Buying Into Bohemia: the Impact of Cultural Amenities on Property Values[1]

Stephen Sheppard
Department of Economics, Williams College

Kay Oehler
Center for Creative Community Development

Blair Benjamin
Center for Creative Community Development

Abstract

Communities in both Europe and North America are encouraging the development of cultural amenities as a strategy for improving quality of life, attracting and retaining productive workers, and promoting urban revitalization. If these policies are effective then the presence of cultural amenities should increase the local demand for housing, and the value of cultural amenities should be reflected in house prices. The prospect of increasing house prices has in turn generated concern about the role of the arts and cultural amenities in the process of gentrification. Amidst these policy initiatives and expressions of concern about the impacts, there have been surprisingly few systematic studies of the impacts of cultural amenities on house prices. This paper helps to fill this gap. Using data from 11 Massachusetts cities, we estimate the impact of the local cultural non-profit sector on residential property values. We find that local availability of cultural amenities can have significant impacts on property values. This supports the potential role for cultural policies in urban revitalization, but also suggests that if such policies are to be distributionally neutral (or progressive) they must be combined with policies that ensure continued access to the community for low and moderate income renters.

Corresponding author:

Professor Stephen Sheppard
Department of Economics
Williams College
Williamstown, MA 01267
USA

e-mail: stephen.c.sheppard@williams.edu

1. Introduction

Communities in Europe and North America are pursuing the development of cultural amenities as a strategy for improving quality of life, attracting and retaining productive workers, and promoting urban revitalization. If these policies are effective then the presence of cultural amenities should increase the local demand for housing, and the value of cultural amenities should be reflected in house prices. The prospect of increasing house prices has in turn generated concern about the role of the arts and cultural amenities in the process of gentrification. Amidst these policy initiatives and expressions of concern about the impacts, there have been surprisingly few systematic studies of the impacts of cultural amenities on house prices.

Policy makers and even academics not directly involved in research in the field might find this lack of previous studies surprising. Much of the discussion by policy makers, journalists and arts advocates, for example, seems to regard the linkage between the presence of artists and the increase in property values as accepted fact and obviously true. Thus Bahrampour (2004) reporting for the New York Times paints a classic picture of gentrification in Brooklyn:

> Broadway near the Williamsburg Bridge has long been seen as the border between the neighborhood's south side, a working-class Hasidic and Hispanic enclave, and the north side, which has become known for its artists, hipsters and, increasingly, affluent professionals. But as northside rents have soared, and ritzy boutiques and nightclubs have moved in, residents seeking cheaper housing have looked southward. Meanwhile, many young Hasidic families are large and their housing needs have grown accordingly. A collision was perhaps inevitable….

Across the Atlantic, Cameron and Coaffee (2005) observe that:

> The power of the arts-based regeneration of this area of Gateshead was strikingly evident in the fact that people queued overnight in order to pay what in terms of the local housing market were enormously high prices for apartments in what a few years before has been a derelict, isolated and unappealing backwater.

These images of gentrification – with artists moving in, bringing different styles, businesses and 'cultural capital' to a neighborhood, attracting affluent households and eventually causing an increase in rents and house prices – is so widespread that many writers assume it has been well-established.

The most widely accepted method for establishing, measuring and testing such a relationship would be to undertake some type of hedonic analysis of housing markets (see Sheppard (1999)) to isolate the separate impact of artists and cultural activities to the value of residential property. Many seem to assume that such studies exist. McCarthy *et al.* (2004), writing about the techniques used to measure

1

the economic benefits of the arts, asserts that the public benefits of the arts "are often given a dollar value … via hedonic approaches that estimate how proximity to the arts affects housing values…." No examples of such studies are mentioned in the text or identified in the 12 page bibliography of the report.

Similarly, Mason (2002), Mourato and Mazzanti (2002) and Throsby (2002) all mention hedonic analysis as a core methodology for economic evaluation of the benefits of culture, and describe the analysis as detecting the impact on house prices of culture. The only references to actual application of the technique, however, concern either the impact on house prices of the architectural design of the houses themselves (rather than the cultural environment in which the houses are located) or the analysis of the determinants of the prices of works of art (not houses). Perhaps the impact of cultural vitality and the arts on house prices is one of those things that Mark Twain famously warned us about as sources of trouble: something we "know for sure, that just ain't so."

Hedonic analysis of house prices has been widely used for valuation of goods whose consumption is facilitated by (or requires) residence in a particular location. Everything from school quality (Cheshire and Sheppard (2004) or Kane, Staiger and Samms (2003)), urban property crime (Gibbons (2004)), historic preservation districts (Leichenko, Coulson and Listokin (2001)), land use planning and open space preservation (Cheshire and Sheppard (2002)) and even the presence of neighborhood churches (Do, Wilbur and Short (1994)) have been measured and evaluated using hedonic analysis of house prices. Given the widespread assumption that the arts and cultural vitality lead to increased house prices it is mildly astonishing how difficult it is to find studies of the subject.

The issue is not an idle or pedantic one of incomplete bibliographies or accepted but rarely applied specialist techniques. The assumption that a relationship exists between house prices and cultural vitality has motivated several cities to create special benefits for artists to ensure access to live-work spaces. Plimpton (1995) presents four case studies of such projects whose total investment exceeded $13 million in the mid-1990s. In the decade that has passed since this report, dozens of similar projects have been undertaken in cities around the US to preserve and protect housing for artists – partly motivated by concern that their very success in producing the golden eggs of neighborhood revitalization not lead to the killing (or at least displacement) of these highly desirable geese.

The issue is also of importance for understanding the social value and intrinsic benefits of the arts, and the rationale for public support for culture and the arts. If cultural vitality produces external benefits that are not captured by the artists themselves, then there is a clear argument for public support for the arts (since without the support a socially inefficiently low amount of artistic activity would be produced). One signal of such externalities would be the capitalization of the benefits into the values of nearby residential properties (in the same way as the benefits of air quality, good schools, or open space preservation are capitalized into the prices of houses with access to them). The measure of these benefits can serve as a partial guide concerning the appropriateness of, and appropriate magnitude of, public support for the arts.

The nature of the relationship between house prices and cultural vitality is of further relevance in assessing the desirability and expected impacts of the arts as an urban regeneration strategy. If the relationship between cultural vitality and housing prices is very strong, then it poses a significant problem for policies seeking to promote the arts as a way of improving the lives of people who reside in communities seen as in need of regeneration. If a consequence of such policies is to drive up rents and displace the original residents, then the policy succeeds in making the neighborhood attractive but fails to improve the lives of the original residents. Arts-based economic development becomes equivalent to slum clearance and urban renewal.

If so many observers see an apparent link between the arts and increasing house prices, is further study really required? Many point to the example of the SoHo district in New York as the 'classic' case where artists moved in, revitalized the neighborhood, and were driven out when the vitality they created resulted in higher house prices. The
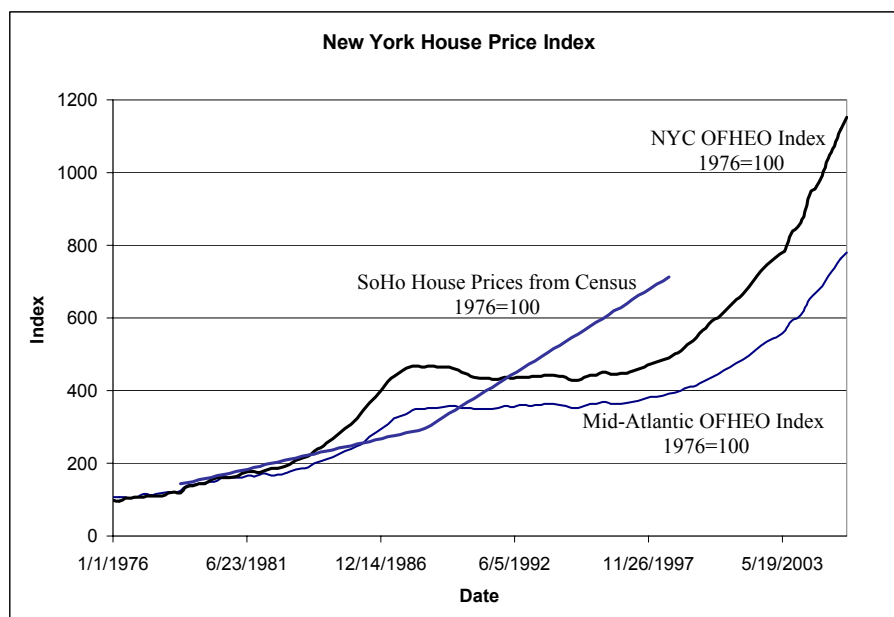
Figure 1: SoHo House Prices

difficulty arises from the fact that many factors influence house prices. Observing house prices increasing in an area with cultural vitality might lead one to falsely attribute the increase to the

presence of arts and culture, when the increase is part of a broader regional trend. Figure 1 above illustrates the potential problem. Taking census tracts in the SoHo area that have reported house prices for 1980, 1990 and 2000, the average house price is seen to increase seven fold in the last two decades of the century. This seems very significant until one compares it with the experience of the entire New York City MSA. We see that SoHo actually lags behind the metro area during the 1980s, and then catches up during the 1990s. Overall, the pattern of SoHo house price increases does not look particularly out of character for the entire metropolitan area.

This is not to say that there have not been some neighborhoods that experienced unusual increases in property values. Lees (2003) documents the tremendous growth in values in Brooklyn Heights. While her analysis does not make use of hedonic methods to isolate those factors that might be related to the price increases, and she does not attribute the price increases to culture or the arts (instead to the expansion and prosperity of the finance sector in New York) the changes she documents are clear. Less clear are the causes of these changes.

There have been several applications of a different type of hedonic analysis to evaluate the impact of the arts and culture. For example Clark and Kahn (1988), Schmidt and Courant (2006) and others have used wage hedonics that look for the impacts of (among other factors) the presence of cultural amenities on local wage rates. The idea is that if culture and the arts are attractive, people will accept a reduction in pay in order to live in a city characterized by cultural vitality. The reduction in pay provides a measure of the willingness to pay for the arts. Using US wage data, Clark and Kahn find significant values for most cultural amenities (except opera) while Schmidt and Courant consider the presence of museums and measures of concert and theater performances and find no statistically significant impact associated with either.

For our research we assemble data on residential sales in eleven communities in Massachusetts. We combine these with little-used but publicly available information on the activities of not-for-profit organizations in each community, and estimate hedonic models that allow us to measure and test the linkage between the level of cultural activity and residential property values. In the next section we review some theoretical perspectives that justify estimating such a relationship. In section 3 we describe the data we have collected and the communities that are the subject of our study. In section 4 we present the estimated models and discuss their performance. Section 5 concludes with a discussion of what we see as the policy implications of our study, and the prospect and need for further research.

2. Culture, Quality of Life, and Property Values

There are at least three theoretical approaches to housing markets that would imply a positive causal link between the level of arts and cultural amenities and house prices. We discuss each of these briefly.

a. Capitalization of access to cultural amenity

Suppose that occupying a residence in a community provides the occupant with differential or preferred access to the arts and cultural activities that are present in the community. At the very least, the resident enjoys reduced transportation costs between her home and the museum, theater or concert hall where the activity is available. It seems reasonable to also suppose that residence in the community increases the probability that she finds out about the events or is able to secure tickets if they are required. In some cases, discounts are made available to community residents for admission at certain times, conferring a further advantage upon the resident.

Finally, if more speculatively, there might be a sense in which the resident derives greater pleasure from the arts and cultural activities in her community. This would naturally occur in the presence of Tiebout sorting in which households tend to take up residence in communities offering the type of cultural activities they prefer. It might also occur because of a type of network externality that can be argued to characterize cultural activities. The arts involve symbolic communication in a variety of ways, and the value of this communication is increased if the consumer/observer has subsequent contact and interaction with others who have also absorbed or learned these symbols and ways of using them. This shows up in many ways. A repeated line from a play or film may be employed for comic effect. Artistic symbols drawn from shared experiences are used to communicate in advertising. Particular issues become important items for public action when they feature in, and are explained by, works of art and culture. These are essentially examples of what has been called cultural capital, and a person who resides in the community where cultural activities are readily available can take advantage of this cultural capital. The economic value of this advantage is an amount that a household would be willing to pay in order to secure residence in the community.

Adapting the notation used in Sheppard (1999), we assume that a household has a utility function that depends upon the characteristics Z which includes the cultural vitality of the community where she

5

lives, the level of composite good Y she is able to consume, and a vector of utility function parameters α. So her preferences are represented by the utility function $u = u(Z, Y, \alpha)$. The price of housing depends upon the characteristics of the structure and the community Z, and is represented by the function $P(Z)$.

Optimizing behavior in choice of housing and communities implies that:

$$\frac{u_Z}{u_Y} = \frac{\partial P}{\partial Z} \tag{1}$$

Thus the marginal rate of substitution between cultural vitality and the composite good (i.e. the consumer's marginal willingness to pay for cultural vitality) is equal to the rate of change of house prices with respect to cultural vitality. If the arts and cultural activities are worth something to the typical consumer, then we would expect to observe increasing house prices associated with an increase in cultural activities. In this sense the value of culture is capitalized into house prices.

b. Urban regeneration and housing demand

An alternative view is to take a more "macro" perspective on the impacts of cultural vitality and the relation to housing demand. The public programs referred to above are seeking to increase employment, income and therefore population in particular communities through investment in the arts and culture. While his analysis has been criticized for being excessively simple, Florida (2002a, 2002b and 2002c) has been a visible and widely read proponent of the link between cultural vitality, the "talent" of the local labor force, and population growth.

One way of presenting the essential thesis of these arguments is that workers with high levels of human capital produce goods or services with a relatively high value-to-weight ratio, so that they have great flexibility in where they live and work. In addition, they tend to have a developed taste for cultural amenities (in addition to other community characteristics such as ethnic diversity and tolerance). As a result, they tend to be drawn to reside in communities with higher levels of cultural activity. As suggested by the research of Rauch (1993), this increases total factor productivity in the community and can be expected to increase incomes and hence, via a standard comparative static result from models of urban land and housing markets, increase land values and house prices.

Further support for this perspective comes from the theoretical analysis of Lucas (2001) and recent empirical research by Fu (2005), who find that increasing human capital is clearly associated with

increasing land values and hence with increasing house prices. While the causal connection to the arts and cultural activities remains dependent on the maintained hypothesis of high human capital workers having a preference for cultural amenities, this hypothesis is consistent with Florida's findings and seems generally plausible.

c. "Quality of Life" and non-market goods

The final perspective suggesting a positive link between the level of cultural vitality and the price of housing grows out of the analysis of the quality of life in cities developed by Rosen (1979) and Roback (1980), and widely applied for comparing the value of non-market goods available in different communities. These models assume that firms and workers are mobile between communities. Workers have preferences that depend on their wage income Y, the price of accommodation in the community P and some non-market good Z that could include a measure of cultural vitality. Workers would prefer lower P and higher Y, and the availability of Z varies between communities. Equilibrium requires that workers have moved between cities so that the same utility level is available to them in every location. Letting V represent the indirect utility function for a typical worker and k be the constant utility level available in equilibrium, we must have:

$$V(Y,P,Z) = k \quad with \quad \left.\frac{\partial P}{\partial Y}\right|_{V(\cdot)=k} > 0 \tag{2}$$

Note here that if increasing the level of cultural vitality Z increases worker utility we will have $\frac{\partial V}{\partial Z} > 0$.

The profits of firms also depend on the price of accommodation P (production requires space), wages that must be paid to workers Y, and potentially on the non-market good Z. Free entry and mobility of firms implies zero economic profits in all locations, so letting Π represent the firm's profit function we must have:

$$\Pi(Y,P,Z) = 0 \quad with \quad \left.\frac{\partial P}{\partial Y}\right|_{\Pi(\cdot)=k} < 0 \tag{3}$$

For any given level of arts and culture Z, general equilibrium in the community requires finding a wage level Y^* and price of space P^* so that:

$$\Pi(Y^*,P^*,Z) = V(Y^*,P^*,Z) \tag{4}$$

Suppose that, starting from such an equilibrium, a community experiences an increase in the level of cultural vitality available to residents. Suppose also that the cultural activities have no impact on the profitability of the firms. The situation is illustrated in Figure 2 below.
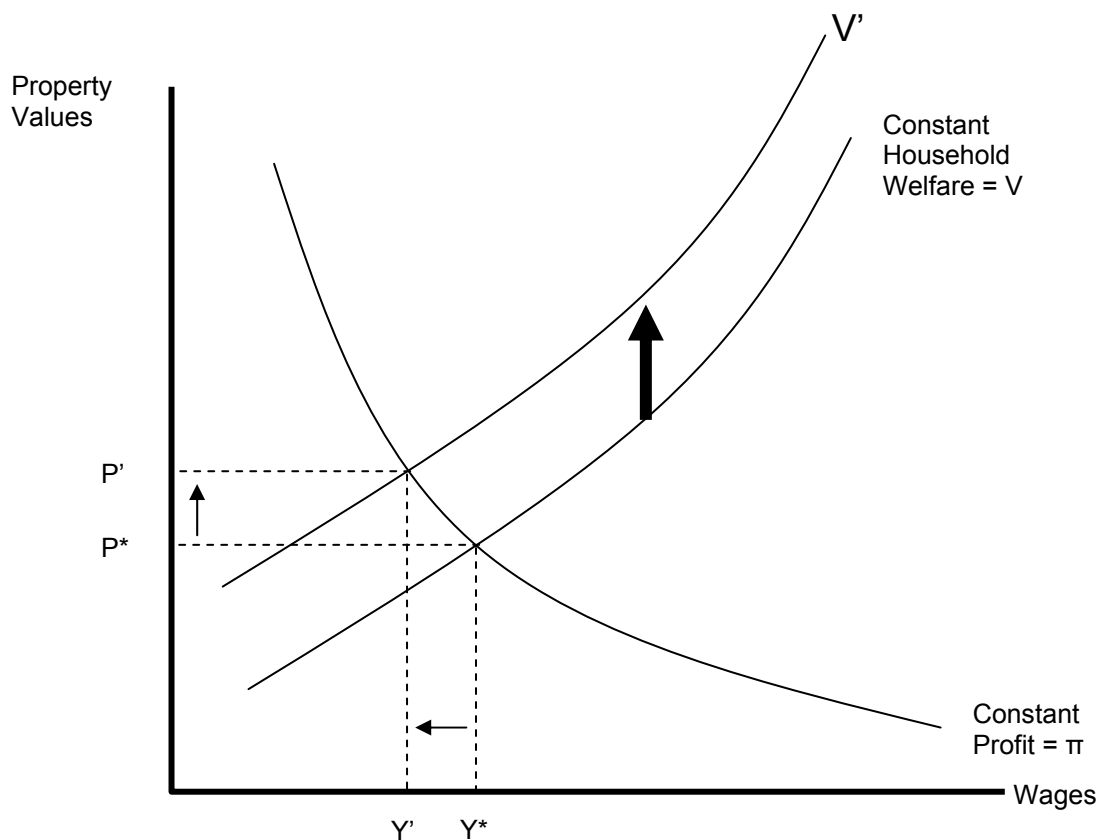
Figure 2: The Impact of Increased Cultural Vitality on Property Values

The improved level of cultural vitality will shift *V* upwards to *V'*. This causes wages to fall from *Y** to *Y'* (as in Clark and Kahn (1988)) and causes the price of accommodation to rise from *P** to *P'*. This suggests that we should observe a positive relation between measures of cultural vitality and house prices, as long as households attach a positive value to the arts and culture, and firm profits are not adversely affected.

It is interesting to note that if firm profits are positively affected by culture (as might occur in the 'creative class' urban regeneration examples discussed above) then the impact on house prices would be even more pronounced, while the impact on worker wages would be ambiguous (consistent with the findings of Schmidt and Courant (2006)).

3. Data

Each of the theoretical approaches presented in the preceding section implies that, subject to certain assumptions, an increase in cultural activity in the community should be associated with an increase in residential property values. We now proceed to test this hypothesis. In this section we describe the data collected for analysis.

a.   The not-for-profit cultural sector

Many discussions of the cultural sector and its impact make no distinction between the for-profit and not-for-profit organizations in the sector. While the typical organizations that come to mind when the "cultural sector" is mentioned (such as museums, symphony orchestras and many performing arts centers) are organized as not-for-profit corporations, there are also many for-profit enterprises active and highly visible in the sector.

For our analysis, we focus on the not-for-profit organizations. There are two central reasons for this focus. First, by focusing on the not-for-profit sector we focus on organizations who view the generation of community benefits as a central component of their mission. It might be argued that we are focusing attention on precisely the component of the cultural sector most likely to generate cultural amenities and improvements in the quality of life for community residents.

The second reason for focusing on the sector is more pragmatic: data availability. Every registered not-for-profit organization in the US with a budget exceeding $25,000 per year is required to file an annual Form 990 with the Internal Revenue Service. Data from these returns for organizations in the cultural sector are available back through 1992 for New England from the New England Cultural Database maintained by the New England Foundation for the Arts (NEFA). The returns themselves are available for the entire US for non-commercial use (through Guidestar.com) but only for the most recent two or three years.

For each community in our study, we obtained data on all not-for-profit cultural organizations located in the community, and summed their total expenditures for each year as a general measure of the level of cultural activity in the sector for that community. There are some cautions that must be noted in making use of these data. First, there are a variety of individual artists, performers, teachers and organizations that may make important contributions to cultural vitality but are either not organized as formal not-for-profit organizations or are too small to be required to file a form 990. This won't be a

problem if these "invisible" culture providers stand in constant proportion to the "visible" not-for-profits. Second, we attribute the expenditures for each organization to the community where they are located. There are no doubt some organizations who undertake explicit programming in neighboring communities or even nationwide. Finally, there are considerable amounts of cultural activity produced as subdivisions of organizations that are not, themselves, not-for-profit organizations in the cultural sector and hence not included in the New England Cultural Database. Plays, visiting artists and concerts produced within public schools, for example, are not included. Despite these potential shortcomings, we argue that the data on the level of cultural vitality in the communities being studied are among the most complete ever assembled for a study of this type. The data certainly cover a very large proportion of the cultural activity available in each community.

The magnitude of cultural expenditures was adjusted for inflation using the CPI for the Northeastern US. Two measures of cultural vitality were used in the hedonic models. The total real cultural expenditures (measured in 1000's of 1983 dollars) and the total real cultural expenditures per capita in the community. The first of these is more appropriate if we regard the cultural sector as approximating a pure public good. The second is more appropriate if we regard the level of cultural activity as subject to congestion.

b.   The communities

The communities themselves represent a reasonable economic and geographic cross-section of towns within Massachusetts, although we exclude the largest urban areas and individual cities (such as Boston, Cambridge, and Springfield) both because these communities are subject to different state requirements for reporting data on property values (for property taxation) and because of the greater difficulty in isolating the cultural sector within cities that are part of larger metropolitan areas from the culture produced in adjacent cities that are essentially part of one contiguous community.

The communities covered in our analysis are Brockton, Brockton, Concord, Holyoke, Lee, Lenox, Lowell, North Adams, Northampton, Provincetown, Stockbridge and Sandwich. These communities extend from the rural northwest corner of the state (North Adams) to the tip of Cape Cod (Provincetown), include very affluent areas close to Boston (Concord) as well as very poor communities suffering from industrial decline and very high unemployment (Holyoke). They range in size from very small towns (Stockbridge, population 2,276) to medium size (for New England) cities such as Lowell (population 105,167) and Brockton (population 94,304).

Table 1: Descriptive Statistics for Entire Sample					
Variable	**Observations**	**Mean**	σ	**Min**	**Max**
Real House Price ($1000)	26425	90.3933	101.114	4.141	3266.449
Transformed Variables					
Cultural Expenditures	26425	2925.3090	1866.583	12.745	8628.210
Per Capita Cultural Expenditures	26425	105.6262	191.070	0.868	2083.828
Real Income	26425	122.5639	46.801	81.011	296.697
Age	26425	51.3789	41.483	1	366
Land Area (acres)	25649	0.4775	1.568	0.01	81.69
Distance to center (KM)	25873	3.1418	2.397	0.035	19.303
Rooms	23991	7.3415	2.505	1	61
Baths	26423	2.7147	0.773	1	10
Floors	26372	2.6722	0.517	1	7
Dichotomous Variables					
Ranch	26425	0.1418	0.349	0	1
Raised Ranch	26425	0.0306	0.172	0	1
Conversion/Old Style	26425	0.1977	0.398	0	1
Cape Cod	26425	0.1159	0.320	0	1
Colonial Gambrel	26425	0.1534	0.360	0	1
Split Level	26425	0.0293	0.169	0	1
Condo	26425	0.1404	0.347	0	1
Contemporary	26425	0.0286	0.167	0	1
Two Family	26425	0.0764	0.266	0	1
Cottage/Bungalow	26425	0.0203	0.141	0	1
Antique	26425	0.0035	0.059	0	1
Quality1 Poor	26385	0.0002	0.014	0	1
Quality2	26385	0.0017	0.042	0	1
Quality3	26385	0.0274	0.163	0	1
Quality4	26385	0.0350	0.184	0	1
Quality6	26385	0.1645	0.371	0	1
Quality7	26385	0.0887	0.284	0	1
Quality8	26385	0.0435	0.204	0	1
Quality9	26385	0.0234	0.151	0	1
Quality10	26385	0.0072	0.085	0	1
Quality11	26385	0.0111	0.105	0	1
Quality12	26385	0.0032	0.057	0	1
Quality13	26385	0.0011	0.034	0	1
Quality14	26385	0.0006	0.025	0	1
Quality15 Superior Plus	26385	0.0002	0.014	0	1
Brockton	26425	0.1357	0.343	0	1
Concord	26425	0.0727	0.260	0	1
Holyoke	26425	0.0722	0.259	0	1
Lee	26425	0.0225	0.148	0	1
Lenox	26425	0.0210	0.144	0	1
Lowell	26425	0.3544	0.478	0	1
North Adams	26425	0.0275	0.164	0	1
Northampton	26425	0.1204	0.325	0	1
Provincetown	26425	0.0294	0.169	0	1
Stockbridge	26425	0.0114	0.106	0	1
Sandwich	26425	0.1327	0.339	0	1

Table 2: Descriptive Statistics for Select Variables by City										
	Brockton	Concord	Holyoke	Lee	Lenox	Lowell	North Adams	Northampton	Provincetown	Stockbridge	Sandwich
Real House Price ($1000s)	83.130	282.512	51.892	61.573	102.021	64.170	37.018	78.885	115.612	144.061	97.940
σ	23.775	262.776	23.997	35.553	96.682	32.089	18.125	42.241	114.059	125.662	61.267
Cultural Expenditures ($1000s)	1508.518	2093.270	938.659	1971.543	2637.904	4355.893	1434.562	4213.734	1267.110	3419.789	1763.781
σ	665.487	506.328	213.342	474.179	1026.048	1154.579	1089.476	2190.426	313.957	679.170	1747.612
Per Capita Cultural Expend	15.996	123.184	23.562	329.414	519.579	41.419	97.716	145.412	369.312	1502.544	87.593
σ	7.057	29.796	5.355	79.228	202.097	10.979	74.210	75.589	91.506	298.405	86.790
Real Income	96.526	265.098	90.005	111.667	129.090	94.844	90.547	137.310	143.971	166.257	148.461
σ	1.131	18.944	3.841	2.457	3.769	2.746	4.405	15.416	17.565	18.139	11.625
Age	59.595	56.233	62.996	57.449	53.430	51.136	78.104	55.097	68.772	64.362	19.403
σ	32.232	49.237	35.396	49.456	41.633	38.633	39.975	41.869	57.556	62.152	28.487
Land Area (acres)	0.252	1.345	0.328	0.620	1.300	0.130	0.532	0.616		3.467	0.695
σ	0.222	2.537	0.679	0.420	2.019	0.149	1.516	2.045		8.779	0.903
Distance to center (KM)	2.793	3.623	2.568	1.902	2.683	2.287	1.890	3.281	1.248	3.611	6.513
σ	1.967	2.423	1.581	1.945	2.084	1.069	1.228	1.983	0.871	2.521	3.175
Rooms	7.604	9.617	7.903	7.591	8.245	6.996	7.467	7.709	5.426	8.275	7.267
σ	1.804	2.364	2.303	1.562	2.062	3.125	1.984	2.152	2.367	2.581	1.501
Baths	2.412	3.572	2.620	2.714	3.186	2.514	2.367	2.738	2.691	3.684	3.042
σ	0.514	1.163	0.609	0.760	1.021	0.554	0.589	0.738	0.826	1.279	0.700
Floors	2.441	2.752	2.759	2.670	2.711	2.795	2.732	2.567	2.499	2.576	2.614
σ	0.503	0.447	0.624	0.488	0.491	0.516	0.464	0.467	0.627	0.488	0.415
Observations	3587	1921	1909	594	556	9365	728	3181	776	301	3507

Table 1 above contains descriptive statistics for each of the variables used in the analysis for the entire data set combined. Table 2 contains descriptive statistics for the non-dichotomous variables used in the analysis, presented separately for each of the 11 communities from which data are drawn for our study. Note the wide range of levels of real cultural expenditures, which in real terms range from less than $13,000 per annum to over $8.6 million. This wide range and variance in the data play an important role in helping to identify and precisely estimate the impact of the cultural sector.

c.   Residential price and structure characteristics data

Data for residential prices and structure characteristics were obtained from the property tax assessor's office in each community. Not all of the offices maintain the same variables for each individual property, so we had to make use of the variables that were available for all communities and were measured in a consistent fashion. Two important criteria had to be satisfied for a property to be included in the sample. First, it had to have a complete and recognizable address to permit geocoding of the property to determine its distance from the city center. Second, it had to have sold in an arms-length transaction during the 1992 through 2003 time period (the time period for which we had cultural expenditure data). While 26,425 properties satisfied these criteria, the actual estimates used only the 22,686 observations that had complete data for each variable included in the model.

For each observation having complete data we adjusted the price for both the effects of inflation and regional trends in house prices using the structure component of the seasonally unadjusted CPI for the Northeastern US. The effect of this is to count a property as increasing in value only if its price goes up faster than the general trend for house prices in the Northeast. This provides both a way of combining the data over time for hedonic estimation and a sensible control for the underlying trend in house prices, which is driven by changes in interest rates, economic prosperity, and demographic shifts in the region as a whole. All estimated price effects are in terms of these constant (1983) prices. In reviewing the results in the following section, it might be helpful to note that the 1983 values for residential properties can be approximately translated to 2006 prices by multiplying by two.

As with the levels of cultural expenditures, our use of a multi-city sample provides considerable variance in price and structure characteristics. Real prices range from just over $4000 to more than $3.2 million. Structure age at time of sale ranges from newly constructed properties to houses over 300 years old. There are similarly large ranges for community income levels, structure size, land area, and location within the city.

4. Analysis

a. The models

For each of our models we estimate a similar hedonic price function based on the Box-Cox transformation. We use Culture (either real total or real per capita expenditures of cultural non profits located within the community), Income (real per capita income in the community) plus structure and community characteristics. If the characteristics are measured with dichotomous variables (such as to capture fixed effects for location in individual communities) then the variables are not transformed. Otherwise, the variable is transformed to capture potential non-linearities in the hedonic price function.

The per-capita income variable is included both to address the concern that the estimated impact of cultural expenditures might simply be acting as a proxy for community income levels which are associated with more expensive housing markets and also as an indirect proxy for local public good variations that might not be fully accounted for in the community fixed effects (which are included in the full model). The functional form being estimated is then given by:

$$\frac{\text{Price}^\theta - 1}{\theta} = \beta_0 + \beta_1 \cdot \frac{\text{Culture}^\lambda - 1}{\lambda} + \beta_2 \cdot \frac{\text{Income}^\lambda - 1}{\lambda} + \sum_{i=3}^{L} \beta_i \cdot \frac{x_i^\lambda - 1}{\lambda} + \sum_k \alpha_k \cdot x_k \qquad (5)$$

This provides for a potentially non-linear relationship between price and characteristics, but we don't simply assume that the relationship is non-linear. We undertake likelihood ratio tests of the hypothesis that the true values of $\lambda = \theta = 1$ (in which case the relationship would be linear), $\lambda = \theta = 0$ (in which case the relationship would be logarithmic) and $\lambda = \theta = -1$ in which case the relationship would be reciprocal. Every model estimated and presented below rejected these hypotheses and supported the estimated Box-Cox form of the relationship.

b. The estimates

We began by estimating separate hedonic models for each of the communities for which we had data. Table 3 below shows three of these models – for Brockton, Concord and Holyoke. Since the data for each model are drawn from only a single city the city fixed effects are obviously not included, but otherwise the estimated models are identical to the per-capita cultural expenditure models presented for the full sample below.

Table 3: Coefficient Estimates for Select Individual City Models			
	Brockton	**Concord**	**Holyoke**
	Bold = Statistically Significant at 5% level		
Per Capita Cultural Expenditures	**3.7762**	**0.0532**	**-42.1744**
Real Income	**-1375.7520**	0.0348	**1334.0410**
Age	**-0.2124**	**0.0080**	**2.7155**
Land Area (acres)	**0.1468**	**0.0673**	**0.2138**
Distance to center (KM)	**0.2413**	-0.0081	**0.4854**
Rooms	**2.3798**	**0.1333**	**7.5567**
Baths	**1.8717**	**0.0637**	**5.5493**
Floors	**1.2236**	-0.0395	**2.6631**
Non-transformed Variables			
Ranch	-0.1886	-0.0897	-0.2371
Raised Ranch		-0.1739	
Conversion/Old Style		-0.0880	**-1.5830**
Cape Cod	-0.2375	-0.0372	-0.5755
Colonial Gambrel	-0.5105	-0.0635	-0.4406
Split Level	0.0707	-0.0385	0.2526
Condo		-0.1174	**13.2858**
Contemporary		-0.0882	-0.1233
Two Family	-0.3517	**-0.1351**	-2.3623
Cottage/Bungalow	-0.2131	-0.1923	**-1.3016**
Antique		**-0.2907**	
Quality2	0.0027		-2.4368
Quality3	-0.4810	**-0.0991**	-1.6679
Quality4	-0.5777	-0.0496	**-0.8690**
Quality6	0.3771	**0.0606**	**1.2047**
Quality7	1.0735	**0.1648**	**2.1432**
Quality8	1.5181	**0.2083**	**2.4332**
Quality9	2.6279	**0.1164**	**3.6942**
Quality10	1.1051	**0.3485**	**4.8542**
Constant	1829.3600	1.8051	7.1090
σ	0.6755	0.1410	1.4939
Observations	3586	298	1909
λ	**-0.7251**	**0.3798**	**-0.9621**
θ	**0.3075**	**-0.1501**	**0.4542**
LR χ^2 (43)	3552.98	410.34	2237.17
LogLikelihood	-14555.818	-1753.5034	-7478.0265
Test H$_0$:			
$\theta = \lambda = -1$	**-15174.5390**	**-1848.1834**	**-9102.2631**
$\theta = \lambda = 0$	**-14606.3480**	**-1765.0774**	**-7755.4192**
$\theta = \lambda = 1$	**-14762.3600**	**-2021.9073**	**-7785.0252**

Table 4: Impacts of Cultural Sector Estimated From Mutli-City Hedonic Models				
	Expenditures ($1000s)		Expenditures Per Capita	
	Coefficient	χ^2	Coefficient	χ^2
Cultural Expenditures	0.2945	150.310	0.6772	283.173
Real Income	1.3561	62.338	5.4595	88.712
Age	0.1648	358.248	0.3243	583.611
Land Area (acres)	0.1577	248.903	0.0742	181.168
Distance to center (KM)	0.0736	33.681	0.1157	70.137
Rooms	0.1544	53.366	0.2099	57.691
Baths	0.9781	521.619	1.3005	570.479
Floors	0.6876	124.544	0.8679	124.631
Dichotomous Variables				
Ranch	0.3765	77.354	0.3393	64.976
Raised Ranch	0.5539	98.456	0.5143	88.643
Conversion/Old Style	-0.2565	55.362	-0.2484	53.386
Cape Cod	0.1775	21.129	0.1528	16.253
Colonial Gambrel	0.1303	12.542	0.1339	13.403
Split Level	0.6278	128.047	0.5772	113.869
Condo	-0.4435	99.781	-0.3982	80.230
Contemporary	-0.0062	0.011	0.0271	0.220
Two Family	-0.3873	95.223	-0.3693	91.190
Cottage/Bungalow	0.2600	19.621	0.2459	18.462
Antique	0.1543	1.339	0.2417	3.446
Quality1 Poor	-0.4296	0.862	-0.3881	0.746
Quality2	-1.1658	46.305	-1.1422	47.142
Quality3	-1.1263	287.055	-1.0991	285.450
Quality4	-0.5975	137.794	-0.5824	138.856
Quality6	0.3343	228.686	0.3320	239.037
Quality7	0.6751	612.129	0.6749	647.724
Quality8	0.9505	591.272	0.9690	656.865
Quality9	1.3859	768.022	1.4131	850.615
Quality10	1.7413	432.075	1.7683	473.247
Quality11	1.6845	449.060	1.7262	502.807
Quality12	1.7750	208.445	1.8808	249.946
Quality13	1.9371	103.737	1.9101	106.921
Quality14	1.5538	28.536	1.7359	37.866
Quality15 Superior Plus	4.3840	88.243	4.4896	98.212
Brockton	1.5943	1121.524	1.7315	203.862
Concord	3.6810	438.204	3.3993	619.470
Holyoke	0.6685	197.745	0.6123	23.619
Lee	0.4147	41.221	0.0652	0.312
Lenox	0.8398	119.597	0.4769	18.802
Lowell	1.1209	544.376	1.2835	111.391
North Adams	0.4775	47.408	-0.1759	1.904
Northampton	0.3803	7.891	0.3629	11.901
Sandwich	0.8745	89.355	0.6202	33.975
Constant	-4.8586		-12.6902	
σ	1.0328		1.003	
Observations	22686		22686	

Table 4: Impacts of Cultural Sector Estimated From Mutli-City Hedonic Models				
	Expenditures ($1000s)		Expenditures Per Capita	
	Coefficient	σ	Coefficient	σ
λ	-0.0130	0.0294	**-0.2867**	0.0258
θ	**0.2174**	0.0054	**0.2111**	0.0054
LR χ^2 (43)	16363.19		16496.06	
LogLikelihood	-106946.69		-106880.26	
Test H$_0$:	Restricted log-likelihood	χ^2	Restricted log-likelihood	χ^2
$\theta = \lambda = -1$	-125162.23	36431.06	-125153.58	36546.63
$\theta = \lambda = 0$	-107674.88	1456.37	-107674.88	1589.24
$\theta = \lambda = 1$	-123579.69	33265.99	-123578.53	33396.54

In both Tables 3 and 4, we follow the practice of evaluating the statistical significance of individual parameter estimates using a likelihood ratio test of the restricting the parameter to have the value 0. This avoids concern about the dependence of the parameter estimate standard error on the scaling of the variable.

The first thing to note about the model estimates presented in Table 3 is that many of the parameter estimates are not statistically significant. Even worse, there is considerable inconsistency between the models. The model for Concord has parameter estimates that are about the magnitude to be expected. The impacts of income and cultural expenditures are also signed as we would expect: both increasing the value of residential property (although the impact of income is not statistically significant). The models for Brockton and Holyoke, however, are wildly different. Not only are the parameter estimates very large in absolute value, but in Holyoke increasing per capita cultural expenditures are associated with large decreases in property values. While the impact is positive in Brockton, increases in local per capita incomes are associated with large decreases in property values.

These results are almost certainly due to the difficulty in estimating models using data with limited variability in the independent variables. This can be a particularly severe problem when the data are highly collinear and the model is non-linear.

In the framework of the quality-of-life literature discussed above and surveyed recently by Kahn (2004) estimation of the impacts of variation in non-market goods really requires a cross-city hedonic approach. This provides sufficient separate variation in both the quality of life factors (in this case the

size of the cultural sector) and other community and structure characteristics to obtain a reasonably accurate estimate of the impacts. Indeed, one possible explanation for the surprising absence of studies on the impacts of the cultural sector on house prices is that most researchers would start with data from a single or small number of cities. Confronted with inconsistent results such as those in Table 3, most researchers would quietly move on to other research projects.

The results presented in Table 4 present a much more promising story. Virtually all the variables are statistically significant, and those that have clearly predicted signs are correctly signed. While the model using per capita cultural expenditures performs slightly better than the model using total cultural expenditures as the measure of cultural vitality, both models perform well. Both models suggest that increasing the level of cultural vitality will increase property values.

Similarly, increasing community per capita income, land bundled with the structure, or the structure size itself acts to increase the real property value. It is less clear what direction we 'expect' for increasing distance from the city center and increasing age at the time of sale, but for these data both factors increase the real value of the property.

The dichotomous variables and fixed effects also appear to work as might be expected. As the quality indicator moves from level 1 (Poor) to level 15 (Superior Plus) the estimated parameter generally increases. The fixed effect for the affluent community of Concord has the largest estimated parameter of all communities, and so forth. In general we can say that these two models perform well, and are consistent with the theoretical predictions presented in section (2) above. Increasing the level of cultural vitality in a community (as measured by the real expenditures of cultural not-for-profit organizations) has a clear, positive, and statistically significant impact on residential property values. This is as we would expect if the arts and culture are important contributors to the well being of community residents.

Interpreting the estimated coefficients to obtain an implicit price or valuation of increasing cultural expenditures is somewhat more complex for a non-linear model such as we have estimated. The impact depends on the particular property and the particular community. One sensible way to present such an evaluation is to calculate the marginal impact of a unit of each structure or community characteristic, evaluated for the mean house in each community. This will be evaluated for a larger and more expensive home in Concord (for example) and a smaller less expensive home in North

Adams, but the approach gives a reasonable sense of the estimated impact of not only community cultural vitality but also other structure characteristics. Examining these estimates also serves to enhance our understanding of the reliability of the model parameter estimates.

Solving equation (5) for structure price and differentiating with respect to a transformed structure or community characteristic, we can derive the following expression for the marginal impact (or hedonic price) of cultural expenses:

$$\text{Impact per unit} = \beta \frac{\left(Cultural\ Expenses\right)^{\lambda-1}}{\left(Estimated\ House\ Value\right)^{\theta-1}} \tag{6}$$

Where β is the estimated coefficient (from Table 4) for Cultural Expenditures, and λ and θ are the parameters of the Box-Cox transformation as presented in equation (5). If we want to evaluate the marginal impact on house values of other characteristics, we substitute the value for that factor in (6) in place of Culture Expenses, and use the estimated coefficient for that factor in the place of β.

Table 5 below presents the results of these calculations for each of the transformed characteristics in each of the 11 communities included in our study. The top half of the table presents estimates using the model based on per-capita real cultural expenditures, and the lower half of the table presents estimates based on the model that uses total real cultural expenditures. For each characteristic and each community we use mean value of the characteristic and the mean house value from that community in a calculation based on equation (6).

In addition to the hedonic prices of characteristics for each community, we calculate the impact on house values of a one standard deviation change in real cultural expenditures (per capita or total, as appropriate) for each community, using the calculated standard deviation for cultural expenditures in that community. This provides some sense of how important a factor cultural vitality is likely to be for local property markets.

The results in Table 5 are very interesting. In general, the model based on per-capita expenditures gives lower (although similar order of magnitude) estimate of impacts of cultural vitality. The estimates of a one standard deviation increase in the local cultural sector range from just under $800 for an average house in Lee (using the per-capita model) to over $9000 for the average house in Sandwich (using the total expenditure model). Naturally these calculations depend not only on the nature of the community but also on how variable the recent history of the cultural sector has been.

	Table 5: Hedonic prices and Impact of Increasing Cultural Expenditures										
	Brockton	Concord	Holyoke	Lee	Lenox	Lowell	North Adams	Northampton	Provincetown	Stockbridge	Sandwich
Cultural Expend Per Cap	$625	$119	$262	$10	$8	$150	$32	$35	$14	$3	$80
$1 \times \sigma$ increase in PC Cult Exp	**$4,412**	**$3,537**	**$1,403**	**$798**	**$1,686**	**$1,645**	**$2,388**	**$2,650**	**$1,307**	**$833**	**$6,927**
Real Income	$499	$357	$376	$326	$403	$416	$286	$304	$387	$383	$326
Age	$55	$156	$35	$46	$75	$55	$21	$59	$59	$77	$266
Land Area (acres)	$14,262	$4,346	$7,016	$3,542	$2,033	$27,397	$2,884	$4,338		$756	$4,411
Distance to center (KM)	$1,009	$1,895	$775	$1,305	$1,249	$1,064	$881	$787	$3,690	$1,119	$386
Rooms	$505	$979	$331	$399	$534	$458	$273	$476	$1,011	$698	$609
Baths	$13,699	$21,691	$8,491	$9,286	$11,253	$10,590	$7,414	$11,164	$15,436	$12,254	$11,567
Floors	$9,001	$20,247	$5,301	$6,329	$9,242	$6,165	$4,114	$8,096	$11,331	$12,963	$9,380
Total Cultural Expenditures	$6	$11	$6	$3	$4	$2	$3	$2	$9	$4	$5
$1 \times \sigma$ increase in Cult Exp	**$3,755**	**$5,340**	**$1,346**	**$1,613**	**$3,858**	**$1,817**	**$3,435**	**$4,191**	**$2,736**	**$2,572**	**$9,569**
Real Income	$421	$394	$312	$287	$368	$350	$238	$283	$363	$373	$309
Age	$83	$230	$55	$68	$109	$80	$34	$87	$93	$119	$295
Land Area (acres)	$20,238	$9,674	$10,729	$6,440	$4,512	$32,452	$5,046	$7,863		$2,189	$8,250
Distance to center (KM)	$827	$1,655	$623	$965	$1,011	$827	$652	$674	$2,421	$980	$399
Rooms	$629	$1,291	$418	$498	$680	$559	$340	$595	$1,146	$888	$749
Baths	$12,748	$22,304	$8,107	$8,942	$11,286	$9,984	$6,899	$10,760	$14,771	$12,761	$11,458
Floors	$8,853	$20,421	$5,408	$6,392	$9,343	$6,303	$4,194	$8,076	$11,193	$12,893	$9,391

Overall the estimated hedonic prices are plausible. Adding an extra acre of land to a structure increases its value by an amount that ranges from approximately $1,000 (about the value of agricultural land if it cannot be developed for non-agricultural use) to more than $30,000 in communities that are closer to the large urban centers. Adding an extra bathroom (valued between $7000 and $22000) is worth more than simply adding another generic room to the structure (which adds between $300 and $1000). The general reasonableness of these values serves to further build our confidence in the model and its estimates of the contribution of cultural vitality to property values.

5. Implications

We conclude with some remarks and observations about the policy implications and prospects for further development of our research.

a. Cultural economic development

As observed in both sections (1) and (2) above, if use of the arts and culture are a viable policy for encouraging urban revitalization, then increasing the level of cultural vitality in a community should be associated with increasing property values. The absence of clear evidence for this was cause for potential concern about the efficacy of these policies. The data and estimates we present suggest that there is a clear and statistically significant link and that these policies are potentially effective.

Our analysis should not be interpreted as showing that such policies are always effective. First, our estimates suggest that the marginal benefits of cultural community development vary considerably from community to community. There may well be some communities where the cost of increasing per capita cultural expenditures does not generate sufficient benefits to pass a reasonable cost-benefit test.

Second, we have not evaluated the potential for interaction and competition between communities. As more local policy makers turn to the arts and culture as strategies for urban revitalization, it seems likely that some will find it increasingly difficult to generate marginal benefits that cover the costs of the strategy. This is an important area for future research.

b. Gentrification

Our analysis does suggest that in some communities it might be reasonable to maintain concern about gentrification and displacement of original community residents. While the changes in property values

21

generated by a one standard deviation change in the cultural sector are generally modest compared to the magnitude of property value changes observed in the region during the past decade, they do contribute to what is widely regarded as a housing affordability problem.

Note that this is not a 'problem' in terms of the desirability of maintaining and improving the cultural sector. The increases in property values are themselves a signal that the sector is generating benefits (although as noted above public policy should be concerned with the net benefits generated). The issue is one of being concerned about how these benefits are distributed through the community. If public policies are concerned about the distributional consequences, then it might be necessary to combine cultural development strategies with specific housing policies to ensure continued access for low-income households to newly improved and revitalized neighborhoods.

c. Public support for the cultural sector

One of the most important implications of our analysis is the evidence presented that there are significant public benefits generated by the local cultural sector. These benefits are revealed by the improved property values that provide a measure of the willingness of households to pay to reside in a community with a more active arts and culture scene.

Given this it seems reasonable for public policy to be devised to draw revenues from the property owners who benefit from the presence of these externalities and use the resources to support the arts in the community. The argument is exactly the same as the provision of any other local public good. The failure of public policy to act to support the arts will potentially result in welfare losses for residents and make our communities less attractive.

6. References

Bahrampour, Tara, 2004. A 'Plague of Artists' is a Battle Cry for Brooklyn Hasidim. *The New York Times*, February 17, 2004.

Cheshire, Paul and Sheppard, Stephen, 2002. The Welfare Economics of Land Use Planning, *Journal of Urban Economics*, **52**, 242-269.

Cheshire, Paul and Sheppard, Stephen, 2004. Capitalising the Value Of Free Schools: The Impact of Supply Characteristics and Uncertainty, *The Economic Journal*, **114**, F397-F424.

Clark, David and Kahn, James, 1988. The Social Benefits of Urban Cultural Amenities, *Journal of Regional Science*, 28, 363-377.

Do, A. Quang, Wilbur, Robert W. and Short, James L., 1994. An Empirical Examination of the Externalities of Neighborhood Churches on Housing Values, *Journal of Real Estate Finance and Economics*, **9**, 127-36.

Florida, Richard 2002a. The Economic Geography of Talent, *Annals of the Association of American Geographers*, **92**, 743-755.

Florida, Richard 2002b. Bohemia and Economic Geography, *Journal of Economic Geography*, **2**, 55-71.

Florida, Richard 2002c. *The Rise of the Creative Class*, New York, NY : Basic Books.

Fu, Shine 2005. What Has Been Capitalized Into Property Values: Human Capital, Social Capital, or Cultural Capital? *Working Paper* CES 05-25.

Gibbons, Steve, 2004. The Cost of Urban Property Crime, *The Economic Journal*, **114**, F441-63

Glaeser, E. L. and Shapiro, J. M. 2003. Urban growth in the 1990s: Is city living back?. *Journal of Regional Science* 43 (1): 139-165.

Kahn, Matthew 2004. Environmental Valuation Using Cross-City Hedonic Methods, chapter prepared for forthcoming volume to be published by Ashgate Press.

Kane, Thomas J., Staiger, Douglas O. and Samms, Gavin, 2003. School Accountability Ratings and Housing Values, *Brookings-Wharton Papers on Urban Affairs*, 2003, 83-127.

Lees, Loretta, 2003. Super-gentrification: The Case of Brooklyn Heights, New York City, *Urban Studies*, **40**, 2487–2509.

Leichenko, Robin M., Coulson, N. Edward and Listokin, David, 2001. Historic Preservation and Residential Property Values: An Analysis of Texas Cities, *Urban Studies*, **38**, 1973-87.

Lucas, R. E. 2001. Externalities and Cities, *Review of Economic Dynamics*, **4**, 245-74.

Mason, Randall, 2002. Assessing Values in Conservation Planning: Methodological Issues and Choices, in Marta de la Torre, ed. *Assessing the Values of Cultural Heritage*, Los Angeles: The Getty Conservation Institute.

Mourato, Susana and Mazzanti, Massimiliano, 2002. Economic Valuation of Cultural Heritage: Evidence and Prospects, in Marta de la Torre, ed. *Assessing the Values of Cultural Heritage*, Los Angeles: The Getty Conservation Institute.

Murata, Y. 2003. Product diversity, taste heterogeneity, and geographic distribution of economic activities: market vs. non-market interactions. *Journal of Urban Economics* 53 (1): 126-144.

Ottaviano, G. and Peri, G. 2006. The economic value of cultural diversity: evidence from US cities. *Journal of Economic Geography* 6 (1): 9-44.

Ottaviano, G. and Peri, G. 2005. Cities and cultures. *Journal of Urban Economics* 58 (2): 304-337.

Plimpton, Jan 1995. Live/Work Space: Housing for Artists in Your Community, *National Assembly of Local Arts Agencies Monographs*, **4**, 1-18.

Rauch, J. 1993. Productivity Gains from Geographic Concentration of Human Capital: Evidence from Cities, *Journal of Urban Economics*, **34**, 380-400.

Roback, Jennifer 1980. Wages, Rents and the Quality of Life, Journal *of Political Economy*, **90**, 1257-1278.

Rosen, Sherwin 1979. Wage-based indexes of urban quality of life, in P. Mieszkowski and M. Straszheim, eds., *Current Issues in Urban Economics*, Baltimore: Johns Hopkins University Press.

Sander, W. 2005. On the demand for city living. *Journal of Economic Geography* 5 (3): 351-364.

Schmidt, Lucie and Courant, Paul N. 2006. Sometimes Close is Good Enough: the Value of Nearby Environmental Amenities, *Journal of Regional Science*, *forthcoming*.

Sheppard, Stephen, 1999. Hedonic Analysis of Housing Markets, in *Handbook of Regional and Urban Economics Volume 3: Applied Urban Economics*, edited by Paul Cheshire and Edwin Mills, Amsterdam: North Holland, Chapter 41, 1595 – 1635.

Throsby, David, 2002. Cultural Capital and Sustainability Concepts in the Economics of Cultural Heritage, in Marta de la Torre, ed. *Assessing the Values of Cultural Heritage*, Los Angeles: The Getty Conservation Institute.