CEOs for Cities

The Changing Dynamics of Urban America

Executive Summary

March 30, 2004

**by: Robert Weissbourd, RW Ventures &
Christopher Berry, Harvard University**

RWVentures

ACKNOWLEDGEMENTS

ABSTRACT

Highlights are presented from an extensive project analyzing the critical factors that accounted for economic growth in American cities in the 1990s. The main findings, organized along five key dimensions, reveal significant changes in the dynamics of urban economies: for the first time, income growth is occurring independently of population growth, and there is evidence of increasing divergence between wealthier and poorer cities. Among the key drivers of urban economic growth, higher education proved to have the greatest positive impact, as knowledge-based activities are increasingly important across all industry sectors. Business diversification appears to favor economic growth, while specialization requires more caution: only certain specializations drive growth, and economic specialization generally may be shifting from industry sectors to business functions and occupations. Income inequality and racial segregation had negative effects on economic growth. Further findings, on such issues as the effects of age, "sprawl" and the relationship of city and suburban growth, are also provided.

Cities appear to be more important than ever to the economic performance of the nation. However, there is great variation among different types of urban economies, and the impact of different factors varied greatly from place to place. There are many paths to economic success, and making the right strategic choices at the local level is more important than ever. In addition to offering some broad implications for economic development, the project provides preliminary tools for individual cities. A typology of cities is described, differentiating and grouping urban areas based on key economic characteristics. The typology, along with the database and models created by the project, provide a foundation for truly customized assessments leading to economic development strategies tailored to the unique economic mix of individual cities.

It should be noted that, as a summary document, the findings presented here are necessarily highly generalized, without the nuance or explanation of methodology which appears in the full report.

THE CHANGING DYNAMICS OF URBAN AMERICA

Executive Preview

Three years ago, CEOs for Cities undertook a "Data Scan" [1] on the role of cities in regional and national economies. The scan documented circumstances often known to city leaders but otherwise little understood: urban areas contain the nucleus of the U.S. economy. Cities disproportionately house the nation's assets, and play key roles as drivers and hubs of economic growth. This critical importance of cities raised a next set of questions: how are varied cities doing, and why? Can the factors that account for success be identified? What are their policy implications? The current study was undertaken to begin the much deeper analysis necessary to understand and strengthen city economic performance.

The project examined five key dimensions of change in America's cities: Knowledge Economy, Business Composition, Demographics, Urban Growth Form, and Regionalism.[2] With respect to each dimension, the project collected data on dozens of variables, and examined changing patterns between 1990 and 2000.

Dimensions and Illustrative Variables

Knowledge Economy	Educational Levels; Information Sector Jobs; Internet Access; Patents; Educational Institutions; High Tech Jobs
Business Composition	Sector Specializations (e.g. manufacturing, financial services); Occupational Concentrations; Industry Diversification
Demographics	Immigration; Age Structure; Ethnic Composition; Income Inequality; Racial Segregation
Urban Growth Form	Commuting Times; Population Density; Land Use; Use of Public Transit; Sprawl Indices
Regionalism	City/Suburb Income & Property Value Ratios; Poverty Disparities; Government Fragmentation

The project then proceeded to build econometric models to identify the variables that contributed to city and metropolitan[3] performance. The project focused on two aspects of performance: population change and economic success. The indicators for economic success were income and wage growth. "Economic success" is a complex notion subject to definitional issues. While income and wage growth are generally accepted measures associated with economic success, it should be noted that in certain circumstances income and wages can grow without economic growth.[4]

To increase the likelihood that the project was identifying causal effects, the models examined how conditions with respect to each of the variables in 1990 related to growth in population and income (and wages) between 1990 and 2000.[5] The findings below about which factors affect economic performance generally report the evidence from

CEOs
for Cities

these models. For example, the statement that "having college graduates is good for economic growth" reports that the effect of college graduates in 1990 on growth in income between 1990 and 2000 was positively significant in the underlying regression model.

Few simple prescriptions emerge from the project results. Rather, the ingredients of economic success are changing as urban populations become more diverse, and as knowledge factors become increasingly important to success across all sectors. The recipes for success are also changing, as the very nature of cities shifts, making different types of economic specialization important, and factors like urban growth form, regional interdependence and quality of life more relevant to economic performance. A few highlights are offered below, beginning with broad findings about urban performance ("What's the Big Picture?"), followed by key factors that affect performance and their implications ("What Matters?"), and concluding with some interpretations and next steps for local economic development ("What Next?").

WHAT'S THE BIG PICTURE?

Urban performance over the last decade was highly uneven: $\log^6$ change in income in the largest 100 cities ranged from 27% growth to 14.4% decline; while log change in population ranged from 62% growth to 13% decline. Median growth in income per capita was 10.2% (CPI-adjusted), while median population growth was 7.7%.
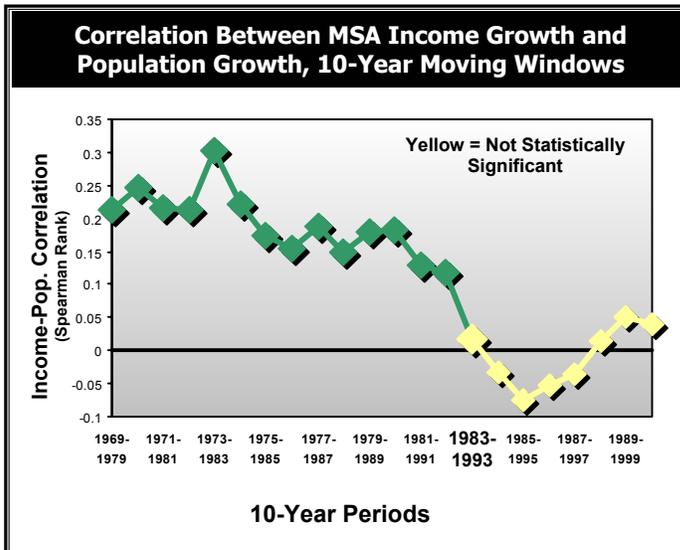
Income and Population Growth (1990-2000)				
Income			**Population**	
1. San Francisco	27%		1. Las Vegas	62%
2. Austin	23%		2. Bakersfield	35%
3. Atlanta	23%		3. Austin	34%
4. Seattle	21%		4. Mesa	32%
5. Tampa	21%		5. Charlotte	31%
6. San Antonio	18%		6. Phoenix	30%
7. Charlotte	18%		7. Raleigh	28%
8. Cincinnati	17%		8. Colorado Springs	25%
9. Colorado Springs	16%		9. Arlington	24%
10. San Jose	16%		10. Aurora	22%
...			...	
91. Yonkers	-3%		91. Jackson	-6%
92. Fresno	-3%		92. Detroit	-8%
93. Anchorage	-4%		93. Birmingham	-9%
94. Los Angeles	-5%		94. Dayton	-9%
95. Riverside	-6%		95. Cincinnati	-9%
96. Bakersfield	-7%		96. Pittsburgh	-10%
97. Glendale	-8%		97. Norfolk	-11%
98. Long Beach	-10%		98. Buffalo	-11%
99. Santa Ana	-10%		99. Baltimore	-12%
100. Anaheim	-14%		100. St. Louis	-13%
[See Appendix A for Complete Lists.]				

Most important, however, the *relationship* of income and population growth has changed.

⇨ **Finding: For the first time in modern American history, population and income growth no longer tend to go together.**

Traditionally, the common measure of an urban area's success has been its population growth: we think of a city as doing well if it is growing in numbers of people. This measure has worked well, including as a proxy for economic success, because growth in population historically has correlated closely with growth in income, wages, outputs and other more direct measures of economic performance. *This is no longer true.*

Correlation Between MSA Income Growth and Population Growth, 10-Year Moving Windows

Income-Pop. Correlation (Spearman Rank)

Yellow = Not Statistically Significant

10-Year Periods: 1969-1979, 1971-1981, 1973-1983, 1975-1985, 1977-1987, 1979-1989, 1981-1991, **1983-1993**, 1985-1995, 1987-1997, 1989-1999

Beginning in the 1990s, for the first time population and income growth no longer coincided (see graph). Notably (from the list above), Bakersfield is in the top 10 for population growth, but the bottom 10 for income growth. On the other hand, Cincinnati is a leader in income growth, but near the bottom in population growth. Only three cities (Austin, Colorado Springs, Charlotte) were leaders in both income and population growth.
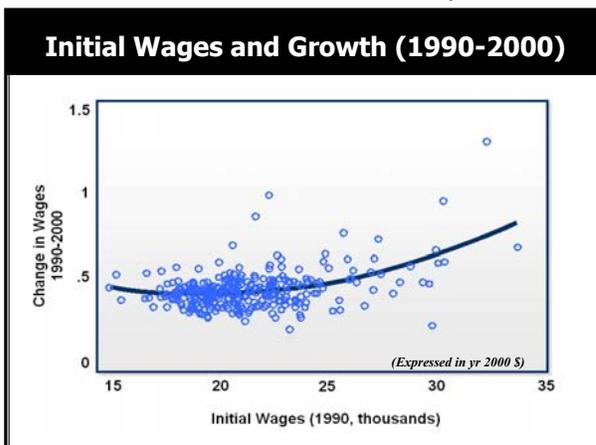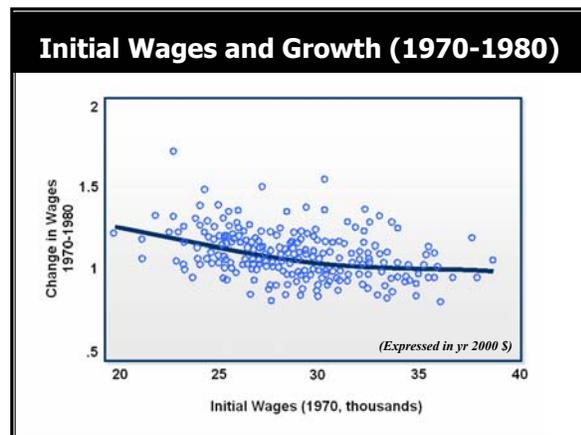
CEOs for Cities

Similarly, the South and West generally grew more than other regions in population, but less in income. Sacramento, for example, had 10% population growth, but 1% income decline. Interestingly, the model results for weather are consistent with this divergence of population and income growth, and are quite different than commonly presumed. As would be expected, warm weather is good for population growth, while precipitation is bad. However, with respect to income growth, the opposite is true. Overall (the model looks at 250 cities), cities with more rain and colder weather in 1990 had higher income growth in the ensuing decade. And if one examines the effect of weather on just the college educated population (a key to income growth, as we'll see), it turns out that while better weather attracts population overall, *college graduates tend to go to places with worse weather.* [7] Cities like Cleveland and Cincinnati, for example, though declining in population, were growing in college graduates and experiencing income growth in the 1990s. [8] The point, of course, is not that bad weather attracts people or is good for growth, but rather that good weather is not a likely explanation for prosperity.

Implication: The new divergence between income and population presents a threshold question which has significant implications for urban development strategy: what constitutes success? *Cities do not need to grow big to grow wealthy, and growing big won't necessarily lead to wealth. Leaders may choose to focus less on size, and instead aim for prosperity over population growth.*

⇨ **Finding: Cities no longer share a common fate**: the rich get richer.

Historically, economic performance has tended to converge across cities over time – poorer cities have tended to catch up as labor and capital moved to less developed markets. The first chart shows a typical historical pattern of convergence, where cities with higher wages in 1970 had less wage growth than those cities that began with lower wages. [9]

Initial Wages and Growth (1970-1980)

This pattern of convergence appears to be changing: *success now tends to breed more success.* Cities like San Jose, San Francisco and New York (represented by the circles in the upper right of the second chart) had high wages in 1990, and also led in wage growth in the last decade.

Initial Wages and Growth (1990-2000)

In other words, initial advantages may now tend to create further advantages in particular cities, "locking in" paths to success. This increasing path dependence could be the result of different types of economic factors,

(ranging from information technology to business networks) now being more important, factors that tend to build more upon themselves and to be less mobile.

Implication: The point, for present purposes, is that if success tends to breed success, then *being on the right path – and selecting the right development strategy for that path -- is more important than ever.*

⇨ **Finding: City economies show enormous variation: many types of economies mean many potential paths to success.**

Among those cities that have been succeeding economically, there is no one successful industry concentration or development strategy. Different cities and types of economies play different economic roles, and have varied possible paths to prosperity. For example, some economies have thrived by creating ideas, while others have prospered by using them (attracting and implementing innovations);[10] some have achieved efficiencies and success by concentrating business headquarters or financial functions, while others have developed sophisticated facilities and infrastructure for production. As illustrated below, a wide range of factors seem to matter to economic success in different places.

Implication: As urban economies are highly differentiated, and the factors which matter change and vary by city, *development choices must be more tailored and strategic. One size does not fit all: there is no single path or formula for success.* And since success breeds more success, *the choices are critical*.

WHAT MATTERS?

So what factors drive economic growth? Some factors clearly make a positive difference: education, knowledge based activities and infrastructure, some types of economic specialization as well as business diversification, lack of income inequality and of racial segregation. Age characteristics are also positively significant. Several factors, that are often thought to have negative effects, now seem neutral, including racial and ethnic proportions, and manufacturing. Other factors matter, selectively, in certain places – these include, in emerging and complex ways, aspects of urban growth form and regionalism. For summary purposes, the effects of some of these factors are illustrated in the chart below.[11] The following discussion of these and other factors is then organized by the five dimensions the project examined.

Illustrative Drivers of City Income Growth (1990-2000)

Estimated Effect on Growth
(Standardized Regression Coefficient: with 95% Confidence Interval)
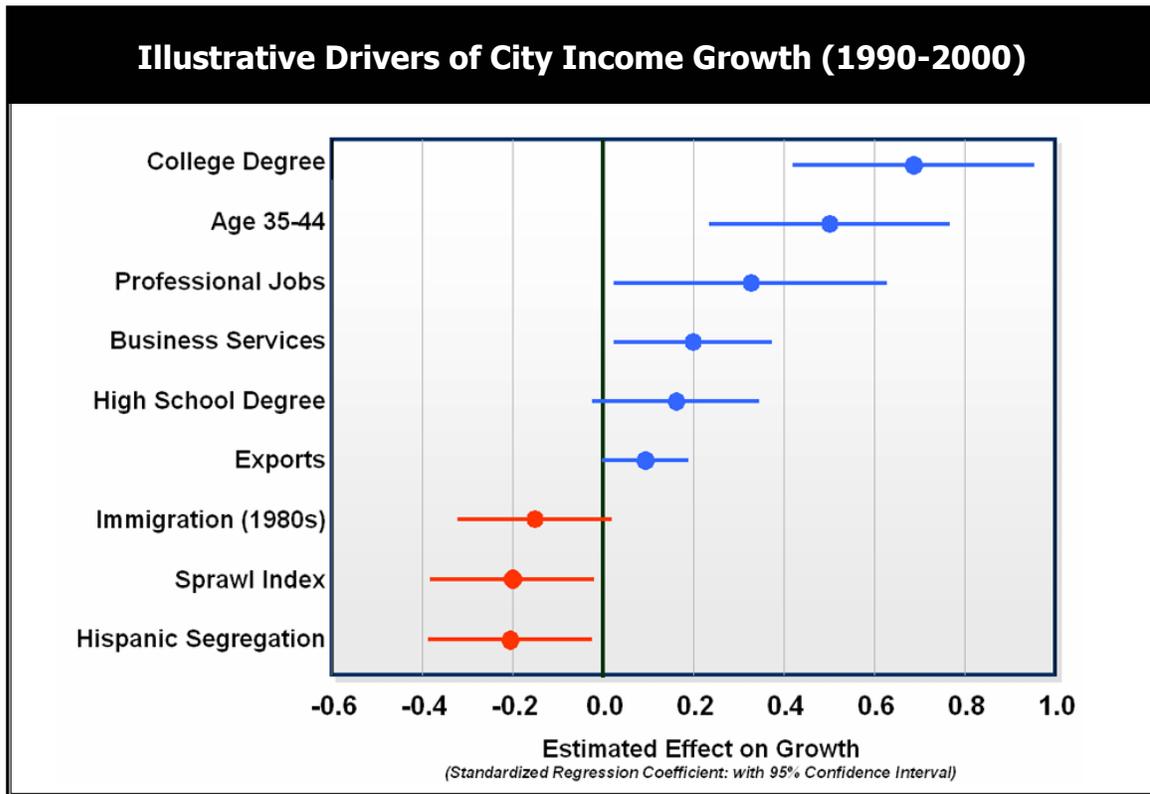
Knowledge Economy[12]

⇨ **Finding: Educational levels were the single biggest driver of economic growth, but high school degrees are not enough.**

10 Most Educated Cities*	
1. Arlington, VA	60%
2. Madison, WI	48%
3. Seattle, WA	47%
4. San Francisco, CA	45%
5. Raleigh, NC	44%
6. Fremont, CA	43%
7. Austin, TX	40%
8. Washington, DC	39%
9. Minneapolis, MN	37%
10. Charlotte, NC	36%
Median (for top 100**) = 25%**	
* % of adults w/ BA or higher	

▪ Educational levels in cities increased substantially in the 1990s: the average percent of adults with a college degree ("BA") or higher rose from 22.8% to 26.3%. However, there is great variation: 60% of Arlington's adult population has a BA or higher, compared to only 9% in Newark. Also, educational levels grew faster in cities that were more highly educated to begin with – *the smart got smarter in the '90s.*

- *Having college graduates proved highly significant to economic growth.* Roughly,[13] for each 2% growth in the proportion of college graduates, income growth increased about 1%.

- The number of college *in*-completions is striking: in 39 of the top 100 cities, the number of adults with some college but no degree actually exceeds the number of college graduates.

- In Chicago, for example, in 1990, 19.5% of adults had a college degree (or higher), and 17.3% -- 300,000 people -- had some college but no degree. Simply to illustrate the general significance of this factor, hypothetically[14] if one-third of those people had finished college, or if Chicago attracted 100,000 additional college graduates, Chicago's predicted income growth would have increased by 4% -- an increase of $1,000 per person, or $2.8 billion dollars!

10 Most College Incompletes
1. Mesa, AZ
2. Anchorage, AK
3. Virginia Beach, VA
4. Aurora, CO
5. Huntington Beach, CA
6. Newport News, VA
7. Tacoma, WA
8. Tucson, AZ
9. Arlington, TX
10. Spokane, WA

- Note, on the other hand, that having a high school degree without completing college is not very significant any more. A 2% increase in high school graduates yields only 0.2% income growth.[15]

Implications: *Focus on education – particularly on increasing college attendance and completion rates*. Targeting the population who enters college but does not complete could have substantial impact.

⇨ **Additional Knowledge Economy Findings: By virtually all measures, information and knowledge (and their enabling technologies) have continued to become more important to the economies of cities between 1990 and 2000.**

- The economy has shifted from goods production to more information intensive sectors. [16] More importantly, across all sectors, the economy has shifted towards more information intensive occupations and functions. Investment in information and knowledge generation, as well as use of information technologies, has increased dramatically.
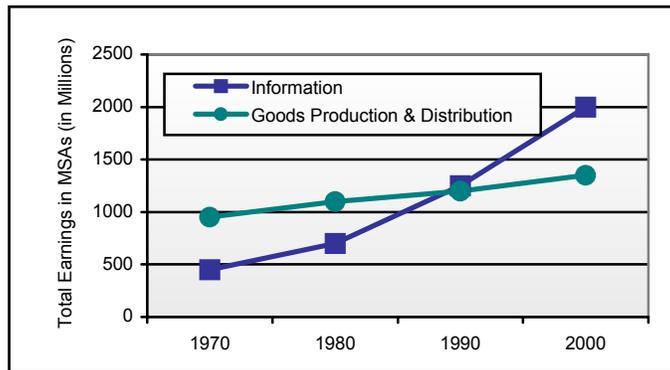
- The 1990s continued a gradual transformation of the economic base of metropolitan

Composition of Metropolitan Earnings in Traded Goods and Services (2000)
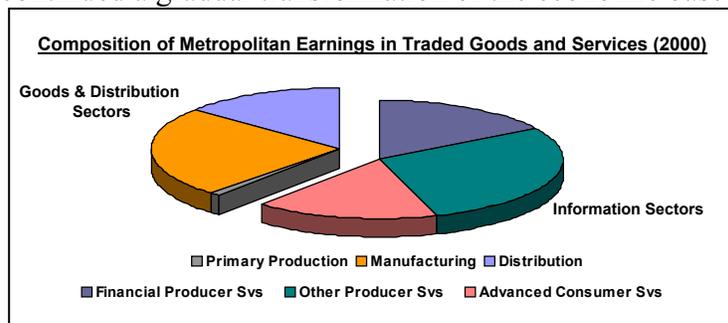
economies. Between 1990 and 2000 the information sector's share of total earnings increased by 4.4% (while goods production and distribution declined by 3.9%).

- Digital economy factors -- such as online population, broadband capacity and use of computers -- correlate highly with economic performance (though the data are too recent to draw firm conclusions or use in the models[17]).

Implications: This shift towards information and knowledge (embedded in people and technologies) helps account for many of the other observations, and has fundamental implications for the economic role of cities, as discu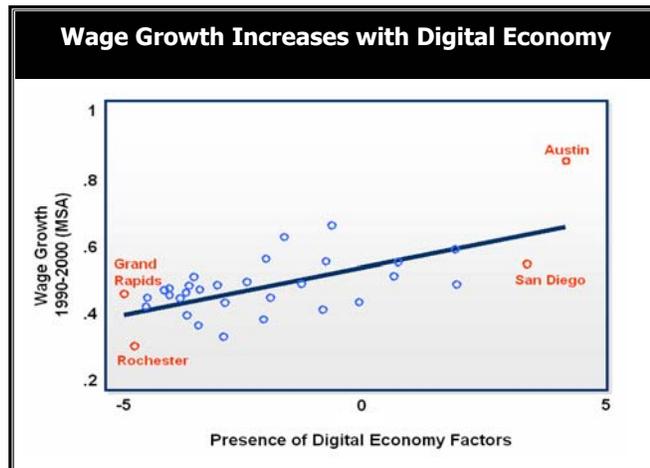ssed in the next section ("What Next?"). For present purposes, the increasing relevance of these factors makes it important to *focus on human capital (education, again, including workforce); innovation and commercialization of knowledge (R&D, universities, knowledge and business networks); and information technologies*.

Business Composition

⇨ **Findings: Both business diversification and selective specializations can be good for growth, and specialization may be shifting towards functions.**

- Overall, cities specialized in business services (which include legal and communications as well as more conventional business services) grew income about 3% faster. Among the 100 largest cities, all of the top five in income growth specialized in business services, and had over 20% income growth – San Francisco, Austin, Atlanta, Seattle and Tampa.

- *While certain types of economic specialization have a positive effect on growth, specialization is not inherently good for growth.* Indeed, 9 of the 10 fastest growing cities – *and* 9 of the 10 slowest growing cities – had at least one specialization. Rather, *what* cities specialize in matters.

- Notably, specialization in manufacturing was not significant (as either contributing to or impairing income growth), and the proportion of total earnings in manufacturing had a positive effect on income and wage growth for MSAs. In earlier time periods (1960-90), manufacturing was negatively correlated with growth;[18] now, manufacturing overall appears to be contributing.[19] However, the manufacturing comeback varies greatly by city: real manufacturing earnings increased in 169 MSAs (led by Austin and Boise), but declined in 102 (including, for example, Cleveland and St. Louis).

▪ *Specialization seems to be occurring in terms of occupation or function as well as by sector.* New organizational forms, and more differentiation in types of city economies, may be occurring as, for example, the benefits of grouping business headquarters in one place and their manufacturing plants in another outweigh the costs of having headquarters and plants separated. As business headquarters are in different cities than their plants, specialization in each city is less by industrial *sector*, and more around specialized *functions and occupations*. For example, the number of stand-alone headquarters rose by 79%, and employment in headquarters facilities rose by 69%, between 1958 and 1987.[20] Back office or call center functions similarly often are now separated from headquarters.

▪ *Business diversification offers an alternative, and perhaps less risky, path to economic success.* Diversification of the local economy reduces dependence on any particular industry, creating less risk and often more long term sustainability.[21] One of the leading analysts in this field, Gilles Duranton, suggests that new firms (and innovation) tend to be created in cities with diversified economies, while relocating firms tend to move to specialized cities.[22] Moreover, there is evidence that business diversification and interaction among different industries directly spur innovation and employment growth, thus favoring economic success.[23]

Implications: The importance of specialization may be far more subtle than its current popular appeal: *cities do not need to specialize to grow.* Specialization and diversification each offer advantages and disadvantages, and both may be needed in the national economy, with different types of cities playing quite different roles over time. *If the economic development strategy is to specialize, do it right.* It's not whether a city is specialized, but what it is specialized in that matters. *Finally, when considering what to specialize in, look beyond sectors -- functional specializations may become increasingly important.*

Demographics

⇨ **Findings: The proportion of particular racial or ethnic groups matters less to economic performance, while their segregation generally has negative effects. Income inequality also negatively affects performance. 35-44 year olds have highly positive effects. Immigration drives population growth, and its income effects appear to vary by type of economy.**

Overall, urban areas are growing in population and income – getting bigger and wealthier.[24] A few of the largest cities grew in population for the first time in decades. At the same time, the population of the largest 100 cities is majority non-white for the first time, and 43 of the top 100 cities (up from 30 in 1990) are now majority non-white. Hispanics became the largest minority, and most Hispanics now live in the suburbs.[25] Across almost all dimensions -- race, ethnicity, immigration, income, age – cities' populations are more diverse.[26]

▪ Generally, *the proportion of any particular race or ethnicity had no significant effect on income growth.* This may be progress: in past studies, race and diversity have often appeared to be negatively associated with growth. While the *proportion* of racial or ethnic groups may no longer be as important to economic performance, their

segregation is: in particular, segregation of Hispanics had negative effects on both city and MSA income growth.

- The big story behind urban population growth in the '90s was *immigration*. The largest 100 cities added a total of 4.7 million in population over the decade. Seventy five percent of that growth, or 3.5 million people, was due to growth in the foreign born population. The average growth in foreign born population among the largest 100 cities was a stunning 83%, while the average growth in native-born population was only 4.3%. The amount, type and impact of immigration vary greatly between cities, and the economic impact of immigration depends on how immigrants fit into the local economy. For example, immigration appears to be negatively associated with income growth in low-education cities (where, in some instances, lower skilled immigrants may be competing with lower skilled workers, driving down wages), but its effects are neutral in high-education cities.[27]

- For cities, *having a greater proportion of 35 to 44 year olds contributes to prosperity*. Roughly, for each one percent growth in the proportion of 35 to 44 year old population, income grows 1.5%.[28] The chart below depicts the significance of proportions of other age groups (with 25-34, 45-54 and over 65 all being similarly positively significant).

* Not statistically significant
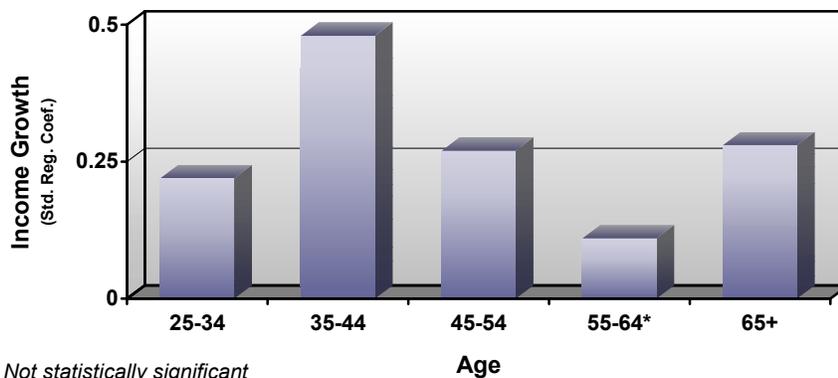
- Income inequality has a negative effect on economic performance for metropolitan areas (but not for cities alone), and a negative effect on population growth in cities.[29] Overall, metropolitan areas with lower levels of income inequality experienced higher economic growth. For instance, San Jose, which in 1990 had the second least income inequality in the nation, had one of the highest income growth rates at 16%. Conversely, Los Angeles, with high levels of income inequality, experienced extremely low income growth (-4%). This does not mean that cities with high levels of inequality cannot succeed economically (Atlanta, for example, ranks # 2 in income inequality and #7 in income growth), but that, all other things being equal, being more equitable results in higher economic growth.

Implications: *Addressing income inequality and segregation is good for business*. More generally, as cities are diversifying across all demographic characteristics, the key point may not be whether diversity is good or bad for the economy: rather, *demographic diversity is increasing, and the results are consistent with the view that the places that take advantage of it will do best*. This includes approaching immigration as *urban* policy (since cities are where its effects are felt most), and focusing on attracting and integrating into the economy immigrants that fit and complement the labor pool and economic base.

Furthermore, the age structure of the population is more important than its racial composition to prosperity. While 35-44 year olds are most significant, having nearly twice the impact of any other segment, 25-34 year olds tend to be more mobile, so attraction and retention strategies might aim at both. As discussed below ("What Next?", Section 1), it is likely that jobs and other economic factors are at least as important to attraction as quality of life.

Urban Growth Form

⇨ **Findings: "Sprawl" appears to have negative economic effects only when it reaches a high level. More broadly, the economic significance of urban growth patterns varies in complex ways specific to different types of growth and different types of cities and economies.**

▪ In effect, *physical growth in itself is not a key driver that either enhances or impairs economic performance.* Rather, different growth forms make sense for different types and stages of economies. Of the dozens of variables examined to analyze what is sometimes referred to as "sprawl," several proved significant, but in ways that suggest these phenomena are very complex and case specific.[30]

10 Most Sprawling MSAs
1. Riverside-San Bernardino
2. Greensboro-Winston
3. Raleigh-Durham
4. Atlanta
5. Greenville-Spartanburg
6. W. Palm Beach-Boca Raton
7. Bridgeport-Stamford
8. Knoxville
9. Oxnard-Ventura
10. Fort Worth-Arlington
Based on Smart Growth America Sprawl Index

▪ It appears that the effects of "sprawl" on economic growth may be nonlinear: *an MSA may have to be sprawling a great deal before economic effects appear*. Using a recently developed overall sprawl index,[31] the 20 most sprawling metropolitan areas grew in income 1.5% slower than the other areas, and their central cities grew 3% slower. However, variation in the degree of sprawl amongst the rest of the areas seems to have little effect on income growth. In other words, the regions that sprawled the most (by this measure) had less income growth, but otherwise income growth was similar among higher and lower sprawling cities. Note that sprawl (where it is significant) appears in this more limited analysis to hurt central cities more than their regions.

Implications: Subtler aspects concerning the form and structure of growth are likely more important than absolute geographic growth. For example, the spatial organization of particular components of the economy such as jobs and labor force deserves attention: is affordable housing available in key employment centers, allowing workers to access available jobs? A key point, reflecting the divergence of population and income growth, is that *cities do not have to sprawl to have a growing economy*. Portland, Omaha and Miami, for example, all had very low sprawl levels[32] and significantly above average income growth.

CEOs for Cities

Regionalism

⇨ **Findings: Cities and suburbs are interdependent parts of one regional economy, but the nature of their economic linkages may be changing.**

▪ Cities and their suburbs tend to succeed or fail together: the income of cities and surrounding suburbs continues to have a significant positive correlation;[33] as does the correlation of their property values. The urban typologies work, discussed in Appendix B, further suggests that economies are regional – and so the economic success of cities and suburbs is inevitably linked as part of one regional economy.[34]
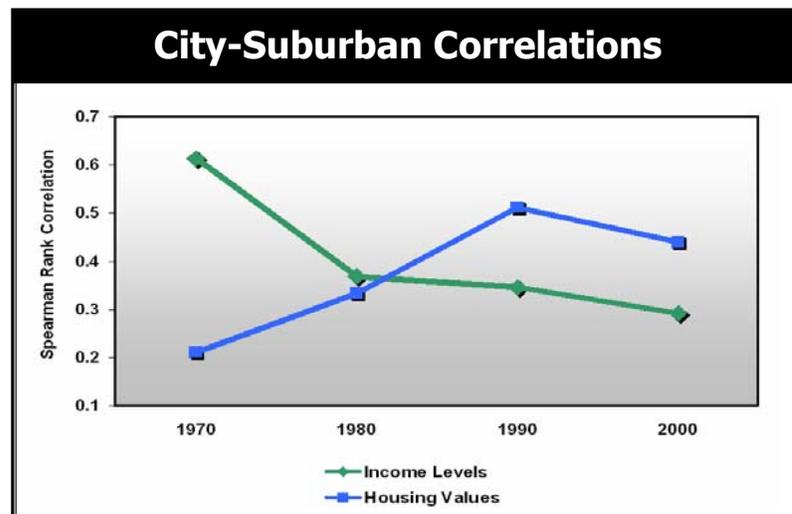
▪ However, the shifting correlations (as well as the earlier observations about increasing functional specialization in the organization of the economy) suggest that the degree and nature of the interdependence between cities and suburbs is likely changing, and also varying in different types of metropolitan economies. Particular cities and specific suburbs may be more or less heavily linked by shared labor, real estate markets, specialized functions (like financial centers) or infrastructure (such as transportation), each affecting the efficiency and productivity of regional economic performance. Studies of business to business relationships across city and suburbs, for example, show the extent to which companies in the suburbs rely on central city firms for a wide array of services, ranging from auditing to banking to legal services.[35] Extensive evidence exists on other types of linkages as well, including consumer to business, labor force to jobs, shared amenities and infrastructure.[36]

Implications: The important questions may not be whether city and suburb are interdependent (they are), or which is more important, but rather what are the key linkages between the components of regional economies located in cities and suburbs. *The most important focus for regional economic development may be to understand and build on the linkages particular to each local economy.* Identifying these linkages would allow local governments to develop more deliberate and focused partnerships to promote regional economic development.

CEOs
for Cities

WHAT NEXT?

What are the major economic trends in American cities? For present purposes, there may be two key points: (1) what's important to economic success is changing, so we need to better understand the new dynamics, and promote policies to enhance them;[37] *and (2) there is great variation between cities, so practical economic development strategies need to be more tailored to local circumstances.*

1. The Changing Dynamics of Urban Economies

The project results reported above begin to fit together when viewed in the context of the role of cities in economic growth. Economic growth is broadly a function of the *factors or inputs* of production (such as labor, capital, natural resources, knowledge, technology), and of the *organization* of those factors into wealth creation through institutions that define the market and *environment* (like government) and that engage in production (firms). The role of cities -- indeed the reason for cities, from an economic point of view -- is to enhance production through reducing costs (especially transportation costs), and through creating "agglomeration" effects – the benefits of shared labor, ideas and other inputs resulting from synergies, spillovers, network and other effects of proximity of inputs and firms.[38]

Generally, the findings suggest that different factors of production and different institutional characteristics are increasingly significant now. In effect, *which economic **inputs** are important is changing.* For example, the role of knowledge factors as a basis of value creation has increased dramatically across the economy. This is reflected in the findings about the significance of information and knowledge embedded in people (e.g. education) and technology (e.g. digital economy indicators), across all sectors (e.g. both growth of information sectors, and increase in information functions, services and occupations in all sectors).[39] The increasing diversity of the labor force presents another major change in the inputs or factors of production.

As the key inputs change, the optimal **organization** of production also changes. The increasing economic specialization by function and occupation may be an example of a more efficient way of organizing production as knowledge factors become more significant. In order to benefit from the distinct specialized knowledge spillovers associated with management functions or with production networks, firms are changing their structure and separating their management and production facilities. Consequently, cities are now specializing by function (management versus production) as well as by sector. Similarly, the increasing specialization by occupation or profession likely reflects the increasing benefits of concentrating specialized knowledge. More generally, knowledge inputs may be best developed and deployed through different kinds of economic organization – such as more deliberate, flexible and cross-sectoral networks of firms and knowledge institutions.

Finally, due to the changes in the inputs and organization of production, what is important in the **environment** of production has changed as well. As the components of the economy organize differently across space (e.g. business services and production, back-office and finance), the political and economic units do not coincide – economic

CEOs for Cities

activity more often happens across city and suburban boundaries. At the same time, the specific linkages of cities and suburbs within the regional economy change. Another change in the relevance of environment may arise as the interactive dynamic between attracting firms and residents (particularly knowledge workers) may be shifting,[40] and creating the right environment may be more important to attracting a good mix and fit of firms and workers. These changes make regional dynamics and city-suburb relationships more critical, and have major implications for areas such as urban growth form, quality of life, and governance structures. Each takes on increased economic significance, and can be tailored to differing economies.

These changes, overall, have reached a point where income growth no longer correlates with population growth, and where advantages breed further advantages. Yet their implications go much further. ***Cities themselves may be more important than ever in the changing economy***. The benefits of agglomeration apply particularly to knowledge inputs. Knowledge factors build upon themselves and get converted to economic value through face-to-face contacts, dense business networks and shared resources that cities particularly provide.[41] The urban environment is extremely well suited for spurring innovation, which is favored by the diversity of ideas, and consequently by the diversity of people, interconnected and integrated in urban networks. The growing demographic diversity of urban areas across race, ethnicity, income, and age could contribute to this process and reinforce the role of cities as major engines of economic growth.

> ## Quality of Life As An Attraction Strategy?
>
> A popular current trend in economic development suggests focusing on quality of life to attract certain types of workers, which firms will then follow. However, while quality of life may be becoming more important, the project results overall suggest caution with respect to *over*emphasis on quality of life as an economic development strategy, for two reasons. First, other factors are at least as important to economic success, particularly to attracting workers. *Quality of life must be approached as one among many important factors.* Second, and perhaps more importantly, too narrow an emphasis on quality of life sometimes has characteristics of a zero-sum game, where cities compete to attract certain types of workers from each other. Why not focus instead on knowledge infrastructure, commercialization of new ideas, and the other factors that lead to genuine innovation and economic growth?

Much further work is necessary to fully understand each of these changes and the opportunities they present – both by examining each of the dimensions in more depth, and by analyzing particular urban economies in detail. *With respect to examining particular dimensions in more depth, and developing appropriate policies, the project results about "what matters" suggest some priority areas of focus: education, immigration, knowledge factors (from information sectors to networks for commercialization of knowledge), new forms of economic specialization and specific city-suburban economic linkages.* The results similarly suggest some priority questions in each of these areas.[42] Equally important, however, the results suggest that different things will be important in different places, and so point towards analyzing particular economies in more detail. The project has more immediate implications for this process, to which we now turn.

2. Towards Local Solutions

In many ways, the biggest value of the project outcomes may be at the practical, local development level. The local development challenge, particularly when resources are constrained, is most often in knowing which policies are really relevant to, and will have the most impact in, particular places and economies.[43] *In effect, cities are becoming more like markets, highly differentiated, each with different niche opportunities. Any particular city's most important step may be to understand its unique economic opportunities, and prioritize development activities to capitalize on them.*

There is no silver bullet. Instead, lots of factors are important, varying by place. Furthermore, just as the ingredients for prosperity are changing, the number of recipes is increasing. The challenge now is to determine which recipe is the most appropriate for each city type. It is necessary to better understand, in each particular place, the iterative relationships between, for example, creating a rich mix of occupations, functions and firms; attracting certain age and education groups; and improving quality of life. In effect, at the local level, the opportunity is to analyze – in fact develop the capacity to continually be aware of – the unique dynamics of the particular local economy, and to then implement customized strategies.

Developing targeted strategies will require further assessing the particular conditions of a specific city and regional economy. As an initial step towards understanding the relationship of individual cities to the overall findings, the project developed a preliminary, illustrative *typology of urban economies*. The typology is useful to begin suggesting which factors deserve more attention in particular cities, sub-patterns of city types and varying paths to success. An illustration from the typology (which does not lend itself to summary preview) is provided in Appendix B.

The project has also produced two other critical sets of tools to help with localized assessment: (1) an extensive database; and (2) a baseline set of models.[44] Together, they serve to identify key variables, and create a framework for continuing customized analysis, both by place (more detailed application to a particular city), and by subject (more detailed analysis of, for example, the impact of immigration, or of types of business specialization). Applying these tools to a particular place might, for example, help determine whether spending limited resources on college scholarships or on freeway improvements is more likely to produce economic growth.

Using the typology, these tools, and the results to date, it is possible to design and undertake, in essence, a *Metropolitan Economy Customized Audit*. Appendix C provides a few illustrative examples, one from each of the dimensions, of the more detailed questions and policies that would be addressed in such an assessment.

The project results already carry certain practical implications, many of which are not new themes, that are likely to apply broadly: develop an inclusive, regional strategy; invest in knowledge development, infrastructure and networks; invest in human capital – workforce and education; support complementary, diverse specializations (and be cautious about narrow "clusters" of firms within sectors); and pay increasing attention to the impact of quality of life on economic performance. Yet no place can tackle all of

these things, and they aren't equally significant in each regional economy. Careful localized assessments can lead to customized strategies that prioritize the areas which leverage the greatest economic opportunity in a particular place.

Finally, a key step towards developing customized strategies is to understand that the past need not predict the future, nor should it. We can re-think basic goals. Population or income growth? It's possible, for example, that some cities should neither expect nor desire to get back to their prior population, but instead should make prosperity the primary goal.

CONCLUSION

Cities are more important than ever to the economic performance of nations as enhanced productivity increasingly flows from physical concentrations of personal, knowledge and business networks. New opportunities and paths for success are emerging, and cities have more choices as differentiation between cities leads to more varied economic roles. While there are many ways to achieve prosperity, making the right choices is both more important and more complex. The key is to be strategic – for each place to build on its unique economic mix.

TABLE OF APPENDICES

CEO s
for Cities

Appendix A: Population and Income Growth (100 Cities)

City Name	Per Capita Income Growth (1990-2000)		Population Growth (1990-2000)	
	Log Change	**Rank**	**Log Change**	**Rank**
Akron, OH	0.089	56	-0.027	83
Albuquerque, NM	0.106	47	0.154	26
Anaheim, CA	-0.144	100	0.208	11
Anchorage, AK	-0.039	93	0.140	32
Arlington, TX	0.031	80	0.241	9
Arlington, VA	0.093	53	0.103	39
Atlanta, GA	0.230	3	0.055	62
Aurora, CO	0.031	79	0.219	10
Austin, TX	0.232	2	0.344	3
Bakersfield, CA	-0.072	96	0.346	2
Baltimore, MD	0.055	71	-0.123	99
Baton Rouge, LA	0.108	43	0.037	72
Birmingham, AL	0.143	21	-0.091	93
Boston, MA	0.112	36	0.026	74
Buffalo, NY	0.069	66	-0.114	98
Charlotte, NC	0.176	7	0.312	5
Chicago, IL	0.155	12	0.040	69
Cincinnati, OH	0.172	8	-0.094	95
Cleveland, OH	0.141	25	-0.055	88
Colorado Springs, CO	0.164	9	0.250	8
Columbus, OH	0.149	19	0.117	37
Corpus Christi, TX	0.101	51	0.075	51
Dallas, TX	0.015	84	0.166	23
Dayton, OH	0.154	14	-0.091	94
Denver, CO	0.143	22	0.171	22
Des Moines, IA	0.058	70	0.028	73
Detroit, MI	0.151	18	-0.078	92
El Paso, TX	0.112	37	0.090	44
Fort Wayne, IN	0.082	61	0.173	21
Fort Worth, TX	0.064	67	0.178	19
Fremont, CA	0.154	15	0.160	25
Fresno, CA	-0.029	92	0.188	15
Garland, TX	-0.009	89	0.178	20
Glendale, CA	-0.080	97	0.080	49
Grand Rapids, MI	0.088	57	0.045	65
Greensboro, NC	0.092	54	0.199	13
Hialeah, FL	0.038	78	0.186	16
Honolulu, HI	-0.027	90	0.017	75
Houston, TX	0.051	73	0.181	18
Huntington Beach, CA	0.015	85	0.044	66
Indianapolis city, IN	0.109	41	0.067	58

City Name	Per Capita Income Growth (1990-2000)		Population Growth (1990-2000)	
	Log Change	Rank	Log Change	Rank
Jackson, MS	0.045	76	-0.065	91
Jacksonville, FL	0.105	48	0.147	28
Jersey City, NJ	0.104	50	0.049	64
Kansas City, MO	0.115	35	0.015	76
Las Vegas, NV	0.111	38	0.616	1
Lexington-Fayette, KY	0.142	23	0.145	29
Lincoln, NE	0.132	27	0.161	24
Little Rock, AR	0.124	34	0.041	68
Long Beach, CA	-0.096	98	0.072	53
Los Angeles, CA	-0.048	94	0.058	60
Louisville, KY	0.164	11	-0.049	85
Lubbock, TX	0.059	69	0.069	56
Madison, WI	0.147	20	0.084	47
Memphis, TN	0.131	28	0.063	59
Mesa, AZ	0.080	63	0.319	4
Miami, FL	0.142	24	0.011	78
Milwaukee, WI	0.084	60	-0.051	86
Minneapolis, MN	0.132	26	0.038	71
Mobile, AL	0.075	64	0.013	77
Montgomery, AL	0.126	30	0.074	52
Nashville-Davidson, TN	0.126	31	0.110	38
New Orleans, LA	0.124	33	-0.025	81
New York, NY	0.026	82	0.090	45
Newark, NJ	0.030	81	-0.006	80
Newport News, VA	0.046	75	0.058	61
Norfolk, VA	0.107	44	-0.108	97
Oakland, CA	0.109	40	0.071	54
Oklahoma City, OK	0.052	72	0.129	34
Omaha, NE	0.151	17	0.150	27
Philadelphia, PA	0.019	83	-0.044	84
Phoenix, AZ	0.049	74	0.295	6
Pittsburgh, PA	0.110	39	-0.100	96
Portland, OR	0.155	13	0.190	14
Raleigh, NC	0.104	49	0.283	7
Richmond, VA	0.081	62	-0.026	82
Riverside, CA	-0.065	95	0.119	36
Rochester, NY	-0.006	87	-0.053	87
Sacramento, CA	-0.008	88	0.097	41
San Antonio, TX	0.181	6	0.201	12
San Diego, CA	0.072	65	0.097	42
San Francisco, CA	0.270	1	0.070	55
San Jose, CA	0.164	10	0.135	33
Santa Ana, CA	-0.100	99	0.140	31
Seattle, WA	0.211	4	0.087	46
Shreveport, LA	0.128	29	0.008	79

| City Name	Per Capita Income Growth (1990-2000)		Population Growth (1990-2000)	
	Log Change	**Rank**	**Log Change**	**Rank**
Spokane, WA	0.107	46	0.099	40
St. Louis, MO	0.107	45	-0.130	100
St. Paul, MN	0.094	52	0.053	63
St. Petersburg, FL	0.108	42	0.039	70
Stockton, CA	0.014	86	0.145	30
Tacoma, WA	0.151	16	0.091	43
Tampa, FL	0.210	5	0.080	48
Toledo, OH	0.087	58	-0.060	90
Tucson, AZ	0.085	59	0.183	17
Tulsa, OK	0.040	77	0.068	57
Virginia Beach, VA	0.091	55	0.079	50
Washington, DC	0.125	32	-0.059	89
Wichita, KS	0.060	68	0.124	35
Yonkers, NY	-0.028	91	0.042	67

NOTE: Log Change (used in the data and in the model for its technical properties; see endnote 3) roughly corresponds to percentage change. The ranks are the same for both measures.

CEO s
for Cities

Appendix B: Illustration of Typology

The project results provide important evidence about what matters to urban economic success by looking in the aggregate across all 250 of the largest urban areas and their central cities. Yet the results also reveal that cities have great variation, and the increasing importance of leveraging uniquely local paths to success. To help begin examining the different types of cities and their paths, the project produced a typology of cities.

The analysis clustered the 250 cities into 15 different types, using primarily the factors which proved most significant to economic success in the models. Each type of city has a distinct set of socioeconomic characteristics, and achieved different levels of economic growth.[45] Examining a particular city and its cluster can help in two ways: first, comparing across clusters helps identify characteristics of the city's type and path, and its strengths and weaknesses. Second, comparing to other generally similar cities within the cluster suggests how particular differences from peers may affect economic performance.

The typology outcome pertaining to two specific clusters (clusters 8 and 11) is provided below, as well as a brief explanation of the methodology. [46]
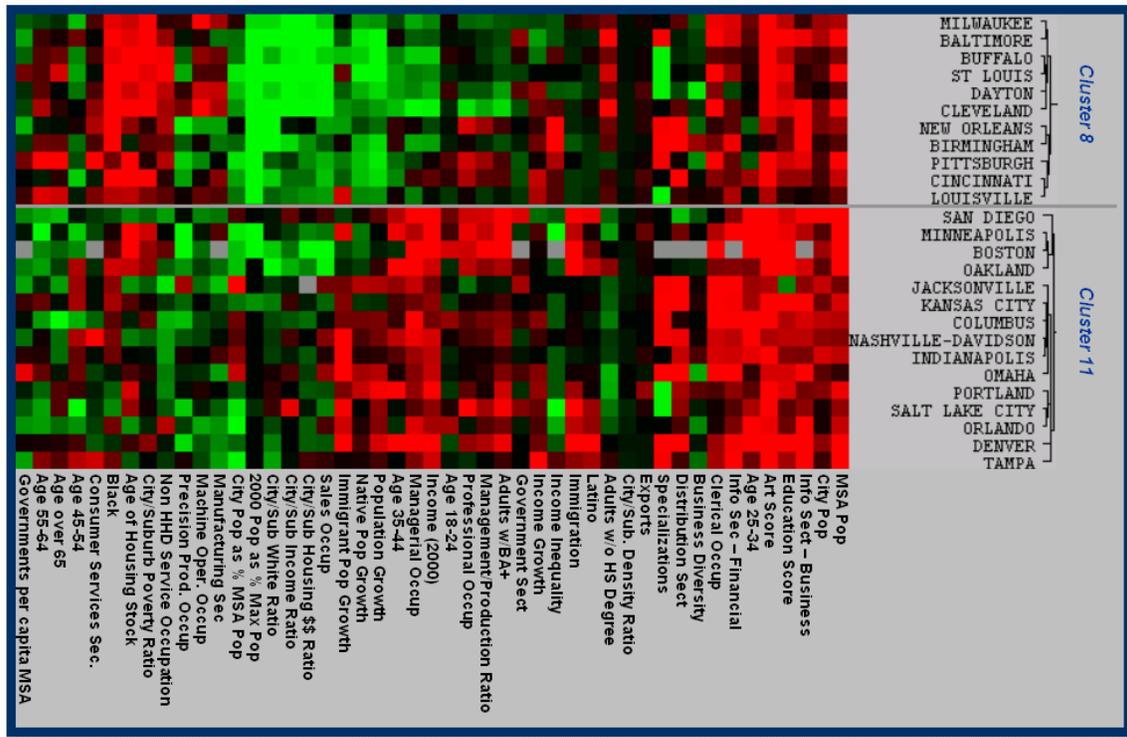
This graphic is an application of DNA heat mapping to display clusters of cities (based on significant variables from the project models). The score of each city on the variables listed below the chart is represented by degrees of color, from light green (very low) to bright red (very high). The clusters are created by grouping together cities that tend to have similar scores on the same variables. Within each cluster, cities that are closer together in the chart are more similar than cities that are further apart, forming sub-clusters as indicated by the lines on the right.[47]

These two clusters – fairly represented by Cleveland (Cluster 8) and Portland (Cluster 11) -- generally contain cities with slightly above average income growth.[48] Yet they achieved this result through different paths. The different paths may reflect that the cities in these two clusters are coming from very different starting points: they have different challenges and strengths to build on. The cities like Cleveland were generally older Midwestern cities, with lower absolute income, a high percentage of African Americans, and high levels of income inequality between central city and suburbs. The cities in cluster 11, on the other hand, had less income inequality, and generally had higher levels of immigration and a high percentage of Latinos.

Considering the differences between these two city types, it is not surprising to see that their paths to success appear quite different as well. The economies in Cleveland's cluster are much more concentrated in manufacturing and consumer services. The population in Portland's cluster tends to be younger, more highly educated, and more likely in managerial and professional occupations. Interestingly, both clusters exhibit a high presence of information sector industries (particularly financial and business services). Cities in these two clusters also experienced very different levels of population growth: both native and immigrant population growth was very high in cluster 11, but generally very low in cluster 8. This, again, confirms that economic growth (measured in terms of income) can be achieved independently of growth in population.

Typologies like these might be a useful starting point for particular cities to examine where they "fit" in the economic landscape, and to figure out which factors of success are likely most relevant to them. It is necessary, of course, to get well beyond this starting point – to tailored analysis of those factors and customized strategies (hence, the Metropolitan Economy Customized Audit; see Appendix C).

Appendix C: Illustration of Subjects for Metropolitan Audit

The project highlights the importance of being strategic (because success breeds success), at the same time that it reveals the extent to which cities are differentiated, and so need to develop their own strategies uniquely tailored to their particular assets and opportunities. The model results and urban typology help identify priority questions to focus on, and provide a foundation, along with the database, to begin answering the questions in particular places. Examples of some of the subjects that might be covered in a local audit follow.

Knowledge Economy. *Example: Education*

- Considering the importance of college level education, where are college graduates coming from or going to, and why? If they are produced locally and leave the area, for what reasons? If they are staying or coming to the area, what are the key factors in their decisions?
- Where (places and institutions) are the people who are starting college but not finishing? What are the reasons people drop out of college (economic hardship, job offers, perceived benefits)? Is there potential to increase college completion rates?
- Available data[49] could address many of these questions, as well as ethnic and economic characteristics of students and graduates, migratory patterns, and details on courses of study and performance (or drop-out rates) of students at local colleges.
- Analysis of this data could help target strategies to increase, retain and attract college graduates. These might range from focusing on problems at particular local colleges, to creating partnerships between local colleges and businesses to retain graduates.[50] Other strategies could, for example, help with high housing costs or provide student loan forgiveness programs tied to staying in the area. The point, of course, is that the results of the analysis would determine which of these things, or others, would make the most economic sense.[51]

Business Composition. *Example: Types of Specialization*

- Considering that specialization carries risks as well as benefits, and that the nature of specialization appears to be changing, the threshold analysis would determine the extent and nature of current specialization: is the economy concentrated in certain sectors? In particular functions (such as back office, distribution, data processing, R&D, finance, management)? Particular occupations or professions?[52]
- Some of these questions can be readily analyzed with available data (indeed, much of the relevant baseline data is already in the database). For example, County Business Patterns and Economic Census data offer insight on the business composition and the occupational mix of every city, while PUMS[53] data, which shows individual level records, would allow getting at the intersection between functional and sectoral specialization. The business survey, referenced below, could complete this information.
- This analysis, first, will help identify the most promising specializations (if any: remember, diversity is an equally good path to prosperity). Once promising specializations are identified, tax, fiscal, zoning and other policies can be tailored to strengthen them. Investment, R&D, infrastructure development or workforce training

can be targeted to the identified plans and needs of connected firms and functions. At the other extreme, places that are very narrowly specialized will be better able to anticipate and plan to mitigate the risks of specialization, such as with business insurance and workforce transition programs.

Demographics. *Example: Immigration*

- Immigrants present an unusually diverse pool: for example, as a whole, they are both more likely to have no high school degree *and* more likely to have a college degree. Furthermore, their economic impact varies greatly based upon the fit between the types of immigrants and the type of local economy. While standard census data does not reveal which types are coming to a particular city, census micro-data would allow a thorough profile of the immigrant population by age, education, income, length of residence, country of origin and other characteristics. INS data also shows where immigrants find employment, what kind of occupation they tend to have and, indirectly, what industries rely more heavily on immigrant labor. This allows better understanding the fit of immigrants with the local economy, how to most productively incorporate them, which to seek to attract, and how well they are being incorporated so far.

Regionalism and Urban Growth Form. *Example: Distribution of Components*.

- The interdependency of cities and suburbs varies by region and type of economy. Similarly, whether urban growth form is impairing economic success (and if so, how) varies across economies. Both issues are particularly dependent on localized analysis. How are the key components of the economy distributed across city and suburbs? What are commuting patterns (by occupation and industry)? Is appropriate housing near job centers? What are the expenditure patterns of consumers and businesses? Is the distribution reaching a point of "sprawl" where particular industries or functions are affected? The point is not just to identify what the linkages are, but where: which components are most important to focus on, and which suburbs?
- Baseline data, again, is already available in the project database on many of these issues. Other more specialized data sets are available, both nationally and locally.[54] Increasingly, regional development organizations are gathering relevant data, and are well positioned to deepen it with original data collection, as well as to act on it.
- With analysis of these issues, initially, policy makers can be more deliberate about how much and what kinds of growth are sought (given that growth is neither inherently necessary – nor inherently bad -- for prosperity). Where growth is having negative effects, or needs to be managed going forward, tax policy, infrastructure investment, zoning, land use and transportation planning can be better tailored toward more clearly defined and high impact goals. Similarly, understanding the particular linkages allows identifying specific points of interdependence between city and suburbs, and demonstrating their mutual economic benefits. City and suburban interests could be aligned across a range of possible activities, from support for specific regional business clusters to transportation to targeted workforce training. This creates a basis for more productive, focused regional development activities and partnerships.

CEOs
for Cities

Getting Started. Ideally, cities would develop the capacity to continually know details like these about their economies. Indeed, the capacity and results would themselves be valuable additions to the local knowledge infrastructure. A relatively simple, but highly useful, first step would be to *undertake an annual survey of people moving into and out of the area*.[55] The survey would establish basic demographics (age, education, family situation and structure, industry and occupation), then ask where respondents are coming from or going to, and for what reasons (moving to a job? quality of life issues?). Understanding why different types of people are coming and going, when tied to the other information and models, would be enormously useful in prioritizing economic development activities. A similar routine survey could be designed for businesses.

ENDNOTES

[1] "Cities and Economic Prosperity," available at <www.CEOsforCities.org>.

[2] Growth Form refers to the geographic growth and arrangement of the components of the economy, popularly called "sprawl." Regionalism in many ways cuts across the other dimensions, referring to the relationships between city and suburbs, and so also to the relationship of political and governmental structures to economic performance.

[3] The models were built for the largest 250 MSAs and their central cities. While "urban area" and "city" are sometimes used interchangeably in general discussion below, when reporting descriptive facts or analytic results, "cities" is used to refer to the central cities, and "urban areas" to the MSAs (metropolitan statistical areas, a proxy for regions). The "top [or bottom] 10 lists" used as illustration in the text refer to the largest 100 cities. Income and population growth numbers refer to logarithmic change (see, Charles Jones, Introduction to Economic Growth, 2nd ed*.,* W.W. Norton & Company, New York, 2002, p. 203-204 for an explanation of why log change is normally used in this type of analysis).

[4] The project estimated models of income growth for cities and of income and wage growth for MSAs (wage data was not available for cities). The income and wage results were generally consistent. An increase in per capita income or in average wages is generally indicative of the growth of a city's economy and of the increased well-being of its inhabitants. However, each of these variables could also partially reflect factors that do not depend on economic growth. Since per capita income is the ratio of total income to population, per capita income growth could be the result of population shifts. For instance, if lower income people disproportionately leave the city, it would result in income growth, though it might not be considered economic success. Wage growth, on the other hand, is less sensitive to demographic effects, since it depends on available jobs and productivity. Still, an increase in average wage could be due not to an increase in productivity (which would result in economic growth) but to a loss of low-paying jobs and a rise in unemployment. The research design included both income growth and wage growth in the model as separate dependent variables to make it more likely – if the income and wage effects were consistent, as they were – that the effects reflect actual economic growth rather than these other factors. Nevertheless, this is a complex subject, partly dependent on varied views of what constitutes economic success, and the results should be carefully interpreted when applied to particular cities. It is important to understand what different factors in fact contribute to income and wage growth in particular places.

[5] The project's modeling approach makes it more likely that we are observing causal effects as distinct from contemporaneous correlation, but note that models cannot definitively establish causation. The project followed the approach recommended by Edward Glaeser of regressing change in economic performance on earlier conditions (see Edward Glaeser, "Cities, Information, and Economic Growth," Cityscape, Proc. of the Regional Growth and Economic Development Conference, Vol. 1, No. 1. August 1994). For example, we looked at how change in income between 1990 and 2000 was related to various initial conditions such as college graduation rates in 1990.

[6] See reference in endnote 3 for explanation of why log change is used.

[7] Highly educated people may more often choose places because of location-specific job prospects; or perhaps the amenities that are most relevant to them are different (theatres not beaches?). *In any event, don't blame it on the weather.*

[8] In Cleveland, the number of people with a college degree or higher rose from 25,532 in 1990 to 33,949 in 2000 (28% growth), but the population declined 5.5%. Similarly, Cincinnati had 9.6% growth in college educated population, but 9.4% population decline.

[9] Neoclassical theory predicts *convergence*: poorer regions grow faster than richer ones. One of the distinguishing features of "new growth theory" is its prediction of *divergence* or increasing returns: richer regions may lock in an initial advantage and outpace poorer regions permanently. This is one of the hottest debates in this area of economics. The results of past analyses have tended to favor convergence, although there is some debate as to whether divergence began in the mid-1980s. Our preliminary results show a very interesting, and novel as far as we know, pattern for the 1990s: nonlinear path dependence. Essentially, the lowest performing cities tended to grow a little faster (convergence), but the highest performing tended to grow a lot faster (divergence), while the great majority of cities in the middle had only a weak relationship between past and future performance. Although success breeds success, *the good news is that failure does not necessarily breed failure.* For important recent work on convergence, see Janet Rothenberg Pack, Growth and Convergence in Metropolitan America, Brookings Institution Press (Washington, D.C. 2002). For overviews of theories of economic growth that pay particular attention to convergence, see Robert Barro and Xavier Sala-I-Martin, Economic Growth, MIT Press (Cambridge, Mass. 2001). For a less

technical discussion, see Joseph Cortright, "New Growth Theory, Technology and Learning: A Practitioner's Guide," *Reviews of Economic Development Literature and Practice,* No 4 (2001).

[10] See, Paul Romer, "Two Strategies for Economic Development: Using Ideas and Producing Ideas," Proc of the World Bank Annual Conference on Development Economics (1992)

[11] The horizontal axis of the chart records the standardized regression coefficients from the model. These coefficients reflect the effect of the independent variable (listed on the vertical axis) on income growth, expressed in standard deviations. For example, a coefficient of 0.67 for college graduates means that a one standard deviation change in the college graduation rate is associated with a 0.67 standard deviation change in income growth.

[12] "Knowledge Economy" is commonly used to refer to several distinct phenomena: (1) *innovation*; (2) the increase in the *information sector*; and (3) the increasing role of *information and knowledge*. The first, innovation, is not a new phenomenon: innovation has always been a key driver of economic growth. However, it is possible that the rate of innovation may be affected by the other knowledge economy changes. The second, the increase in the information sector, presents some definitional issues. The information sector is sometimes viewed narrowly as dot-coms and information technology companies (and so seen as a transitional change, whose "bubble" has now burst). However, the project defines it more broadly as referring to sectors heavily dependent on information and information functions. (See Drennan, and discussion in endnote 16.) Conceived broadly, this sector is significantly increasing as a component of the economy. Finally, information and knowledge (and their enabling technologies), are becoming more important across all sectors, in ways which represent the biggest change in the underlying economy. *Understood carefully – particularly in terms of the effects of the changing role of information – the knowledge economy is a major driver of economic success.*

[13] This should be considered a rule of thumb, given the confidence interval of the estimate.

[14] These impacts are what the models predict holding all else equal, which of course would not be the case if an additional 100,000 college graduates were present. The analysis nevertheless demonstrates the general magnitude of the impact, as well as the use of the models to help evaluate and prioritize policy.

[15] This similarly should be considered a rule of thumb, given the confidence interval of the estimate.

[16] This part of the analysis is based on the work and definitions of Matthew Drennan, The Information Economy and American Cities, Johns Hopkins University Press (Baltimore, London 2002). Drennan looks only at traded (or exported) goods and services, since these are the industries accounting for economic growth, and divides them into two sectors: (1) goods production and distribution; and (2) information. The first sector includes three sets of industries: primary production (e.g. mining); manufacturing; and distribution. The information sector also is divided into three sub-groups: financial producer services (referred to in the text as "financial services," and including, e.g., banks, real estate, insurance); other producer services (referred to here as "business services", and including, e.g., communications, law, business services), and advanced consumer services (referred to as "consumer services," including, e.g., movies, health, education).

[17] Data for this analysis is drawn from The Metropolitan New Economy Index, produced by the Progressive Policy Institute. See, Robert Atkinson and Paul Gottlieb, "Metropolitan New Economy Index," Progressive Policy Institute (2001), <www.neweconomyindex.org/metro>. Data on most of these factors has not been collected for long enough, or for enough cities, to have been incorporated in the project's models. The graph included here is for PMSAs only.

[18] See, for example, Edward Glaeser, Jose Scheinkman, and Andrei Shleifer, "Economic Growth in a Cross-Section of Cities," Journal of Monetary Economics, Vol. 36, pp. 117-143. (1995) (evidence that the share of employment in manufacturing was negatively correlated with city income and population growth between 1960 and 1990).

[19] Note that the increasing role of knowledge factors across all industries is particularly evident in manufacturing, whose process of value creation has dramatically changed as a result of knowledge inputs ranging from computer assisted design and manufacturing (CAD-CAM) to just-in-time inventory controls. These changes may help account for the increased productivity and contribution of the manufacturing sector.

[20] Gilles Duranton and Diego Puga, "From Sectoral to Functional Urban Specialization," NBER Working Paper 9112, 2002, available at http://www.nber.org/papers/w9112.

[21] Recent illustration of this appears in a Milken institute report, observing that a common characteristic among the top 20 best performing cities of 2003 was the diversity of their economic base. See Ross DeVol

and Frank Fogelbach, "Best Performing Cities: Where America's Jobs are Created," Milken Institute (June, 2003).

[22] Gilles Duranton and Diego Puga, "From Sectoral to Functional Urban Specialization," NBER Working Paper 9112, 2002, available at http://www.nber.org/papers/w9112.

[23] Maryann Feldman and David Audretsch ("Innovation in Cities: Science-based Diversity, Specialization and Localized Competition," European Economic Review, Vol. 43, pp. 409-429. 1999) recently found that innovation occurs disproportionately in metropolitan areas, and that it tends to be driven by industry diversification. Glaeser et al. ("Growth in Cities," NBER Working Paper 3787, 1991) analyzed employment growth patterns in US cities and found that diversity and local competition foster urban employment growth, providing additional evidence of the benefits of diversification.

[24] Though, as we have seen, the same cities are not always doing both – hence the divergence between income and population growth.

[25] Roberto Suro and Audrey Singer, "Latino Growth in Metropolitan America: Changing Patterns, New Locations", July 2002, Brookings Institution, <www.brookings.edu/es/urban/publications/surosinger.pdf >.

[26] Diversity is measured by the probability that two randomly selected residents will be of different groups (for example, racial/ethnic groups).

[27] In part, the income effect of immigration is likely simple supply and demand: where more people are moving in between 1980-90, labor supply goes up, and income levels (wages) could go down from 1990-2000. This does not suggest that immigration is "bad," but only the importance of anticipating the possible consequences and fully incorporating immigrants into the economy.

[28] A one standard deviation change in the percentage of 35-44 year olds is associated with a ¼ to ½ standard deviation change in income growth.

[29] In order to capture the level of income inequality across cities and metropolitan areas, the project adopted two distinct measures: the Gini coefficient, and the mean-to-median income ratio. Data on the Gini coefficient for MSAs was generously shared with us by Saurav Dev Bhatta. The Gini coefficient ranges between 0 and 1, and has a value of 0 in case of perfect equality (i.e. everybody has exactly the same income) and a value of 1when one person has all of the available income and everybody else has none (a case of perfect inequality). The mean-to-median income ratio measures the discrepancy between mean and median income, and shows how skewed the distribution of income is: the greater the ratio, the higher the level of income inequality. The analysis revealed that both income inequality measures had a negative effect on wage growth (MSA level: -.711 Gini; -.144 mean to median), and that mean to median income ratio had a negative effect on income growth as well (MSA: -.065).

[30] The concept of urban growth form (or "sprawl") addresses several distinct issues, and so includes a wide variety of factors. These include, for example, the geographic organization of the components of the economy (such as jobs-housing mismatch); the degree of concentration of economic activity in dense downtowns; patterns of residential density; street and transportation patterns; and absolute physical growth. In order to obtain appropriate measures for this dimension, the project examined numerous variables, ranging from commuting times to sophisticated measures of patterns of population density to recently developed aggregate measures of urban growth (discussed in the following endnote).

[31] This index was developed by Reid Ewing, Rolf Pendall, and Don Chen for Smart Growth America ("Measuring Sprawl And Its Impact," available at <www.smartgrowthamerica.org>), and combines measures of four different sprawl factors (residential density; neighborhood mix of homes, jobs, and services; strength of activity centers and downtowns; and accessibility of the street network). The data is available for only the largest 80 metropolitan areas. A similar pattern appears using Stephen Malpezzi's principal component sprawl measure, which also combines a number of different measures of urban growth form. See, Stephen Malpezzi and Wen-Kai Guo, "Measuring Sprawl: Alternative Measures of Urban From in U.S. Metropolitan Areas," The Center for Urban Land Economic Research, The University of Wisconsin (2001) <http://wiscinfo.doit.wisc.edu/realestate>.

[32] As measured by the Smart Growth America overall sprawl index.

[33] The drop in correlation of income levels, depicted in the chart, may suggest that suburban economic success is becoming more independent of city success. It likely reflects instead, or in addition, that the arrangement of factors of production between cities and suburbs is changing in ways that make income correlation a worse indicator of their co-dependence. For example, the findings about occupational and functional specialization, or about knowledge inputs, may mean higher and lower paid occupations are segregating, including between city and suburbs, even though in complementary and co-dependant business activity.

[34] Although no geographic variables were used in building the typologies, many of the resulting clusters group cities largely from the same region. In other words, cities in the same region tend to have significant common economic characteristics.

[35] See Alex Schwartz, 1992, "Corporate Service Linkages in Large Metropolitan Areas: A Study of New York, Los Angeles, and Chicago," Urban Affairs Quarterly, vol. 28, no. 2, pp. 276–296. According to this study, for example, in 1990, 91% of the major corporations located in the suburbs of Chicago used banking services based in the central city; similarly, 67% of the companies in the New York suburbs used legal counseling services located within the central city.

[36] For an excellent analysis of the linkages between suburbs and central cities, see Andrew Haughwout and Robert Inman, "Should Suburbs Help Their Central Cities?" in William gale and Janet Rothenberg Pack, eds, Brookings-Wharton Papers on Urban Affairs, pp. 45-88 (2002), available at <http://www.newyorkfed.org/rmaghome/economist/haughwout/citysubbrookings.pdf>. Research on the linkages between labor and jobs found that a substantial percentage of suburban earnings come from employment in the central city, meaning that suburban residents rely on city jobs and city employers rely on suburban labor (Joseph Persky, Elliot Sclar, and Wim Wiewel, Does America Need Cities? An Urban Investment Strategy for National Prosperity, Economic Policy Institute (Washington, DC, 1991).   Another type of linkage often mentioned in the literature focuses on the relationship between suburban residents and city amenities, since many suburban residents make use of central city amenities such as theaters and sport stadiums. For a broad overview of the arguments and empirical evidence supporting the theory of co-dependence between suburbs and central city, see Keith Ihlanfeldt, "The Importance of the Central City to the National and Regional Economy: A Review of the Arguments and Empirical Evidence," Cityscape, Vol. 1, No. 2 (June 1995).

[37] Many of these developments are not new: they have been emerging over at least the last decade. The project findings confirm them, and further suggest that these phenomena are moving beyond being transient or idiosyncratic qualities. Indeed, they may be reaching a stage of critical mass that has major economic consequences. In other words, while some of the trends themselves might not be new, their scale – and the scope of their implications – has changed.

[38] For background reviews of economic theory on the reasons for the existence of cities and the role of agglomeration economies, see, e.g., Paul Krugman, Masahisa Fujita, and Anthony Venables, The Spatial Economy: Cities, Regions, And International Trade, MIT Press (Boston, 1999); John Quigley, "Urban Diversity and Economic Growth," *The Journal of Economic Perspectives,* Volume 12, Issue 2 (Spring 1998); Duncan Black and Vernon Henderson, "A Theory of Urban Growth", *Journal of Political Economy,* Volume 107, Issue 2 (1999).

[39] The divergence between income and population growth can be seen as partially a consequence of this phenomenon. As knowledge inputs (broadly defined -- information functions and services, technologies and networks, across sectors) are becoming a bigger factor of production, economic growth is less dependent on labor force growth.

[40] See, e.g., Edward Glaeser, Jed Kolko, and Albert Saiz, "Consumer City," NBER Working Paper 7790 (July 2000).

[41] For further discussion of these issues, see, e.g., Edward Glaeser et al., "Growth in Cities," NBER Working Paper 3787 (July 1991); Edward Malecki, "Hard and Soft Networks for Urban Competitiveness," *Urban Studies,* Volume 39, Nos 5-6, 929-945 (2002); John Houghton and Peter Sheehan, "A Primer on the Knowledge Economy," Center for Strategic Economic Studies, Victoria University, 2000.

[42] Some examples of important questions for further analysis are illustrated in Appendix C.

[43] No shortage of policy prescriptions are regularly made available. However, each year's laundry list of the "ten best policies for urban development" (e.g., IT infrastructure, entrepreneurship, biotech, etc.) – even if full of good ideas – is rarely sufficiently detailed, prioritized or tailored to particular local circumstances.

[44] Having a baseline set of models creates a framework for further investigating the effects of particular variables, for more readily analyzing new variables, and for forecasting the impacts of various interventions.

[45] The results were generally consistent with the findings from the modeling – both the general findings about variation and paths, and specific findings about the importance of factors like educational level or certain specializations.

[46] Space limitations do not permit elaborating significantly on the typology in this Executive Summary. The specific typology is less significant as a finding, than as an approach to begin identifying where particular urban economies "fit" now, and some of the varying paths to success. It is important to note that

there can be a number of different typologies, and cities can be grouped in a number of different ways, depending on the methodology and variables selected.

[47] The cluster analysis was conducted using the methods described in Eisen, M. B., Spellman, P. T., Brown, P. O., and Botstein, D., "Cluster analysis and display of genome-wide expression patterns.," Proc Natl Acad Sci USA 95, 14863–14868 (1998).

[48] The national average income growth was 10%. The average income growth in cluster 8 was 12%, while the average income growth in cluster 11 was 13%. There was more variation among the cities in cluster 8 (where income growth ranged from 5% in Baltimore to 17% in Cincinnati). Cleveland's income growth was 14%; Portland's was 15%.

[49] For example, Public Use Micro Sample (PUMS) Census data combined with data available from organizations such as the College Board would address many of these questions. Often, other local sources exist to supplement these. Some original survey work could easily supplement and further customize the analysis.

[50] Such programs, for instance, might enhance the relationship between local courses of study and changing occupational qualifications, or might facilitate local job placement.

[51] A related next step in the Audit might examine commercialization of knowledge – the factors concerning entrepreneurship, venture capital and business and innovation networks which affect whether knowledge generated in universities, for example, gets converted into local economic value. See, e.g., Joseph Cortright and Heike Mayer, "Signs of Life: The Growth of Biotechnology Centers in the U.S.," The Brookings Institution Center on Urban and Metropolitan Policy (January, 2001).

[52] Specialization has another dimension: its benefits flow from the dynamic interaction, shared ideas, labor and processes within the "cluster" that is specialized. Identifying operational connections that define genuine clusters would come next: where are the spillovers, networks and business relationships really happening? This entails understanding locally, in detail, which businesses, functions and people are in fact relating to each other, in terms of everything from supply chains and outsourcing to shared labor, scientific base or other resources.

[53] PUMS stands for Public Use Micro-Sample.

[54] Varied specialized data sets might shed some light on regional linkages. For example, on the consumer side, journey to work and tract to tract commuting flows data from the Census can show what percentage of the people who work in the city live in the suburbs, and conversely what percentage of the people who work in the suburbs live in the city. On the business side, looking at business-to-business relationships, SEC (Securities and Exchange Commission) filings can provide valuable data on the location of the major professional service providers for each publicly owned company.

[55] Such a survey would not be extravagant: it would require only a modest sample, and respondents could easily be identifiable through post office or real estate databases.