion & Income Equality. The second pattern shows that six indicators are significant for growth of employment and gross metropolitan product (GMP): Legacy of Place (negatively related to economic growth), Business Dynamics, Racial Inclusion & Income Equality, Individual Entrepreneurship, Urban Assimilation, and Urban/Metro Structure.

Only one indicator, Racial Inclusion and Income Equality, is related to all measures of economic performance. It suggests that improvements in any of the variables that underlie this indicator will be associated with gains in per capita income, employment, GMP, and productivity. For example, a decline in poverty and falling rates of violent crime as well as an increase in racial inclusion and income equality should positively affect all measures of regional economic growth.

On the other hand, Locational Amenities, a proxy for quality of life, is shown to be significant only in relation to growth in per capita income. Since wages are a critical part of per capita personal income, it may suggest that people with higher-paying jobs are attracted to places with higher quality of life.

Ranking of NEO's Metropolitan Areas Based on Dashboard Indicators in 2000 and 2005

The economic performance of Northeast Ohio metropolitan areas and other regional economies depends on changes in the indicators and their underlying variables. The table below shows the rankings for each dashboard indicator for both 2000 and 2005 in the four Northeast Ohio metropolitan areas. It should be noted that comparison of Locational

Amenities ranking between the two years is not meaningful because the methodology used to calculate the variables underlying this indicator changed in the later ranking.

Comparison of Indicator Rankings of Northeast Ohio MSAs among 136 Metropolitan Areas

Indicator	Akron		Canton		Cleveland		Youngstown	
	2000	2005	2000	2005	2000	2005	2000	2005
Skilled Workforce and R&D	74	58	119	117	66	64	128	129
Technology Commercialization	36	60	91	97	35	57	125	134
Racial Inclusion & Income Equality	69	69	40	74	119	124	81	105
Urban Assimilation	127	129	136	134	86	93	130	127
Legacy of Place	30	29	17	17	16	16	6	7
Business Dynamics	89	93	81	112	100	127	104	123
Individual Entrepreneurship	104	101	100	81	102	94	87	74
Locational Amenities	71	49	110	62	3	16	114	74
Urban/Metro Structure Score	38	66	32	42	35	23	18	16

Note: 2005 refers to data from 2005 or earlier years if 2005 data were not available.

All four metro areas in Northeast Ohio showed improvement in ranking of Individual Entrepreneurship. Three of the four areas showed improvement in Skilled Workforce and R&D (Akron, Canton, and Cleveland).

The *Akron* area improved its ranking in two indicators. It experienced a significant improvement in Skilled Workforce and R&D and a small one in Individual Entrepreneurship. Akron remained stable in Racial Inclusion & Income Equality.

The *Canton* area improved its ranking in three indicators. It showed small improvements in Skilled Workforce and R&D and in Urban Assimilation and a more substantial increase in Individual Entrepreneurship.

The *Cleveland* area improved its ranking in three indicators. It experienced a small improvement in Skilled Workforce and R&D and more significant improvements in Individual Entrepreneurship and Urban/Metro Structure.

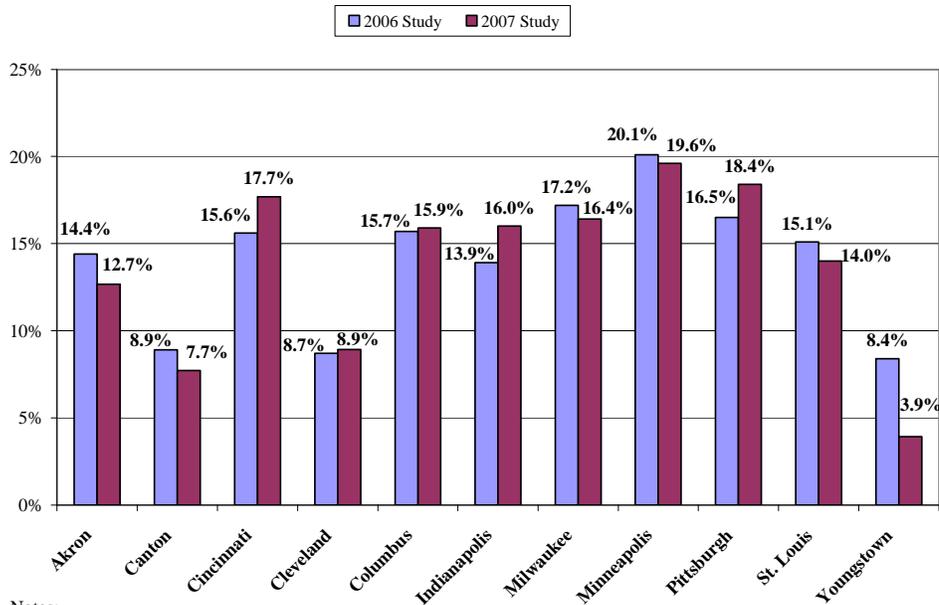
The *Youngstown* area improved its ranking in four indicators. Rankings increased slightly in Urban Assimilation, Legacy of Place, and Urban/Metro Structure. The Youngstown area had a more significant increase in the ranking of Individual Entrepreneurship.

Comparison of Per Capita Income and Employment Growth Rates Based on the 2006 and the 2007 Dashboard Indicators Studies

Comparing growth rates of per capita income between the original study and this update reveals that the growth rate increased slightly in the Cleveland metropolitan area (from 8.7 percent over the earlier period to 8.9 percent between 1995 and 2004) but slowed in

each of NEO’s smaller three metropolitan areas. Among the larger Midwest metropolitan areas, Columbus had a slight increase in its growth rate and grew significantly faster than the Cleveland area. Three other metropolitan areas grew faster than Cleveland and also increased their rates of growth by two percentage points—Cincinnati, Indianapolis, and Pittsburgh. However, Milwaukee, Minneapolis, and St. Louis experienced slower growth rates in the latter time period.

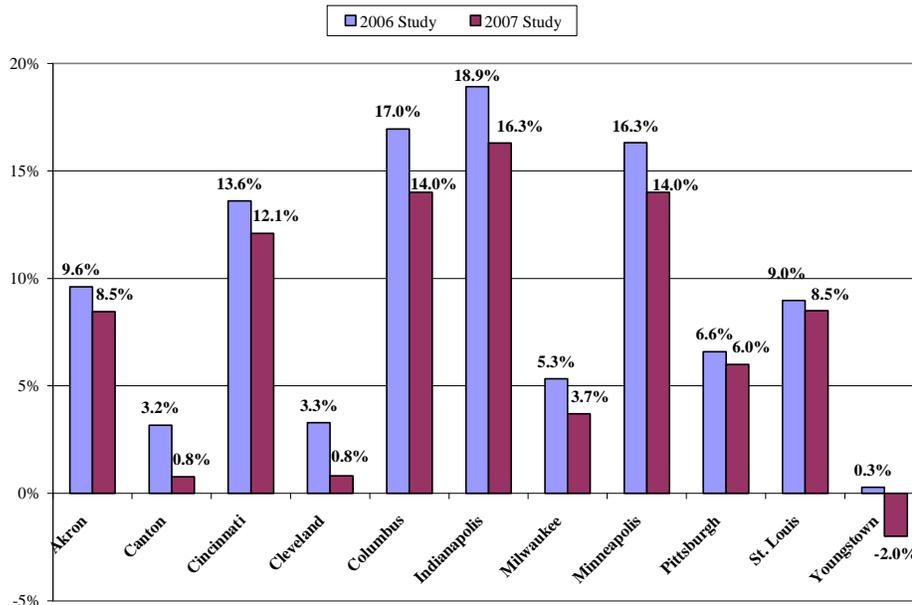
Comparison of Per Capita Income Trends among Midwest MSAs



Notes:
 - Per capita income is adjusted for inflation.
 - The 2006 Dashboard study measured per capita income growth from 1993 to 2003, and the 2007 Dashboard study measured it from 1995 to 2004. Data from the 2006 study is recalculated for a nine-year period to match the number of years of the 2007 study.

Comparing employment trends between the two studies demonstrates that employment growth rates declined in the four NEO metropolitan areas as well as in the larger Midwest metropolitan areas. The average employment growth rate for all four NEO metropolitan areas dropped from 3.9 percent between 1994 and 2004 to 1.7 percent between 1995 and 2005. Even Indianapolis, which was the fastest-growing metropolitan area among the larger Midwest areas in both time periods, experienced a decline in its employment growth rate from 18.9 percent in 1994-2004 to 16.3 percent in 1995-2005.

Comparison of Employment Trends among Midwest MSAs



Note:
The 2006 Dashboard study measured employment growth from 1994 to 2004; the 2007 Dashboard study measured growth from 1995 to 2005.

Conclusions

This report provides a broad framework and a set of dashboard indicators that explain the regional economic performance of metropolitan areas in the U.S. This framework suggests several points of intervention, allowing decision makers to make educated decisions on how to prioritize their investments. Many of the dashboard indicators can lead to initiatives that may be undertaken by different entities. Although the framework is diagnostic in nature, it does not provide one simple prescription on how to transform a slow-moving, traditional manufacturing-based economy into a fast-growing one. The study also offers a strong starting point for additional research and an examination of policies undertaken by other regions that are similar to Northeast Ohio but experienced stronger economic growth.

The dashboard indicators also provide a mechanism to monitor the performance of the Northeast Ohio economy. The four measures of economic growth as well as the nine indicators will be updated annually to monitor the progress of Northeast Ohio metropolitan areas over time and in comparison to other metro areas across the U.S.

There are two types of regional growth in large and mid-sized metropolitan areas in the U.S. The first reflects the restructuring of regional economies through technological product and process innovations and results in growth in productivity and per capita income. This productivity-driven type of growth is less sensitive to regional legacy characteristics and socio-economic factors. It can best be described by such vibrant

economies driven by a skilled workforce paired with research and development resources that result in the deployment of new technologies within a region.

The second pattern creates larger-scale economies through business dynamics and results in an increase in total gross regional product and employment. It is place related and requires the right combination of socio-economic characteristics and business dynamic factors for an economy to grow in size. These regions may not be the fastest growing, but their size provides them with an opportunity for economic diversification, generating steady growth and compensating for declines during recessionary periods. These regions could succeed in mitigating legacy costs through urban assimilation, racial inclusion, and income and social equality. However, size alone does not guarantee economic diversity or growth in employment and GMP, and not every metropolitan area fits into one of the two patterns.

The economic performance of Northeast Ohio is modest at best when compared to other regions of the country, although its relative performance improved in recent years in comparison to a longer period. The decline has occurred over many decades, and new initiatives will take time to make a measurable impact. This history should not discourage the development of new initiatives or tracking the progress of the local economy, but it sets expectations regarding our ability to see quick progress over the short run. Policy makers should expect some variables and indicators to register improvement, while others will continue to decline. Nevertheless, Northeast Ohio must continue to pay attention to its progress over time in comparison to its past performance and in comparison to the performance of other metropolitan areas across the U.S. Continued monitoring of the regional economy is necessary in helping decision makers adjust their strategies for the transformation of Northeast Ohio.

