

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

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One of the central political challenges to advancing the cause of sustainability in cities is rooted in understandings of 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 undermines 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 trade-off as well. Such advocates seem to be willing to accept lower levels of economic growth if that is what is required to protect the biophysical environment. The “no-growth” sentiment has long been associated with pro-environmental interests and policies.

While the trade-off between local economic development and environmental protection may well have once served as an accurate description of realities faced by local governments, there is evidence that this description has changed. Perhaps starting with the seminal works of

Jane Jacobs (1970; 2001), understandings of the potential symbiotic relationship between the quality of the biophysical environment and local economies began to emerge. For at least the last 20 years, an alternative prescription has been advocated suggesting that unfettered growth (with environmental degradation) and no-growth (with environmental protection) are not the only two alternatives. Focusing on what became 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. Met with much initial skepticism, smart growth approaches to economic development seem to have increasingly taken hold in practice as a sort of alternative model of economic growth. In short, the relationship between the pursuit of sustainability and economic growth seems to have changed. This paper represents an effort to investigate this apparent fact. It starts by discussing the nature of the relationship between environmental protection and economic growth, and the various traditional “theories” of local economic development, contrasts these traditional theories with smart growth theories, and examines the nature of the empirical relationship between cities’ pursuit of sustainability and local economic growth. Finally, it tries to develop a deeper understanding of this relationship by offering a multivariate model of local economic growth.

The Economic Development – Environmental Protection Trade-Off

The traditional understanding of local economic development, perhaps like that of economic development broadly, suggests that there is a trade-off with respect to the quality of the bio-physical environment. By and large, economic development leads to deterioration of the environment; environmental protection impedes economic growth. In cities, this certainly seems

to have been true when the foundation of economic development and growth was found in manufacturing industries. Manufacturing processes, usually highly energy-intensive, inevitably produced large amounts of noxious air emissions. They also produced toxic liquid and solid wastes which, when disposed of, despoiled the environment. Efforts to control or limit the production or emission/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 of a number of other restrictive policies, is thought to undermine economic growth and efficiency. This was not just a theoretical proposition; the empirical literature focusing on the relationship between economic growth and the quality of the environment seemed to support this idea.

The trade-off 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 to management growth in order to minimize environmental impacts? In a line of inquiry that parallels that of the impact of city sustainability policies on economic growth, many studies have examined the impact 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. Generally, 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 reduces the supply of housing, which in turn drives prices up. However, when such policies are accompanied by improved environment, this could produce an “amenity effect,” where 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.

A study of cities in Florida 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. As shown in Figure 1, the expectation is that there is a trade-off 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, there is an expectation that growth management policies (more restrictive policies) will be associated with reduced property values (lower economic benefits). Indeed, his analysis of data from Florida cities seems to confirm this expectation. Other research suggests that whether the effects of growth management are negative or not depends on the specific policies used to manage growth. (Feiock 2001)

[Figure 1 Here]

Economic Development as a Driver of Environmental Protection:

The Local Environmental Kuznets Curve

The dynamic relationship between economic growth and the environment is usually described such that economic growth is treated as an independent variable, and the quality of the environment is treated as the dependent variable. Thus, the relationship is used to describe the

trade-off discussed earlier: greater economic growth depletes natural resources and the quality of the environment; less economic growth reduces environmental degradation. However, this is not the entire story. In recent times, the “environmental Kuznets curve” (EKC) has been used to describe an aspect of this dynamic relationship as well. The EKC describes the hypothesis that as economies grow, environmental degradation occurs, but only up to some point. At that point, the relationship begins to change such that at high levels of economic development, environmental degradation starts to decline. Figure 2 provides a simple graph showing the hypothetical EKC as depicted by Kahn, presumably showing that there is a point where the relationship between economic growth and environmental quality turns positive, i.e. more economic growth leads to decreased pollution.

[Figure 2 Here]

Thus, what had been described as largely a linear relationship now is described as curvilinear. While this relationship has been most frequently applied 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 leads him to conclude that there is an urban EKC that describes the relationship. (Kahn, 2006: 50-92) Of course, this raises the question of what happens at the point where the relationship changes. What are the drivers that influence the shape of this relationship? Are there social, political, and economic processes that are responsible for such a change, if it indeed occurs? Kahn focuses 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 increased support for smart growth policies.

In nearly all conceptualizations of the EKC, environmental degradation is thought of as a sort of dependent variable being influenced or caused by economic growth. In short, this view of the relationship has been frequently 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 will be discussed in more detail below.

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, etc. Kahn (2006) presents one of the few discussions of the intermediate results. He concentrates on the “demand for green policies” (70-71) and the “demand for green governance” (71-92). Yet the empirical details concerning what constitute green policies and green governance is rather thin. Of course, there is an alternative conceptualization explaining 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 begins to increasingly impede economic growth. At some point, further economic growth requires

reduced pollution. Indeed, this is one of the foundations 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. It encompasses an effort to promote economic development, but without accepting the inevitability of associated negative environmental impacts. In some versions of smart growth, there is an acceptance of an idea previously thought to be incorrect, that at some point environmental degradation actually impedes local economic growth and development. The dynamic described by this conception goes something like this: cities engage in traditional economic development activities, and as a result the environment gets polluted. As 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, there is much anecdotal evidence to support the existence of such a process. Chattanooga perhaps provides a good case in point. With much of its employment base in manufacturing in the 1960s and 1970s, including two large steel production facilities, air pollution became extreme – perhaps the worst in the country. The city began losing population. There is little doubt that local leaders understand that the population loss was driven by the deteriorating environmental conditions. (Yanarella and Levine 2011: 115-140)

Subsequently, of course, 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 economic based on environmental degradation, city leaders embarked on an ambitious effort to engage in smart growth. And the population of the city began to grow once again.

Although there are specific cities that serve as cases illustrating the dynamics underlying smart growth efforts, there is little systematic empirical evidence yet supporting the idea that such efforts actually produce greater, rather than less, economic growth. As noted earlier, Feiock's 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 is that in cities where demand for smart growth is relatively high, 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 trade-off between protecting the environment and livability on one hand, and economic growth (measured in traditional ways) on the other. Lower levels of economic growth are okay, so the argument goes, if it means doing a better job of protecting and improving the environment. But perhaps because of the decline in manufacturing industries, and employment based in such industries, in nearly every major city in the U.S., 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 above.

As discussed earlier, in traditional models of local economic development, local officials engage in “attract, retain, and expand” activities oriented around luring a major anchor employer to the city with extensive tax and fee incentives, then work hard to retain this employer while encouraging them to expand. Since this approach commonly targeted 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, mainly because manufacturing industries increasingly moved off-shore to other countries, they turned their attention to large retailers, such as Wal-Mart and Home Depot, to name a few. A few cities, such as Wichita, where a major employer is Boeing, have been able practice economic development by hanging onto the old model. But even in Wichita, 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 raises for local officials is, however, that the jobs offered by these retailers tend to be largely minimum wage, and sales by these retailers take “local money” and ships 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 usually focus on investing in human capital – developing a well-educated and well-trained workforce. Even in the information economy, major employers looking for new locations will likely gravitate toward cities with an educated and skilled workforce. Yet this too presents a dilemma for local officials. Investing in human capital requires spending public funds on schools, and on worker training

and re-training, 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 it too is difficult and often costly. As a consequence, local officials have now increasingly turned to cluster green economic development strategies, and have looked for other drivers of local economic development. Sustainability, in many cases, has become such a driver.

Analysis of cities' targeted efforts at green economic development suggest that it is not easier or more successful than traditional forms of economic development. Fitzgerald (2009) provides an extensive array of case studies and examples of ways that cities have striven to attract specific businesses and industries that have low ecological imprints and produce products that are "green," such as solar panels. Her analysis covers green economic development activities in cities around the world, including Freiberg, Germany, and numerous cities in the U.S. She suggests that cities, including relatively small ones like Syracuse and Toledo, can benefit from strategic economic planning where 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 mainly involved a strategic focus on solar and related "green technologies," and relied on infusion of funds from the state and federal governments. (Fink 2011) Much of the effort was anchored by 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, this did not represent a new model of economic development except to the extent that the effort 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 these solar manufacturers got intense, and many (including state legislators) became concerned about what they considered overly generous subsidies. When this was combined with ideological concerns that “all sustainability initiatives are somehow connected to ‘socialistic’ climate change conspiracies,” the comprehensive strategy began to unravel. (Fink 2011: 89) 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 was never really fully committed to the pursuit of green economic development. (Ross 2011)

With the skepticism expressed by many as to whether such a new model could actually work, the question becomes an empirical one. Succinctly put, if the skeptics are correct that 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 non-factor, then economic growth should be unrelated to how extensively a city pursues sustainability. Perhaps surprisingly, very little research has been conducted on these issues.

The Measurement of Economic Growth, Development, and Sustainable Development

The analysis found in Figure 1 focuses on a specific measure of economic growth, change in housing prices. Yet, of course, there are many ways of measuring the degree of economic growth and development in cities. Unlike analysis of nations, which typically relies on measures of change in GDP or GNP, cities within a nation do not find such direct, comprehensive, or unambiguous measures of economic growth.

One approach adopted by Peter Rogers and Sumeeta Srinivasan (2007) is to develop single measures of sustainable development based on the idea of income elasticities. In short, these measures look at specific policies or programs thought to improve the quality of the environment, and to assess how much they contribute to income growth. A policy or program that seems to produce higher income elasticity can be said to be a larger contributor to sustainable development than one that seems to produce lower income elasticity. Of course, 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, higher elasticities might be said to represent stronger relationships, and lower elasticities might be said to represent weaker relationships.

Another approach, pursued by the U.S. Conference of Mayors (2008), and by Muro et al. (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 metropolitan-

wide 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. And 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 taken here 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 the dollar change in per capita income from 1990 to 2009. This 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 below.

Measurement of the Pursuit of Sustainability

As noted earlier, the relationship between income growth and the environment most frequently focuses on environmental conditions or results. Yet much research also focuses on the economic effects of adopting local public policies to protect the environment. Here I wish to look at public policies used in the pursuit of sustainability. Earlier research has argued that there are at least 38 different specific policies and programs that cities in the U.S. adopt and implement in order to try to become more sustainable. Cities that pursue a large number of these can be said

to take sustainability more seriously than those that adopt fewer of these. By simply counting the total number of these programs, the result is used as an Index of Sustainability Programs. Table 1 shows a list of the 55 largest U.S. cities (as of the 2010 Census) and their respective Index values. Portland, Seattle, and San Francisco are at the top of the list, each having adopted and implemented 35 of the 38 programs. Wichita, KS, is at the bottom of the list, having adopted and implemented only 7 of the programs. There are other efforts to measure how sustainable U.S. cities are, although these typically focus on measures of environmental quality rather than on public policies and programs. Yet a simple comparison between this Index and the scores reported by one of the other city sustainability rankings, the SustainLane scores, shows substantial similarity.¹ Both indexes reveal that Portland, Seattle, and San Francisco are at the top; Virginia Beach, Tulsa, and Oklahoma City are near the bottom. The correlation between this Index and the Siemens (2011) environmental performance index for the 21 cities included in the Siemens' analysis is .772 (significant at the .000 level), suggesting that both indexes are likely measuring the same underlying policy commitment to sustainability and the environment.

[Table 1 Here]

The Pursuit of Sustainability and Income Growth

Although this is a topic that deserves much more intensive research, the simple question remains “what is the relationship between pursuing sustainability and economic growth?” If sustainability is simply a manifestation of the same underlying principles as found in smart

¹ The SustainLane web site does not provide actual sustainability scores; it only presents rankings. Karlenzig (2007) *How Green Is Your City?* provides index scores, but for 2006 only.

growth and environmental protection policies, the pursuit of sustainability should produce the same pattern of relationship. Moreover, since many of the 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. In order to look at this relationship, a simple bivariate analysis is presented in Figure 3 showing the scatterplot for the 55 largest cities in the U.S. between the Index 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 pre-dated the changes in income, so potential directions of causation are speculative. Yet many cities' sustainability programs were already in place by the end of the 1990s. The scatterplot shows a fairly strong relationship between these variables. Contrary to the expectation illustrated in Figure 1, more restrictive policies (higher Sustainability Index scores) are strongly associated with greater improvement in economic benefits, not less. The scatterplot shows that many of the cities experiencing the greatest improvement in personal incomes – Seattle, Portland, San Francisco -- are indeed the cities that have been most aggressive in pushing for sustainability. Many other cities that have struggled economically are those that have made the weakest efforts on sustainability – Wichita, Santa Ana, and Detroit among them. To be sure, these cities' struggles likely have much to do with national and international influences, yet on the surface, this pattern is unmistakable. Is this some sort of proof that sustainability policies pay off economically? Of course it 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. But if the expectation is that cities investing in sustainability do so at the risk of sacrificing economic growth, this 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.

[Figure 3 Here]

Of course, this raises the broader issue of what kinds of local policies, programs, and practices influence local economic development. To the extent that there is a pattern of relationship between cities' sustainability policies and improvement in economic growth (as measured by change in per capita income over time), then the question that must be addressed is whether it is these policies, *per se*, that can be said to improve local economies. Is this a spurious relationship where 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 what can be accomplished here. Even so, a brief bit of analysis takes a step in that direction. The common wisdom about local economic 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 here 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 Figure 3 a

reflection of some underlying causal process, or is it merely spurious? Table 2 presents a simple multivariate model to investigate this issue. The dependent variable consists of the total dollar change in per capita income between 1990 and 2006. Cities that experienced greater positive change experienced greater economic growth, and cities that experienced smaller positive change or negative change experienced less economic growth. The key independent variable, as described earlier and shown in Figure 3, is a composite Index measure of the number of city sustainability programs adopted and implemented.

Perhaps the most important control variable that must be included in any effort to understand local economic growth 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. So this analysis uses the percentage of residents 18 years old 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 five years old or younger is included. Since young people are obviously not part of a city's workforce, the larger the size of this age group, the lower the per capita income would be expected to be. The OLS regression results of Model 1 in Table 2 suggest that, even controlling for the education and age variables, the pursuit of sustainability continues to be 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.

[Table 2 Here]

In recent times, the human capital-based understanding of local economies has been at least tweaked by the works of Richard Florida (2003; 2004a; 2004b), who has argued that it's not just about human capital, but also about 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. Much debate has occurred about whether Florida's measure, the Creative Class Index (an index that contains information about the character of the labor force as well as social culture), really is a measure of human capital by another name (Glaeser undated). In any case, it is clear that the pursuit of sustainability, by itself, is not more closely related to cities' economic growth than the size of the creative class.² Yet the fact that there is a positive relationship between the pursuit of sustainability and economic growth, rather than a negative relationship as expected, suggests that the pursuit of sustainability policies probably plays a role in influencing local economic development. Clearly, this is an area of research that deserves much more attention.

In Model 2, the Creative Class Index is added to the regression analysis, producing substantial changes. The Creative Class Index is highly correlated with change in per capita personal income, and the Sustainability Index becomes statistically insignificant. On first blush, this would seem to support an interpretation that the bivariate relationship between sustainability and income growth is spurious. Yet it seems unlikely that the character of the creative class

² The partial correlation between the Index of Sustainability and change in per capita income from 1990-2006, controlling for the percent of the population that has at least a high school education (a measure of human capital) is .460, significant beyond the .01 level. However, the partial correlation between the Index and change in per capita income, controlling for Florida's Creative Class Index, is .220, not statistically significant.

would be unrelated to the pursuit of sustainability. Certainly there is a strong bivariate relationship (.55) between the Creative Class Index and the Sustainability Index. This raises a number of possible alternative possibilities, especially the idea that there may well be an interaction effect between the size of the creative class and the public policy pursuit of sustainability. In order to investigate this, Model 3 substitutes an interaction term for the original Sustainability and Creative Class Indexes. Here, the interaction term is highly significant. In order to separate the effects of the interaction term from the effects of the Sustainability Index, Model 4 introduces both the interaction term and the Sustainability Index. This continues to show that the interaction term is statistically significant. What this suggests is 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 found other cities.

Discussion

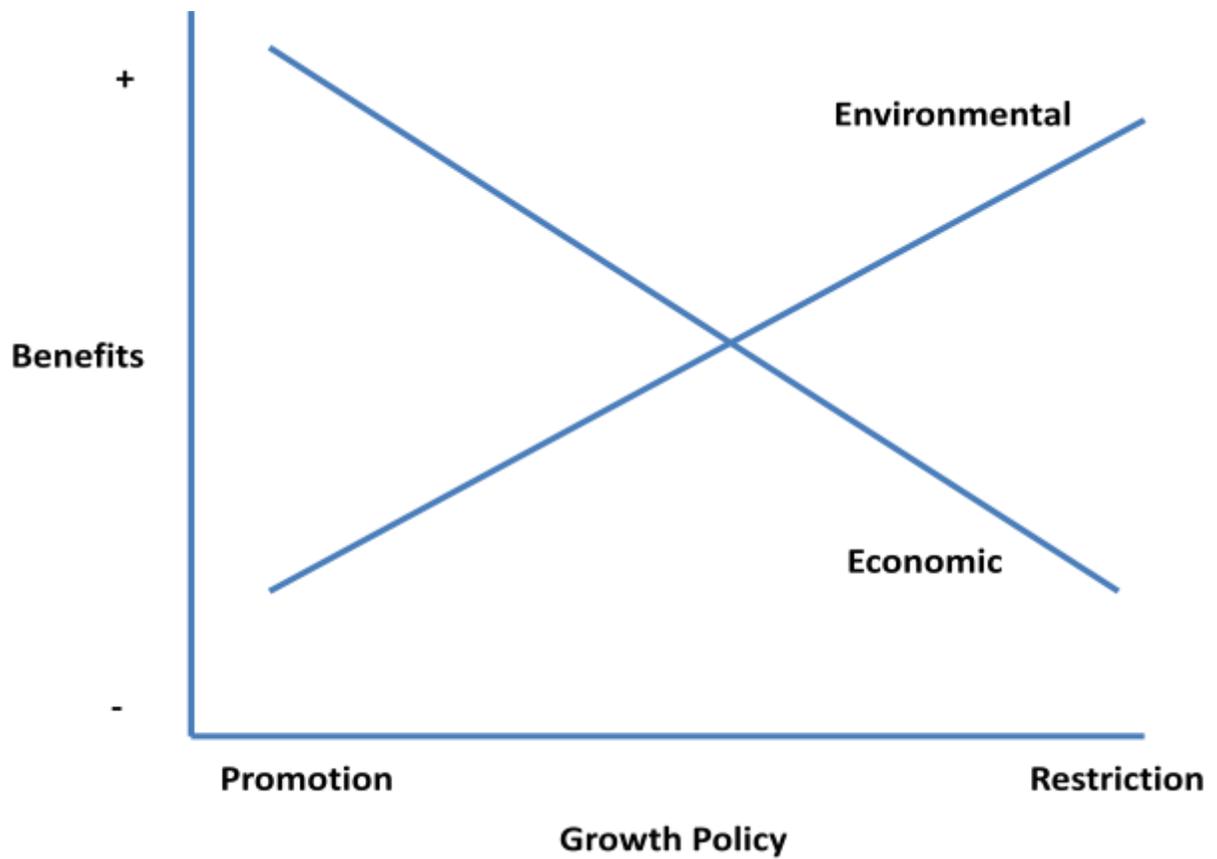
This paper has tried to provide some foundational understanding of how the public policy pursuit of local sustainability affects local economic growth. While theory and analysis seem unequivocal that the pursuit of sustainability should reduce economic growth, analysis presented here finds very little evidence of this. 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 there seems to be an interaction between the size of the creative class of cities and the aggressive pursuit of sustainability such that when cities with

large creative classes decide to get seriously about sustainability policies, they indeed experience higher levels of income growth.

Of course, any analysis of this sort faces methodological challenges. Clearly, even with the modest models presented here, there is the potential that there is an endogeneity problem. This problem is conceptually compounded by the obvious observation that there are many other variables that 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 looked at this, and found that the relationship is much weaker than one would expect. Yet there is certainly the possibility that income influences sustainability policies rather than the other way around. More likely, this could well represent a case of reciprocal causation. Yet the analysis and data used here are sorely inadequate to addressing such issues.

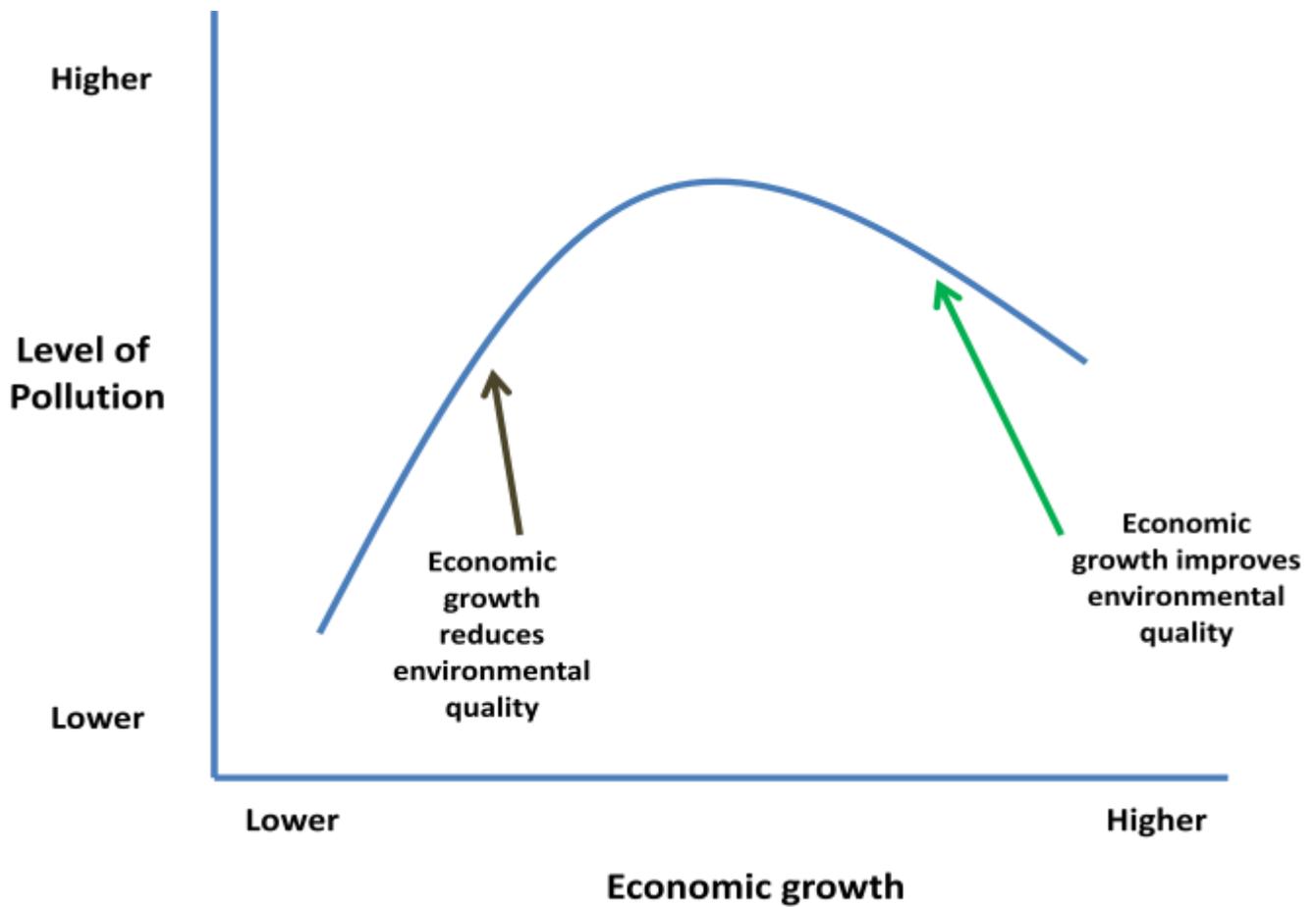
For public officials who worry that decisions to adopt and implement an aggressive array of sustainability-related policies might undermine their economic development activities, there is little evidence that this is true. At least as practiced in American cities to date, the pursuit of sustainability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

Figure 1: Environmental and Economic Impacts of Growth Policy



Source: Richard Feiock, 1994. The Political Economy of Growth Management. *American Politics Research*, 22 (2): 208-220.

Figure 2: The Environmental Kuznets Curve

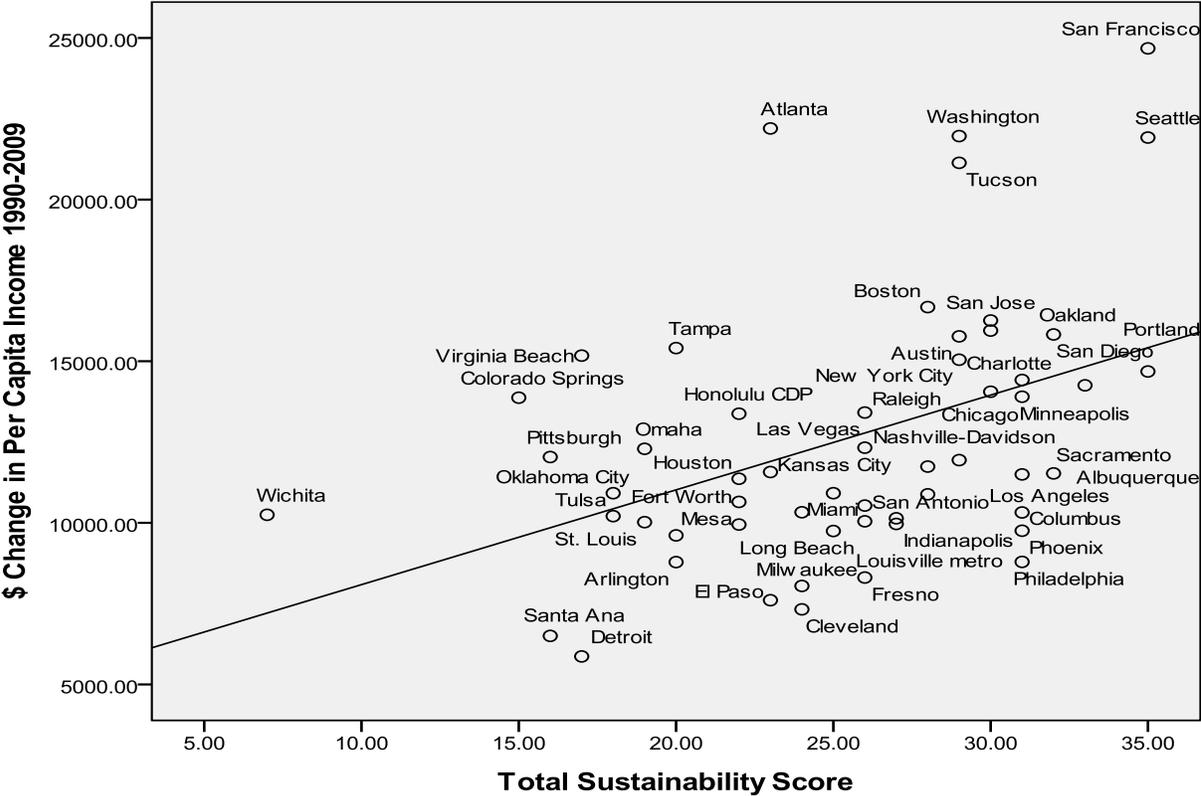


Adapted from Matthew Kahn, 2006. *Green Cities: Urban Growth and the Environment*.

Washington, D.C.: Brookings Institution Press, p. 31.

Figure 3: Scatterplot Showing the Relationship Between Sustainability and Growth in Per Capita Personal Income, 1990-2009 for the 55 Largest U.S. Cities

$$Y = 5156 + 293.2 * (\text{Sustainability Score}) \quad \text{Significance} = .001 \quad R^2 = .166$$



**Table 1: 2011 Sustainability Rankings
55 Largest U.S. Cities, Plus Pittsburgh**

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

Table 2: OLS Regression Results Explaining Change in Per Capita Personal Income 1990-2009

Independent and Control Variables	Model 1		Model 2	
	β	Significance	β	Significance
Sustainability Index	163.2	.032	32.7	.675
% High School Graduate	98.4	.055	90.3	.053
% Age 5 or Below	-1866.8	.000	-1784.5	.000
Creative Class Index	-----	-----	9762.2	.001
Constant	14285.9		10324.8	
Adjusted R2	.522		.613	
Significance	.000		.000	

Independent and Control Variables	Model 3		Model 4	
	β	Significance	β	Significance
Sustainability Index – Creative Class Index Interaction	207.9	.001	388.0	.001
Sustainability Index	-----	-----	-252.4	.074
% High School Graduate	94.9	.046	84.7	.069
% Age 5 or Below	-1656.2	.000	-1698.7	.000
Constant	13146.8		17131.7	
Adjusted R2	.588		.615	
Significance	.000		.000	

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