Local Sustainability Policies and Programs As Economic Development: Is the New Economic Development Sustainable Development?

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Abstract

Common wisdom suggests that local efforts to protect or improve the biophysical environment will inevitably undermine efforts to engage in economic development. Using research on the effects of smart growth and the Environmental Kuznets Curve as the foundation, this article examines the empirical relationship between cities' pursuit of sustainability and their economic growth. Results suggest that cities that take sustainability policies and programs the most seriously, particularly if they have relatively large "creative class" populations, tend to be the cities that have experienced the greatest growth in personal incomes since 1990. Cities that have done the least to pursue sustainability tend to have experienced the least growth in personal incomes, which is taken as evidence that a new model of local economic growth may well be emerging—a model that emphasizes quality of life as a driver of economic development.

Introduction

One central political challenge to advancing the cause of sustainability in cities is rooted in understanding the relationship between the pursuit of sustainability and local economic development. Traditional approaches to local economic development have typically accepted the idea that development depends on limited government and policy restrictions. Any local policies or programs, including zoning and land use policies, that restrict the way land is used undermine the ability of the local economy to grow. Moreover, so the argument goes, any effort of local government to

protect and improve the local biophysical environment represents a restriction on economic development. The result of restrictive policies is less economic development, a smaller employment base, lower property tax revenues, lower local public goods expenditures, and, ultimately, a lower quality of life. On the other hand, local environmental advocates seem to accept this tradeoff, as well. Such advocates seem willing to accept lower levels of economic growth if such levels are required to protect the biophysical environment. The no-growth sentiment has long been associated with proenvironmental interests and policies.

Although the tradeoff between local economic development and environmental protection may well have previously served as an accurate description of the realities that local governments face, evidence suggests that this description has changed. Perhaps starting with the seminal works of Jacobs (2001, 1970), understandings of the potentially symbiotic relationship between the quality of the biophysical environment and local economies began to emerge. For at least the past 20 years, advocates have suggested an alternative prescription that unfettered growth (with environmental degradation) and no growth (with environmental protection) are not the only two alternatives. Focusing on what has become known as *smart growth*, arguments emerged that local economic growth is still possible, even at fairly high levels, without sacrificing the quality of the biophysical environment. Smart growth represents one key policy mechanism underlying the nexus between sustainability and local economic development (Blakely and Leigh, 2010; Greenwood and Holt, 2010; O'Connell, 2008). If cities are going to protect their biophysical environments without forgoing economic growth, so the argument goes, they must pursue economic development through smart growth. Although the local pursuit of sustainability has numerous components (including protecting and improving the biophysical environment, environmental equity, and energy efficiency, to name three), the smart growth component speaks most clearly to the connection between environmental protection and economic growth (Saha and Paterson, 2008).

Met with much initial skepticism, smart growth approaches to economic development seem to have increasingly taken hold in practice as an alternative model of sustainable economic growth. In short, the relationship between the pursuit of sustainability and economic growth seems to have changed. This article represents an effort to investigate this apparent fact. It starts by addressing the nature of the relationship between environmental protection and economic growth and discussing the various traditional theories of local economic development. It then contrasts these traditional theories with smart growth and sustainable economic development theories and examines the nature of the empirical relationship between cities' pursuit of sustainability and local economic growth. Finally, it attempts to develop a deeper understanding of this relationship by offering a multivariate model of local economic growth. The analysis provides evidence that, when cities adopt and implement programs to pursue sustainability, economic growth does not seem to suffer. Indeed, the cities most aggressive in their public policy pursuit of sustainability seem to have experienced greater economic growth than other cities. The character of the local culture seems to bolster this relationship substantially, wherein cities with larger "creative classes" seem to be the same cities that pursue sustainability policies and that experience greater economic growth.

The Economic Development-Environmental Protection Tradeoff

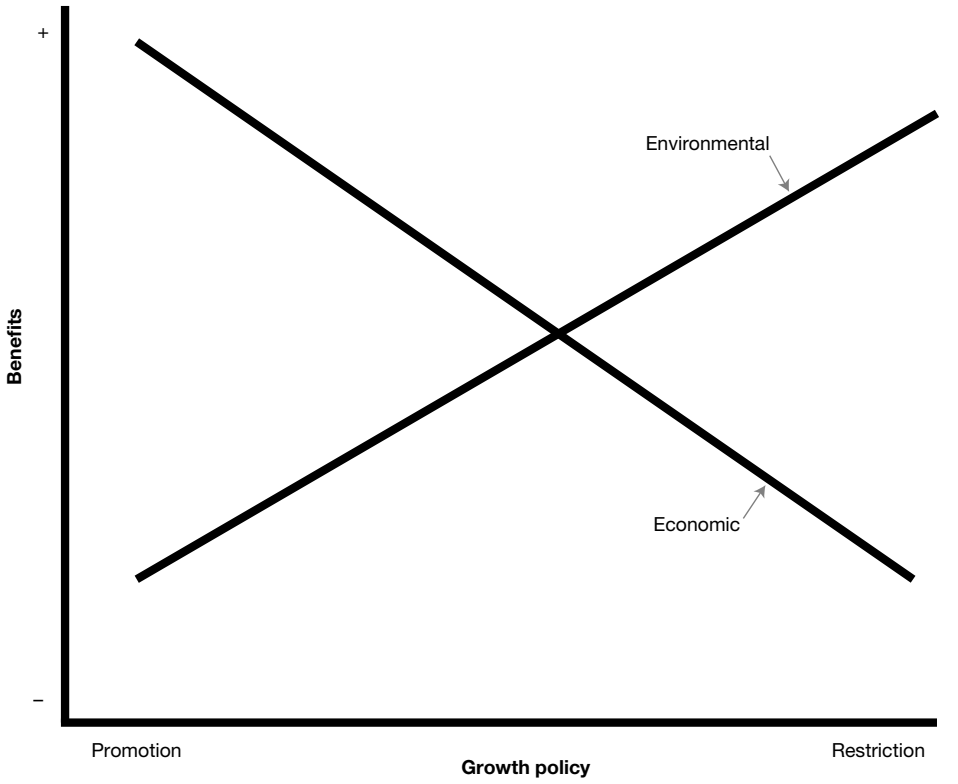
The traditional understanding of local economic development, perhaps like that of economic development broadly, suggests a tradeoff regarding the quality of the biophysical environment. By and large, economic development leads to environmental deterioration; environmental protection impedes economic growth. In cities, the tradeoff between growing the economy and protecting the environment certainly seems to have been true when manufacturing industries were the foundation of economic development and growth. Manufacturing processes, usually very energy intensive, inevitably produced a lot of noxious air emissions and toxic liquid and solid wastes that, when disposed of, despoiled the environment. Efforts to control or limit the production or emission and disposal of such materials necessarily undermined local efforts to grow the economy. Indeed, local efforts to regulate the private sector, whether in terms of zoning and land use or any number of other restrictive policies, are thought to undermine economic growth and efficiency. This proposition was not merely theoretical; the empirical literature focusing on the relationship between economic growth and the quality of the environment seemed to support this idea.

The tradeoff has also been well represented in the empirical literature examining local efforts to protect the environment. What happens to the local economy when cities decide to try managing growth to minimize environmental effects? In a line of inquiry that parallels that of the effect of city sustainability policies on economic growth, many studies have examined the effect of growth management policies on local housing prices. Presumably, growth management policies are important to the pursuit of sustainability because sustainability requires that development will not take place in environmentally sensitive places and that, when housing growth does occur, it must seek to be denser. In general, common wisdom suggests that anything that impedes the market for land undermines economic growth. In the case of housing prices, such wisdom suggests that growth management (if effective) reduces the supply of housing, which in turn drives up prices. When such policies are accompanied by improved environment, however, they could produce an *amenity effect*, whereby the demand for housing goes up as people increasingly want to live in a cleaner environment (Engle, Navarro, and Carson, 1992). Either way, however, prices rise. Not all growth management, however, is effective. As Levine (2006: 121) showed, given the mobility of capital, growth management "… cannot compel developers to build densely … in the presence of alternative development opportunities in the metropolitan region or elsewhere."

This idea has been borne out in other studies of growth management. A study of Florida cities adopting and implementing smart growth measures suggests that this aspect of sustainability may well be a negative economic driver (Feiock, 1994). The conceptual framework presented by Feiock illustrates the expected relationship fairly succinctly. Exhibit 1 shows that the expectation is of a tradeoff between the pursuit of economic benefits and the pursuit of environmental (protection) benefits. Moreover, when cities adopt policies (such as land use controls) that restrict rather than promote economic development, more environmental benefits will be produced at the expense of economic benefits. Thus, the expectation is that growth management policies (more restrictive policies) will be associated with reduced property values (lesser economic benefit). Indeed, his analysis of data from Florida cities seems to confirm this expectation. Other research suggests that

Exhibit 1

Environmental and Economic Impacts of Growth Policy



Source: Feiock (1994)

whether the effects of growth management are negative depends on the specific policies used to manage growth (Feiock and Stream, 2001). The argument that the pursuit of smart growth or other sustainability-related policy goals might actually contribute to greater local economic growth seems foreign, however.

Economic Development As a Driver of Environmental Protection: The Local Environmental Kuznets Curve

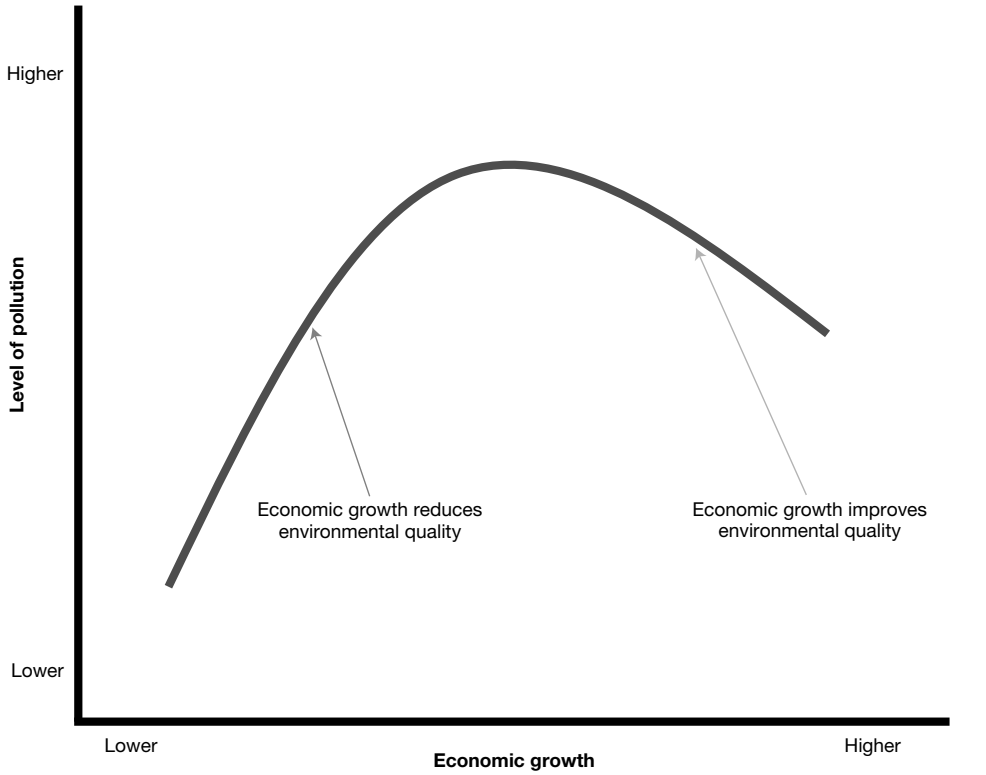
The usual description of the dynamic relationship between economic growth and the environment treats economic growth as the independent variable and the quality of the environment as the dependent variable. Thus, models describe the relationship in terms of the tradeoff discussed previously: greater economic growth depletes natural resources and the quality of the environment; less economic growth reduces environmental degradation. This description of the relationship does not tell the entire story, however. In recent times, the Environmental Kuznets Curve (EKC) has also been used to describe an aspect of this dynamic relationship. The EKC describes this hypothesis: as

economies grow, environmental degradation occurs, but only up to some point. At that point, the relationship begins to change; at high levels of economic development, environmental degradation starts to decline. The simple graph in exhibit 2 shows the hypothetical EKC as depicted by Kahn, presumably showing a point at which the relationship between economic growth and environmental quality turns positive; that is, more economic growth leads to decreased pollution.

Thus, what had been described as a primarily linear relationship now is described as curvilinear. Although this relationship has been applied most frequently to economies of nations, Kahn (2006) suggests that the same pattern holds true for cities. Despite the fact that surprisingly little of his data are for cities, per se, Kahn's analysis of economic growth and carbon emissions in cities led him to conclude that an urban EKC describes the relationship (Kahn, 2006). This analysis raises the question—what happens at the point at which the relationship changes? What are the drivers that influence the shape of this relationship? Are social, political, and economic processes responsible for such a change, if it indeed occurs? Kahn focused his analysis on the growth of consumer, resident, and voter demand for local *green* public policies, by which he means policies and programs that protect and improve the quality of the environment, including but not limited to increased support for smart growth policies.

Exhibit 2

The Environmental Kuznets Curve



Source: Adapted from Kahn (2006: 31)

In nearly all conceptualizations of the EKC, environmental degradation is thought of as a sort of dependent variable that economic growth influences or causes. In short, this view of the relationship has frequently been used to justify a prescription for less developed nations to engage in very rapid economic growth, so that they can reach the point of maximum pollution as quickly as possible. Clearly, this view is driven by an understanding that income growth creates pollution, not the other way around—the idea that greater pollution can actually contribute to reducing local economic growth. This notion will be discussed in more detail.

Few, if any, discussions of the EKC elaborate on the intermediate processes and results that would conceivably yield a change in the relationship between the quality of the environment and income or economic development. Typically, discussions of the reasons underlying this change focus on increased demand for environmental amenities or improved environmental results. At some point, people start to demand cleaner air, less pollution, better quality water, and so on. Kahn presents one of the few discussions of the intermediate results. He concentrates on the "demand for green policies" (Kahn, 2006: 70–71) and the "demand for green governance" (Kahn, 2006: 71–92). He does not, however, directly address the empirical details concerning what constitutes green policies and green governance. The analysis that follows here uses the number of local public sustainability-related policies and programs to indicate how much demand exists for green policies. An alternative conceptualization also explains the curvilinear relationship, if it indeed exists. Many conceptions of sustainable development suggest that the causation works in the opposite direction. In other words, as pollution gets worse, that pollution increasingly begins to impede economic growth. At some point, further economic growth requires reduced pollution, which, indeed, is one foundation of the concept of sustainable development (see, for example, Rogers, Jalal, and Boyd, 2008).

Smart Growth and Local Sustainable Development

Smart growth represents one of the green policies to which Kahn refers. Like other sustainability-related policies and programs, it encompasses an effort to promote economic development, but it does so without accepting the inevitability of associated negative environmental effects. Some conceptions of sustainable development accept an idea previously thought to be incorrect—that, at some point, environmental degradation actually impedes local economic growth and development. The dynamic this conception describes goes something like this: cities engage in traditional economic development activities and, as a result, the environment gets polluted. At some point, the pollution becomes so severe and so unacceptable that people begin moving out of the city. Cities lose their population base and the associated economic resources. When people do not want to live in, or move into, the city, then economic development becomes increasingly difficult. Although the exact nature of the causal process is debatable, much anecdotal evidence supports the existence of such a process. Chattanooga, Tennessee, perhaps provides a good case in point. In the 1960s and 1970s, with much of the city's employment base in manufacturing, which included two large steel production facilities, air pollution became extreme—perhaps the worst in the country. The city began losing population. Local leaders doubtlessly understood that the deteriorating environmental conditions drove the population loss (Yanarella and Levine, 2011). Subsequently, the manufacturing industries responsible for the extreme air emissions closed and moved overseas,

and the air quality improved drastically. Not wanting to return to the days of an economy based on environmental degradation, city leaders embarked on an ambitious effort to engage in smart growth and sustainability, and the population of the city began to grow again.

Although specific cities serve as cases illustrating the dynamics underlying smart growth efforts, little systematic empirical evidence yet supports the idea that such efforts actually produce greater, rather than less, economic growth. As noted previously, Feiock's (1994) study seems to suggest that smart growth policies generally carry negative economic impacts. In other words, when cities engage in smart growth activities, they impede rather than improve their local economies. One way of interpreting this finding is that, in cities where demand for sustainability is relatively great, there is a willingness to live with lower levels of economic growth.

Green Economic Development: An Emerging New Model

With some exceptions, most conceptions of economic development in the context of sustainability seem to accept a tradeoff between protecting the environment and livability on the one hand and economic growth (measured in traditional ways) on the other. Lower levels of economic growth are okay, so the argument goes, if they mean doing a better job of protecting and improving the environment. Perhaps because of the decline in manufacturing industries and employment based in such industries, however, in nearly every major city in the United States, a new model of economic development seems to be emerging (Portney, 2007). In short, this model seems to be rooted in many of the programs and approaches described previously.

As discussed previously, in traditional models of local economic development, local officials engage in "attract, retain, and expand" activities oriented around using extensive tax and fee incentives to lure a major anchor employer to the city, then working hard to retain this employer while encouraging it to expand. Because this approach commonly targets manufacturing industries, it has become increasingly difficult for local governments to successfully follow this strategy. When local officials ceased to be able to attract manufacturers, primarily because manufacturing industries increasingly moved off shore to other countries, they turned their attention to large retailers, such as Wal-Mart Stores, Inc., and Home Depot U.S.A. A few cities, such as Wichita, Kansas, where The Boeing Company is a major employer, have practiced economic development by hanging onto the old model. Even in Wichita, however, Boeing's decision to close its manufacturing plant after receiving substantial assistance from city government illustrates the challenges of this old model. A dilemma this old model raises for local officials, however, is that the jobs that these retailers offer tend to be mostly minimum wage, and sales by these retailers take local money and ship it out of the city, out of the state, and even out of the country. As an economist might say, local expenditures ceased to create the income multiplier effect that once characterized local economies.

Urban economists' prescriptions for promoting local economic growth may also focus on investing in human capital—developing a well-educated and well-trained workforce (Blakely and Leigh, 2010). Even in the information economy, major employers looking for new locations will likely gravitate toward cities with an educated and skilled workforce. This human capital model, too, presents a dilemma for local officials, however. Investing in human capital requires spending

public funds on schools and on worker training and retraining, all of which cost a lot of money and produce returns that accrue later, sometimes much later. Investment in human capital certainly does not offer a quick fix. Attracting educated and skilled workers from other places may be a city's only other option but is also difficult and often costly. As a consequence, local officials have increasingly turned to cluster green economic development strategies and looked for other drivers of local economic development. Sustainability, in many cases, has become such a driver. Many advocates of local sustainability, however, are skeptical that such green economic development, even if successful, represents progress toward becoming more environmentally sustainable (Yanarella and Levine, 2011).

An analysis of cities' targeted efforts at green economic development suggests that it is not easier or more successful than traditional forms of economic development. Fitzgerald (2010) provided an extensive array of case studies and examples of ways that cities have striven to attract specific businesses and industries, such as solar panel manufacturers, that have minimal ecological imprints and produce green products. Her analysis covers green economic development activities in cities around the world, including Freiberg, Germany, and numerous cities in the United States. She suggests that cities, including relatively small ones like Syracuse, New York, and Toledo, Ohio, can benefit from strategic economic planning, whereby efforts are made to build on existing comparative advantages.

The challenges of building a green economy are illustrated by the experiences of Phoenix, Arizona, which embarked in the mid-to-late 2000s to work with Arizona State University, the state government, and the business community to make a broad-based commitment to sustainable development. The effort primarily involved a strategic focus on solar and related green technologies and relied on the infusion of funds from the state and federal governments (Fink, 2011). Much of the effort centered on a strategy of recruiting a major solar panel manufacturer to Phoenix, presumably using as its foundation the traditional "attract, retain, and expand" model. In other words, the effort did not represent a new model of economic development except to the extent that it was directed toward attracting a different type of manufacturer than would have been the case 20 or 30 years ago. As one might expect, competition among cities and states for solar panel manufacturers got intense, and many of the actors and policymakers involved (including state legislators) became concerned about what they considered excessively generous subsidies. When this concern combined with ideological objections that "all sustainability initiatives are somehow connected to 'socialistic' climate change conspiracies" (Fink, 2011: 89), the comprehensive strategy began to unravel. An even more critical analysis of Phoenix suggests that the city never has been able to politically come to grips with the challenges of sustainability, and perhaps it was never really fully committed to the pursuit of green economic development (Ross, 2011).

With the widespread skepticism regarding whether such a new model could actually work, the question becomes an empirical one. Succinctly put, if the skeptics are correct that the pursuit of sustainability gets in the way of economic development, then cities that make the greatest commitments to trying to become more sustainable should experience less economic growth than cities that make weaker commitments. If, on the other hand, sustainability has become an effective mechanism for economic development, then cities doing more should experience greater economic

growth. If sustainability is a nonfactor, then economic growth should be unrelated to how extensively a city pursues sustainability. As noted previously, efforts have been made to understand the economic effects of land use regulation, including smart growth regulation, on housing prices, but, perhaps surprisingly, very little research has been conducted on the economic effects of the broader pursuit of sustainability.

Measuring Economic Growth, Development, and Sustainable Development

The analysis in exhibit 1 focuses on a specific measure of economic growth: change in housing prices, reflecting the idea that when the local economy is growing, the price of housing will increase. Unlike the analysis of nations, which typically relies on measures of change in gross domestic product or gross national product, cities within a nation do not find such direct, comprehensive, or unambiguous measures of economic growth; they have many ways of measuring the degree of economic growth and development.

One approach for measuring the degree of sustainable development as a special form of economic growth, adopted by Rogers and Srinivasan (2007), is to develop single measures of sustainable development based on the idea of income elasticities. In short, these measures examine specific policies or programs thought to improve the quality of the environment and assess how much they contribute to income growth. A policy or program that seems to produce more income elasticity can be said to contribute more to sustainable development than one that seems to produce less income elasticity. The computation of such income elasticities for individual cities combines data about the policies and programs and about changes in (usually per capita) income over time. Although an income elasticity measure carries little specific information about the nature of the relationship between income and some environmental quality, greater elasticities might be said to represent stronger relationships, and lesser elasticities might be said to represent weaker relationships.

Another approach, pursued by the United States Conference of Mayors (2008) and by Muro, Rothwell, and Saha (2011) in a Brookings Institution report, attempts to count the number of green jobs in metropolitan areas and to document growth in this sector. With an emphasis on metropolitanwide growth in this sector, this approach has not (to date) disaggregated the geography of job locations to enable estimates of the size of city-specific green employment. In addition, no effort has been made to explain the amount of growth across metropolitan areas. Even so, to the extent that the concept of a green job has been adequately operationalized, documenting growth in this sector will ultimately provide the linkage between the pursuit of sustainability and economic growth.

The approach in this article distinguishes the two variables that are combined in Rogers' income elasticity analysis. Specifically, it conceptualizes the dependent variable as dollar changes in per capita income over time, in this case from 1990 to 2009. This time span provides a fairly long-term estimate of the economic performance of the city. The key independent variable is the degree to which cities seem to pursue sustainability as a matter of local public policy. The measurement of this key independent variable is discussed in the following section.

Measuring the Pursuit of Sustainability

As noted previously, the relationship between income growth and the environment most frequently focuses on environmental conditions or results. Much research, however, also focuses on the economic impacts of adopting local public policies to protect the environment. This section addresses public policies used in the pursuit of sustainability. Previous research argued that cities in the United States adopt and implement at least 38 different, specific policies and programs to try to become more sustainable. Cities that pursue many of these policies and programs can be said to take sustainability more seriously than those that adopt fewer. In terms of the local EKC, the number of policies and programs might be said to represent the level of demand for sustainability. Cities that have adopted and implemented more policies and programs have populations that demand greater sustainability than cities that have adopted fewer.

Simply counting the total number of policies and programs results in an index of sustainability programs, or Sustainability Index (SI). Exhibit 3 shows a list of the 54 largest U.S. cities (as of

Exhibit 3

2011 Sustainability Rankings and Scores for the 54 Largest U.S. Cities, Plus Pittsburgh

Rank	City	Sustainability Score	Rank	City	Sustainability Score
1	Portland, OR	35	26	Raleigh, NC	26
1	San Francisco, CA	35	26	San Antonio, TX	26
1	Seattle, WA	35	31	Baltimore, MD	25
4	Denver, CO	33	31	Louisville, KY	25
5	Albuquerque, NM	32	33	Cleveland, OH	24
5	Oakland, CA	32	33	Fort Worth, TX	24
7	Chicago, IL	31	33	Milwaukee, WI	24
7	Columbus, OH	31	36	Atlanta, GA	23
7	Minneapolis, MN	31	36	El Paso, TX	23
7	Philadelphia, PA	31	36	Jacksonville, FL	23
7	Phoenix, AZ	31	39	Honolulu, HI	22
7	Sacramento, CA	31	39	Houston, TX	22
13	New York, NY	30	39	Long Beach, CA	22
13	San Diego, CA	30	39	Mesa, AZ	22
13	San Jose, CA	30	43	Arlington, TX	20
16	Austin, TX	29	43	Memphis, TN	20
16	Charlotte, NC	29	43	Tampa, FL	20
16	Nashville-Davidson, TN	29	46	Omaha, NE	19
16	Tucson, AZ	29	46	St. Louis, MO	19
16	Washington, DC	29	48	Oklahoma City, OK	18
21	Boston, MA	28	48	Tulsa, OK	18
21	Los Angeles, CA	28	50	Detroit, MI	17
21	Kansas City, MO	28	50	Virginia Beach, VA	17
24	Dallas, TX	27	52	Pittsburgh, PA	16
24	Indianapolis, IN	27	52	Santa Ana, CA	16
26	Fresno, CA	26	54	Colorado Springs, CO	15
26	Miami, FL	26	55	Wichita, KS	7
26	Las Vegas, NV	26			

Source: Author's analysis

the 2010 Census) and their respective SI values. Portland (Oregon), San Francisco, and Seattle are at the top of the list, each having adopted and implemented 35 of the 38 programs. Wichita is at the bottom of the list, having adopted and implemented only 7 of the programs. This simple count of the number of programs represents city efforts as of 2010. It also represents change in the number of programs since 1990, because none of the 55 cities had enacted any of these programs at the earlier point. Other efforts have been made to measure how sustainable U.S. cities are, although they typically focus on measures of environmental quality rather than on public policies and programs. A simple comparison between this index and the scores reported by another city sustainability ranking, the SustainLane scores, shows substantial similarity, however.[1] The index developed in this article and that developed by SustainLane reveal that Portland, San Francisco, and Seattle are at the top; Virginia Beach, Tulsa, and Oklahoma City are near the bottom. As another indication of the internal validity of the index developed in this article, the correlation between this index and the Siemens (2011) environmental performance index for 21 cities is .772 (significant at the .000 level), suggesting that both indexes are likely measuring the same underlying policy commitment to sustainability and the environment.

Pursuing Sustainability and Income Growth

Although this topic of sustainability and income growth deserves much more intensive research, the simple question remains, "What is the relationship between pursuing sustainability and income growth?" If sustainability is simply a manifestation of the same underlying principles that the analysis of the economic effects of smart growth and environmental protection policies imply, the pursuit of sustainability should produce the same pattern of relationship. Moreover, because many policies and programs related to the pursuit of sustainability indeed seek to restrict economic activity in some way, it is not a stretch to imagine that the aggressive pursuit of sustainability should undercut local economic growth. To examine this relationship, a simple bivariate analysis in exhibit 4 shows the scatterplot for the 55 largest U.S. cities between the SI score, as the independent variable, and change in per capita income between 1990 and 2006, as the dependent variable. With these data, it is not possible to be sure that the establishment and implementation of the sustainability programs predated the changes in income, so potential directions of causation are speculative. Many cities' sustainability programs were already in place by the end of the 1990s, however. The scatterplot shows a fairly strong relationship between these variables. Contrary to the expectation illustrated in exhibit 1, more restrictive policies (higher SI scores) are strongly associated with greater, not less, improvement in economic conditions. The scatterplot shows that many of the cities experiencing the greatest improvement in personal incomes—Portland, San Francisco, and Seattle, for example—are indeed the cities that have been most aggressive in pushing for sustainability. Many cities that have struggled economically are those that have made the weakest efforts on sustainability—Detroit, Santa Ana (California), and Wichita among them. To be sure, these cities' struggles likely have much to do with national and international influences; on the surface, however, this pattern of relationship is unmistakable. Is this pattern some sort of proof that sustainability policies pay off economically?

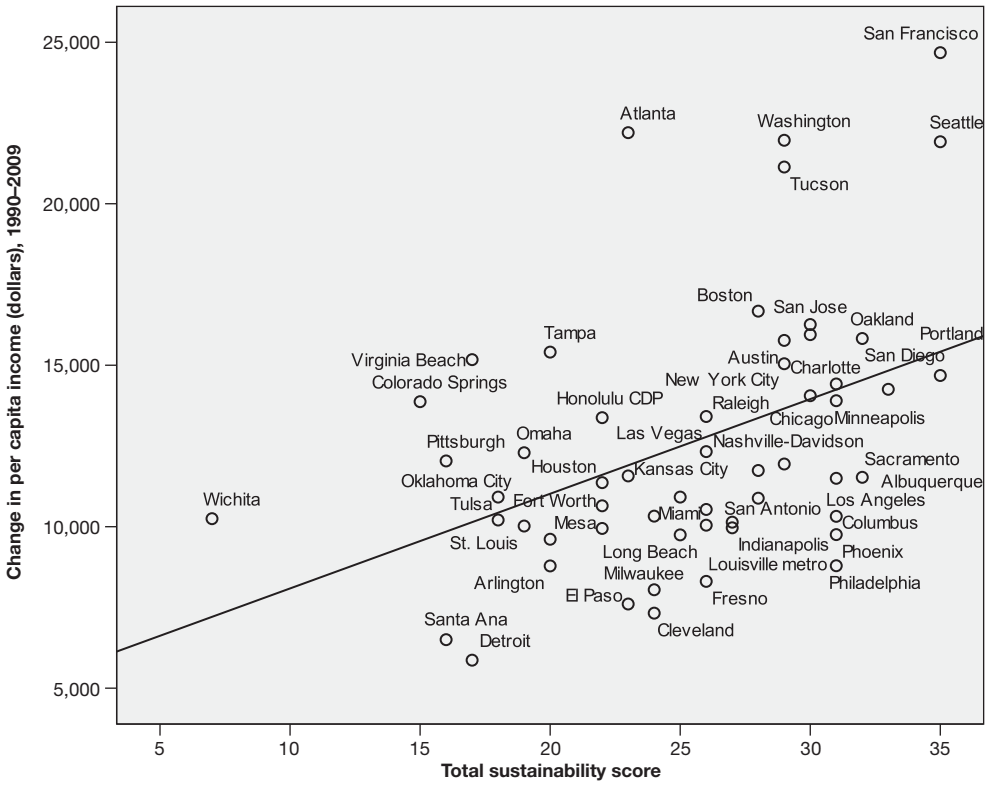
[1] The SustainLane website does not provide actual sustainability scores; it presents only rankings. Karlenzig (2007) provides index scores, but for 2006 only.

It absolutely is not. It is a little piece of evidence that establishes the need to conduct more extensive analysis to understand the nature of this relationship. If the expectation is that cities investing in sustainability do so at the risk of sacrificing economic growth, however, it does not seem to be true. We cannot know with the data at hand whether these cities might have experienced even greater economic growth had they not invested in sustainability, but that seems on its face to be unlikely.

The finding of a positive relationship between the pursuit of sustainability and growth in personal incomes raises the broader issue of what kinds of local policies, programs, and practices influence local economic development. To the extent that the relationship between cities' sustainability policies and improvement in economic growth (as measured by change in per capita income over time) exhibit a pattern, then the question that must be addressed is whether these policies, per se, can be said to improve local economies. Is this relationship spurious, wherein other related factors really explain economic growth? As important as this question might be, presenting a fully developed model of local economic development is beyond the scope of this article. Even so, a brief bit of analysis takes a step in that direction. The common wisdom about local economic

Exhibit 4

Scatterplot Showing the Relationship Between Sustainability and Growth in Per Capita Personal Income, 1990–2009, for the 54 Largest U.S. Cities Plus Pittsburgh



Notes: Y = 5,156 + 293.2 x (sustainability score) significance = .001. R^2 = .166.

Source: Author's analysis

growth is that human capital is the key. For cities, having a well-trained, educated, and creative workforce attracts employers and fuels growth in economic activity. Alternative efforts to explain local economic growth, including those that focus on what economists often call *amenities* such as a high-quality environment (Glaeser, Kolko, and Saiz, 2001), eventually yield to human capital as the important foundation.

The model presented in this article is designed to make a first effort at examining whether the pursuit of sustainability policies can be said to positively influence local economic growth when other possible influences are controlled. Is the bivariate relationship depicted in exhibit 4 a reflection of some underlying causal process, or is it merely spurious? Exhibit 5 presents a simple multivariate model to investigate this issue. The dependent variable is the total dollar change in per capita income between 1990 and 2009. Cities that experienced greater positive change experienced greater economic growth, and cities that experienced less positive change or negative change experienced less economic growth. The key independent variable, as described previously and shown in exhibit 4, is a composite index measure of the number of city sustainability programs adopted and implemented.

Perhaps the most important control variable to include in any effort to understand local economic growth is one that measures human capital. The concern with human capital comes out of the persistent finding that investments in human capital seem to drive economic growth. Although human capital can be measured in many different ways, it is clearly related to the level of education (schooling) in the city. This analysis therefore uses the percentage of residents 18 years or older who are high school graduates as the measure of human capital. Also included in this model is a measure of the age distribution of the population; in this case, the percentage of the resident population that is 5 years or younger. Because young people are obviously not part of a city's workforce, the larger the size of this age group, the less the per capita income would be expected to be. The ordinary least squares regression results of model 1 in exhibit 5 suggest that, even controlling for the education and age variables, the pursuit of sustainability is significantly related to income growth. When cities elect to adopt and implement more sustainability policies and programs, they experience greater income growth regardless of how well educated the population is.

Exhibit 5

Ordinary Least Squares Regression Results Explaining Change in Per Capita Personal Income, 1990–2009

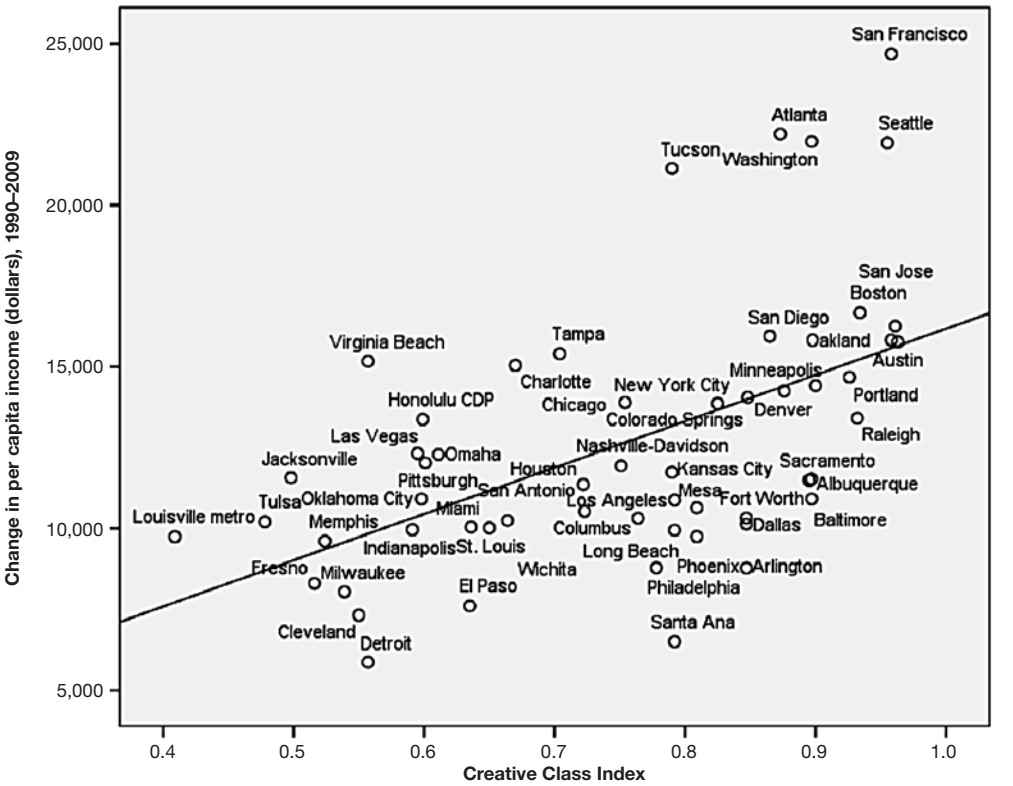
Independent and Control Variables	Model 1		Model 2		Model 3		Model 4	
	β	Significance	β	Significance	β	Significance	β	Significance
Sustainability Index	163.2	.032	32.7	.675	207.9	.001	388.0	.001
% high school graduate	98.4	.055	90.3	.053	—	—	– 252.4	.074
% age 5 or younger	– 1,866.8	.000	– 1,784.5	.000	94.9	.046	84.7	.069
Creative Class Index	—	—	9,762.2	.001	– 1,656.2	.000	– 1,698.7	.000
Constant	14,285.9		10,324.8		13,146.8		17,131.7	
Adjusted R^2	.522		.613		.588		.615	
Significance	.000		.000		.000		.000	

Source: Author's analysis

In recent times, the human capital-based understanding of local economies was at least tweaked by the works of Florida (2004a, 2004b, 2003), who argued that local economic growth and development is not about only human capital, but also the size of what he calls "the creative class." Cities with more people who are part of this creative class do tend to experience much higher rates of economic growth than cities with fewer people in the creative class. Much debate has occurred about whether Florida's measure, the Creative Class Index (CCI)—which contains information about the relative size of the labor force employed in creative occupations and about aspects of the local social culture, primarily based on 2000 census information—is really a measure of human capital by another name (Glaeser, n.d.). The bivariate relationship between the CCI and change in per capita income appears in exhibit 6. This scatterplot clearly shows a strong, positive, statistically significant correlation. Comparison of the two bivariate relationships suggests that the pursuit of sustainability, by itself, is not more closely related to cities' economic growth than is the size of the

Exhibit 6

Scatterplot Showing the Relationship Between the Creative Class Index and Growth in Per Capita Personal Income, 1990–2009, for the 54 Largest U.S. Cities Plus Pittsburgh



Notes: Y = 1,865 + 14,317 x (Creative Class Index) significance = .001. R^2 = .285.

Source: Author's analysis

creative class.[2] The fact, however, that the pursuit of sustainability and economic growth exhibit a positive relationship, rather than the expected negative relationship, suggests that the pursuit of sustainability policies probably plays a role in influencing local economic development. Clearly, this area of research deserves much more attention.

Model 2 adds the CCI to the regression analysis, producing substantial changes. The CCI is highly correlated with change in per capita personal income, and the SI becomes statistically insignificant. On first blush, this result seems to support an interpretation that the bivariate relationship between sustainability and income growth is spurious. It seems unlikely, however, that the character of the creative class would be unrelated to the pursuit of sustainability. Certainly, a strong bivariate relationship (.55) exists between the CCI and the SI. This relationship raises several alternative possibilities, especially the possibility that an interaction effect may well exist between the size of the creative class and the public policy pursuit of sustainability. To investigate this possible effect, model 3 substitutes an interaction term for the original SI and CCI, and the interaction term is highly significant. To separate the effects of the interaction term from the effects of the SI, model 4 introduces both the interaction term and the SI, which continues to show that the interaction term is statistically significant. This result suggests that, when a city has a relatively large creative class and decides to make a major commitment to the pursuit of sustainability in its local policies, it can expect significantly greater economic growth than cities without a large creative class can expect.

Discussion

This article has provided some foundational information about how the public policy pursuit of local sustainability affects local economic growth. Whereas theory and analysis seem unequivocal that the pursuit of sustainability should reduce economic growth, this article's analysis finds very little evidence of this relationship. Indeed, the evidence is either that the pursuit of sustainability contributes to greater economic growth or that it has no effect on economic growth. The most salient finding is that the size of the creative class of cities and the aggressive pursuit of sustainability seem to interact in such a way that, when cities with large creative classes decide to get serious about sustainability policies, they indeed experience higher levels of income growth.

The finding regarding the possible interaction of the size of the creative class and the pursuit of sustainability raises several possible interpretations. The most obvious interpretation is that the creative class likely comprises people who demand greater attention to sustainability from their public officials. Thus, when a city's creative class is relatively large, the city's policymakers respond by enacting and implementing more sustainability policies. This relationship also might suggest that businesses that employ more people in creative-class occupations, and people who might be said to belong to the creative class, find that cities that aggressively pursue sustainability are more attractive places in which to locate. Either way, evidence suggests that when cities have relatively

[2] The partial correlation between the SI and change in per capita income from 1990 to 2009, controlling for the percentage of the population that has at least a high school education (a measure of human capital), is .460, significant beyond the .01 level. The partial correlation between the SI and change in per capita income, controlling for Florida's CCI, however, is .220, which is not statistically significant.

large creative classes and opt to enact many sustainability programs, personal incomes grow more rapidly. What might this finding prescribe for local policymakers who wish to promote greater economic growth? This issue deserves much more analysis, but these results suggest that cultivating a larger creative class, by itself, might not be enough. Enacting and implementing sustainability policies may well be a part of the dynamic process that produces greater economic growth.

Any analysis of this sort faces methodological challenges. Even with the modest models presented in this article, an endogeneity problem is possible. This problem is conceptually compounded by the obvious observation that many other variables could conceivably influence local economic growth. Moreover, it is quite difficult to know with any precision what the direction of causation might be in the relationship between the pursuit of sustainability policies and personal income. The most frequent, albeit weakly supported empirically, hypothesis about what influences cities to become aggressive in pursuit of sustainability is that income is a primary driver. Many studies have found that the relationship is much weaker than one would expect, but it is certainly possible that income influences sustainability policies rather than the other way around. More likely, this case could well represent reciprocal causation. The analysis and data used in this article, however, are sorely inadequate to addressing such issues.

For public officials who worry that decisions to adopt and implement an aggressive array of sustainability-related policies might undermine their economic development activities, little evidence supports their worry. At least as practiced in larger American cities to date, sustainability seems to have been pursued in ways that are consistent with, and not in opposition to, local economic development. Is a new model of local economic development emerging? The evidence presented in this article strongly suggests so. More definitive answers will require additional research.

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