Journal of Economic Geography Advance Access published July 8, 2009

Journal of Economic Geography (2009) pp. 1–22 doi:10.1093/jeg/lbp022

There goes the metro: how and why bohemians, artists and gays affect regional housing values

Richard Florida and Charlotta Mellander***

Abstract

It is often conjectured that artistic, bohemian and gay populations increase housing values in the neighborhoods and communities in which they reside. But these groups are small, and the evidence of their effect on housing prices is anecdotal and limited. We argue that artists, bohemians and gays affect housing values through two kinds of mechanisms: an *aesthetic-amenity premium*; and a *tolerance* or *open culture premium*. To examine this, we introduce a combined measure of bohemian and gay populations—the Bohemian-Gay Index. We conduct statistical analyses to test the performance of this measure against other variables expected to affect housing values—income, wages, technology and human capital. The findings indicate that the Bohemian-Gay Index has a substantial direct relation with housing values across all permutations of the model and across all region sizes. It remains positive and significant alongside variables for regional income, wages, technology and human capital. The Bohemian-Gay Index also has a substantial direct correlation with other key variables, particularly income, indicating an additional indirect effect on housing values.

Keywords: Housing, human capital, creative class, income, gay, artistic, bohemian
JEL classifications: R10, R21, Z13
Date submitted: November 2007 **Date accepted:** April 2009

1. Introduction

'Want to know where a great place to invest in real estate will be five or 10 years from now? Look at where artists are living now.' So went a 2007 *Business Week* story provocatively titled 'Bohemian Today, High-Rent Tomorrow.' A number of studies have shown that artist and gay populations act as urban pioneers and that their location choices can have substantial positive effects on housing prices (Castells, 1983; Ley, 1994; Zukin, 1995; Smith, 1996). But artistic and gay populations are relatively small and the evidence of their direct effect on housing prices is limited and anecdotal. There are roughly 330,000 working artists in the United States and about 1.3 million 'bohemians'—if one counts every individual who is employed in arts, design, entertainment and media occupations, roughly 1.3% of the U.S. workforce in 2000. There are 8.8 million self-identified gay and lesbian gay people in the United States, approximately 4% of the adult population (Gates and Ost, 2004). Still, the basic idea

*Martin Prosperity Institute, Rotman School of Management, University of Toronto, Toronto, Canada. *email* <florida@rotman.utoronto.ca>
**Prosperity Institute of Scandinavia, Jönköping International Business School, Sweden. *email* <charlotta.mellander@jibs.se>

that gay and bohemian populations affect housing prices makes for good headlines. And the notion has become conventional wisdom among many urbanists and real estate developers. Yet a basic question remains: Can groups this small really have a significant effect on housing prices?

We argue that artistic and gay populations affect housing values through two mechanisms. An important study by Glaeser et al. (2001) finds that urban rents have risen faster than urban wages. They conclude that demand for location is driven by something other than the wage level—an urban amenity premium. They introduce a simple formula for this: Urban Productivity Premium + Urban Amenity Premium = Urban Rent Premium. We extend this idea of an urban amenity premium, arguing that bohemians and gays affect housing values on the supply side through an *aesthetic-amenity premium*. Artists and bohemians are direct producers of amenities; their location will thus directly reflect higher levels of amenity. In addition, artists, bohemians and gays are attracted to amenity, authenticity and aesthetics. These locations will command a premium for their cultural amenities, neighborhood character and aesthetic quality of the housing stock.

Second, we argue that bohemian, artistic and gay populations reflect a *tolerance* or *open culture premium*. This tolerance or open culture premium acts on the demand side by reducing barriers to entry for human capital; increasing the efficiencies of human capital externalities and knowledge spillovers; promoting self-expression and idea generation; and facilitating entrepreneurial mobilization of resources, thus acting on regional income and real estate prices.

Our argument can be summarized in a simple equation: Regional Income + Regional Amenity Premium + Regional Openness Premium = Regional Housing Values. We introduce a combined measure of bohemian and gay populations—the Bohemian-Gay Index—as a proxy measure for regional amenity and regional openness. We then use a variety of statistical techniques to test the efficacy and performance of the Bohemian-Gay Index against that research has shown to significantly affect housing values: income, wages, technology and human capital. Some might argue that bohemian and gay populations do not cause higher incomes but are themselves a function of higher income and higher human capital locations. So we control for regional factors such as population, changes in regional income, changes in employment, innovation level and regional size to account for that possibility.

Taking this into account, we separate the direct and indirect effects within a structural equation model and path analysis to further examine these variables in a regional system. The analyses are cross-sectional and are based on data for 331 US metropolitan regions for the year 2000.

The key findings confirm the general theory and hypotheses. The Bohemian-Gay Index has a substantial direct effect on housing values across all permutations of the model and across all region sizes, and remains significant and positive after controlling for factors such as regional size, regional rank, recent economic growth and job availability. It remains positive and significant alongside variables for regional income, wages, technology and human capital, which previous research has found to have a significant effect on housing values. In addition to its direct relation with housing values, the Bohemian-Gay Index also has a substantial direct effect on other key variables, particularly income, and indicating an additional indirect effect in housing values as well. We thus reject the hypothesis that the Bohemian-Gay Index only reflects higher incomes, higher human capital levels or size-related regional

characteristics. The consistency of the findings clearly establishes that the influence of bohemian-gay populations functions independently of those factors to condition housing values.

2. Concepts and theory

The literature covering the determinants of housing values is vast. Housing prices, according to economic theory, are set at the intersection of supply and demand. Acting on the demand side are wages and income, while the availability of housing units conditions the supply side. Where new home building can occur relatively easily, supply increases to meet demand and prices are more or less stable. When incomes rise in highly desirable areas or those with complex or constraining zoning rules, appreciation will be more rapid (Glaeser et al., 2005, 2006).

Recent research has noted the rise of so-called 'superstar cities' where appreciation far outpaces the national average (Gyourko et al., 2006). This research charts the growing divergence in housing prices between the highest-priced city-regions compared with those near the median. It finds that this divergence is the result of limited land in specific metropolitan areas and the increase in high-income households overall, which increases demand for these specific locations. Thus regional housing prices frequently reflect a premium. The literature has argued that several factors affect this premium—some affect demand, others supply.

Alonso (1964), Mills (1967) and Muth (1969) developed seminal microeconomic models for housing prices and household location patterns based on bid rents and housing choice. Fujita (1989) later used a bid rent model to explain land use and city structure in terms of a gradient pattern—households closest to the urban center are likely to be small, reflecting their willingness to pay more to be close to the center and its amenities, while larger households are likely to be further outside the core. Hedonic pricing theory also helps to explain the association between housing characteristics (e.g. the size of the lot, the number of rooms, year of construction and neighborhood qualities) and market value.

Roback (1982) expanded the traditional neoclassical model, where migration occurs in response to wage levels, economic opportunity and land rent to include quality-of-life amenities An empirical study (Glaeser et al., 2001) finds that high-amenity cities have grown faster than low-amenity cities. Consumer and personal service industries such as restaurants, theaters and museums demand geographic proximity between producer and consumer. This study finds that urban rents have risen faster than urban wages, and concludes that demand for location is driven by something other than the wage level—an urban amenity premium which translates into higher housing values. The authors introduce a simple formula for this: Urban Productivity Premium + Urban Amenity Premium = Urban Rent Premium.

Several other studies (Lloyd and Clark, 2001; Clark et al., 2002; Florida, 2002a, 2002b, 2002c; Clark, 2003) document the role of amenities and lifestyle—in the form of entertainment, nightlife, culture and so on—in attracting educated populations who can pay more for housing. Florida (2002c) introduced a measure of observed locational preferences of the producers of artistic and cultural amenities, the 'Bohemian Index,' and found it to be associated with concentrations of human capital and innovation. Shapiro's (2006) detailed study of regional productivity growth finds that 'roughly 60% of the employment growth effect of college graduates is due to enhanced productivity

growth, the rest being caused by growth in quality of life.' Shapiro's study finds that metropolitan areas with greater numbers of skilled workers experienced faster increases in wages, rental prices and housing prices.

Building upon Glaeser et al. (2001) and related studies as mentioned above, we extend the concept of an urban amenity premium, arguing that bohemians and gays affect housing values on the supply side through an *aesthetic-amenity premium*. Artists and bohemians are direct producers of amenities, so their location will directly reflect higher levels of amenity. Furthermore, artists, bohemians and gays are selective buyers with an eye for amenity, authenticity and aesthetics. Thus locations where they concentrate will command a premium for their cultural amenities, desirable neighborhood character and the aesthetic quality of the housing stock. Thus, following Glaeser et al. (2001), we argue that: Regional Income + Regional Amenity Premium = Regional Housing Value.

Second, other studies find that industrial structure affects housing values, by acting on the demand side. Landis et al. (2002) explore the effects of high-technology—or so-called 'new economy'–sectors on regional housing values, and finds that new economy regions, such as Silicon Valley and others, experienced surging home prices in the 1990s. The study also found that home ownership rates were lower and crowding was greater in these markets—even though wages were rising, home ownership was harder to attain. We test for the effects of high-technology industry concentration on housing prices.

A third factor relates to demographic shifts. There is a wealth of literature on neighborhood transition and its effects on housing values. Recent research tracks inter-regional migration and the concentration of highly skilled and education populations. Building on the seminal insights of Jacobs (1961, 1968), Lucas (1988) argues that the clustering of human capital, or what he refers to as human capital externalities, is the basic mechanism of economic growth. Central locations localize human capital and information, create knowledge spillovers and become engines of economic growth. In doing so, they reduce the cost of knowledge transfer, so that ideas can move more quickly, in turn spurring economic growth. Various studies have empirically verified the role of human capital in regional growth (Rauch, 1993; Simon and Nardinelli, 1996; Simon, 1998). It would be expected then that such human capital concentration would lead to increased demand for housing and thus increased prices. Glaeser (2000) finds that firms follow human capital to some degree, locating in areas of high human capital concentration to gain competitive advantages, rather than letting suppliers and customers' geography dictate location.

Recent research finds that human capital is becoming more concentrated (Florida, 2002b; Berry and Glaeser, 2005), and that this acts on housing values by increasing demand in local markets. Berry and Glaeser (2005) find increasing divergence in human capital levels across U.S. metropolitan regions. Glaeser and Saiz (2003) find that skilled cities grow, relative to less skilled cities, through increases in productivity. There are reasons to believe that such divergence will continue, affecting not only regional growth levels, but also housing values (Shapiro, 2005; Gyourko et al., 2006). We test for human capital effects by including variables for both human capital and the creative class in our model.

The fourth factor involves the role of artistic, bohemians and gay populations on housing values. It has become a conventional wisdom to think of artists, designers and gay people as 'urban pioneers' who drive up real estate values in their neighborhoods.

There is a substantial, mainly descriptive literature on gentrification (Castells 1983; Ley 1994; Zukin 1995; Smith 1996). These studies, which are mainly historical case studies, cite the role of artists and gay populations in improving neighborhood conditions, leading to an increase in real estate values and housing prices.

A recent stream of research examines the effects of artistic and gay populations on regional development (Florida and Gates 2001; Florida, 2002a, 2005). Markusen and Schrock (2006) describe an 'artistic dividend' through which arts and cultural activities increase the vibrancy and diversity of life in metropolitan areas and influence other industries. Their investigation of the multiple industries in which artists work is congruent with findings by Glaeser and others regarding the effects of knowledge spillovers on urban innovation and productivity. The basic idea is that artistic and culturally creative individuals act as a conduit for knowledge transfer across firms and industries, creating a multiplier effect of sorts. Currid (2006, 2007) describes the role of creative industries and occupations as a driving factor in the development of New York City, finding that networks of artistic and creative individuals are key conduits for spillovers that result in new ideas, commercial innovation and income growth.

Florida (2002c) introduces a measure of the producers of artistic and cultural amenities—the 'Bohemian Index'—and finds it to be associated with concentrations of talent and innovation. Noland (2005) finds that tolerant attitudes toward gays and lesbians are associated with positive attitudes toward global economic activity and international financial outcomes. Black et al. (2002) document the concentration of gay male households in geographic locations with higher levels of attractiveness or amenity. They argue that since gay households have constraints that make having children more costly for them than for heterosexual households, they will consume 'less' housing. In other words, their lifetime demand for housing is lower. This, in effect, frees up resources for allocation elsewhere, in this case toward housing in more attractive areas. Black et al. identify the overrepresentation of gays in the most attractive—i.e. the highest amenity—regions in the United States. For these reasons, we can expect that artistic and gay populations will affect housing values through their association with broader demographic shifts, especially human capital concentration, and also through their direct effects on innovation and regional development.

We argue that bohemian, artistic and gay populations reflect a second premium—a *tolerance* or *open culture premium*. This acts on the demand side by making local resources more productive, doing so in four key ways. First, the location of bohemian and gay populations reflects low barriers to entry for human capital. Such locations will have advantages in attracting a broad range of talent across racial, ethnic and other lines, increasing the efficiency of human capital accumulation. Page (2007) provides evidence that such diversity is associated with higher rates of innovation and economic growth.

Second, larger bohemian and gay populations signal underlying mechanisms that increase the efficiency of the knowledge spillovers and human capital externalities that Lucas (1988) identifies as the primary engine of economic growth. As mentioned above, recent studies (Markusen and Schrock, 2006; Currid, 2006, 2007) note the role of artistic networks as conduits for the spread of new ideas and knowledge transfer across firms and industries.

Third, artistic and gay populations reflect regional values that are open-minded, meritocratic, tolerant of risk and oriented to self-expression. Inglehart et al. (2003,

2005) note the correlation between self-expression values and GDP growth at the national level, while psychological studies (Amabile, 1996; Stenberg, 1999; Fredrickson, 2001) find that self-expression is positively associated with innovative and entrepreneurial activity. Lucas (1988) explicitly highlights the similarities in values and orientation between technological and entrepreneurial labor and artistic and cultural populations, noting that: 'Much of life is "creative" in much the same way that is 'art' and "science." ... To an outsider it even looks the same. A collection of people doing pretty much the same thing, each emphasizing his own originality and uniqueness.'

Fourth, because bohemians and gays have historically been marginalized groups, traditional economic institutions have been less open and receptive to them. This means these groups have had to mobilize resources independently and to form new organizations and firms. We suggest that regions in which these groups have taken root possess underlying mechanisms more attuned to the mobilization of such resources, entrepreneurship and new firm formation.

These four factors, when taken together, improve the efficiency and productivity of regional human capital, innovation and entrepreneurship, increasing local income and wealth and acting through those channels to increase housing prices.

Therefore, our overall argument can be summarized in a simple equation: Regional Income + Regional Amenity Premium + Regional Openness Premium = Regional Housing Value. To examine this, we introduce a combined measure of bohemian and gay populations—the Bohemian-Gay Index—and enter it into our theory and model alongside income, human capital, technology and other factors previous research has shown to affect housing values. We control for regional factors as well, including variables for regional population, change in regional income, change in regional employment and regional innovation.

3. Model

A schematic picture of our general model of regional housing values is presented in Figure 1. The model considers housing prices in terms of a system of relationships. It thus allows us to test the direct and indirect relationships of variables for income, human capital, technology and openness-amenity (the Bohemian-Gay Index) to

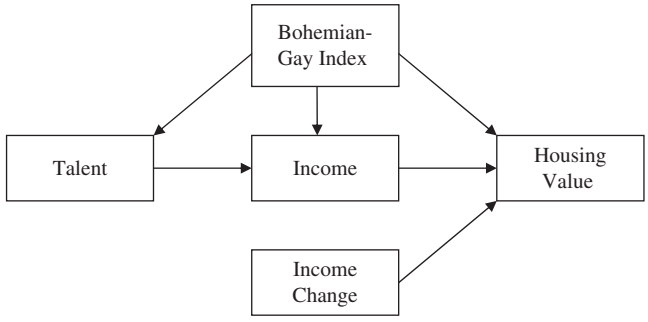

Figure 1. Basic Path Model.

one another and to housing prices. The arrows identify the hypothesized structure of these relationships.

We also include a series of control variables in an OLS estimation to rule out collinearity effects and bias estimations as a result of omitted variables.

4. Variables and data

We now describe the variables and data sources used in the empirical model. The variables cover 331 metropolitan statistical areas (MSAs), and are for the year 2000. Descriptive statistics for all measures and variables are provided in Table 1.

Median Housing Value: This variable is median housing value for the MSA. If the MSA lies within one state, the variable is equal to that MSA's median. If the MSA crosses state borders, we base the variable on separate medians for each state and calculate a weighted average of the medians using the number of owner-occupied houses valued. This is based on the 2000 US Census.

Income: This measure is based on reported income. Income is defined as proceeds from wages and salaries plus self-employment income, interest, dividends, rents, royalties, estates, trusts, social security or railroad retirement income, Supplemental Security Income (SSI), public assistance, welfare payments, retirement, survivor, or disability pensions, and all other income. It is measured on a per capita basis and the data is from the 2000 US Census.

Wages: This measure is defined as total money earnings received for work performed as an employee in the MSA. This includes wages, salary, armed forces pay, commissions, tips, piece-rate payments and cash bonuses earned before taxes. It is measured on a per capita basis and is sourced from the US Bureau of Labor Statistics for the year 2000.

Technology: The technology variable is based on the 2000 Tech-Pole Index published by the Milken Institute. This index ranks metropolitan areas based on: high-tech industrial output as a percentage of total US high-tech industrial output; and the percentage of the region's own total economic output that comes from high-tech industries compared to the national percentage.

Table 1. Descriptive statistics

	Obs.	Mean	Standard deviation	Minimum	Maximum
Human capital	326	23.72	7.43	11.05	52.38
Creative class	331	19.13	5.58	7.39	42.98
Bohemian-Gay Index	326	0.876	0.281	0.44	2.87
Technology	328	0.701	2.253	0.00	29.96
Wages	331	13.428	3.700	5.153	30.311
Income	326	20.607	3.972	9.899	51.462
Housing	331	117.552	56.570	52.400	469.500
Population	331	682.724	1,144.711	57.813	9,519.338
Income/capita change	315	0.025	0.078	–0.20	0.24
Employment change	315	–0.011	0.157	–0.49	1.27
Patent growth	331	0.1362	0.169	–0.07	1.09

Human capital: This variable is the conventional measure based on educational attainment, measured as the percentage of the MSA labor force with a bachelor's degree and above. It is derived from the 2000 US Census.

Creative class: Following Florida (2002a), we define the creative occupations or the 'creative class' as those in which individuals 'engage in complex problem-solving that involves a great deal of independent judgment and requires high levels of education or human capital.' Specifically, it includes the following major occupational groups: computer and mathematics occupations; architecture and engineering; life, physical and social science; education, training and library positions; arts and design work; and entertainment, sports, and media occupations. It also includes professional and knowledge-work occupations such as management occupations, business and financial operations, legal positions, health-care practitioners, technical occupations and high-end sales and sales management. It is measured as share of the regional labor force aged 25–64. All data are from the US Bureau of Labor Statistics for the year 2000.

Bohemian-Gay Index: This variable is based on the over- and under-representation of two groups: gay and lesbian households; and individuals employed in the arts, design and related occupations (see Florida et al., 2001, 2002a, 2002b, 2002c, 2005). It combines the separate location quotients for these two groups into the Bohemian-Gay Index. The data are from the 2000 US Census.

Control variables: We also include a series of variables to control for the effects of regional size and level of development.

Population: We expect that the size of the region has a large effect on housing values. Larger regions usually imply more expensive housing values. It might also be thought that the level of gay and bohemian populations (the Gay-Bohemian Index) is a function of region size. We include regional population figures to control for these possible effects. The data are from the 2000 US Census.

Changes in income per capita 1990–2000: Housing values today not only reflect the current economic situation, but economic development over time. We include the regional change in income per capita in the past decade to control for this effect. The data are based on the US Census for 1990 and for 2000.

Change in employed civilian population 1990–2000: We also include the change in employed civilian population between 1990 and 2000 to control for the effects of regional employment growth. The data are based on the US Census for 1990 and for 2000.

Annual patent growth 1975–2000: Regional innovation has a significant effect on regional economic development, and this may be reflected in regional housing values. We use annual patent growth from 1975 to 2000 to control for the effects of regional innovation rates on housing values. The data are sourced from the US Patent and Trademark Office.

5. Methods

We use path analysis and structural equations to examine the relationships between variables in the model. Structural equation models (SEM) may be thought of as an extension of regression analysis and factor analysis, expressing the interrelationship between variables through a set of linear relationships, based upon their variances and co-variances. In other words, structural equation models replace a (usually large)

set of observable variables with a small set of unobservable factor constructs, thus minimizing the problem of multicollinearity (further technical description in Jöreskog, 1973). The parameters of the equations are estimated by the maximum likelihood method.

It is important to stress that the graphic picture of the structural model (Figure 1) expresses direct and indirect correlations, not actual causalities. Rather, the estimated parameters (path coefficients) provide information on the relation between the set of variables. Moreover, the relative importance of the parameters is expressed by the standardized path coefficients, which allow for interpretation of direct and indirect effects.

From the relationships depicted in the model (Figure 1) we estimate three equations. The relationship between our Bohemian-Gay Index and the dependent variables in Equations (1) and (2) are basically treated as direct and indirect relations. The key equation is Equation (3):

$$lnTalent = \beta_{11} lnBohemianGay + e_1 \quad (1)$$

$$lnIncome = \beta_{21} lnBohemianGay + \beta_{22} lnTalent + e_2 \quad (2)$$

$$lnHousing = \beta_{31} lnBohemianGay + \beta_{33} lnIncome + e_3 \quad (3)$$

We also run a revised version of path models (Figure 2), allowing the talent variables—human capital and the creative class—a direct as well as an indirect effect on housing.

We also evaluate Equation (3) with an OLS, controlling not only for collinearity between the different explanatory variables with a VIF test, but also for alternative explanations, e.g. earlier economic development, the occupational structure of the region (including changes in unemployment over the past decade), the industry structure of the region as well as the regional population.

6. Findings

We begin by providing simple correlation coefficients between housing values and key measures for income, human capital, the creative class and the Bohemian-Gay Index. We then present the findings of the OLS models. The subsequent section summarizes the key findings from the structural equation models and path analysis.

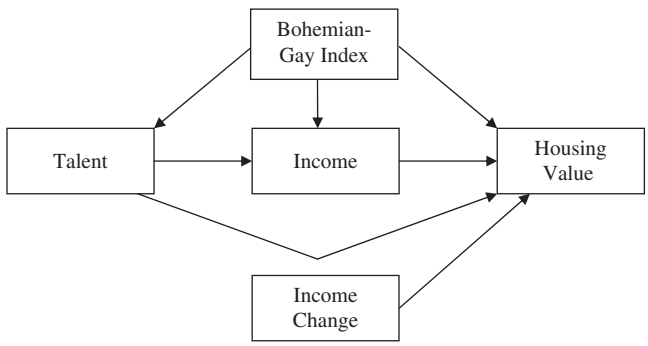

Figure 2. Revised Path Model.

Table 2 provides a correlation matrix for all key variables. The highest correlation is not surprisingly between income and housing (0.747). But the correlation coefficient between the Bohemian-Gay Index and housing is only slightly lower at 0.731. It is also considerably larger than that for wages and housing (0.494). Looking at the various talent measures, the coefficient between human capital and housing (0.643) is about the same as for the Bohemian-Gay Index, while the coefficient for the creative class (0.291) is about half that for the Bohemian-Gay Index. Furthermore, the Bohemian-Gay Index is also closely correlated with income (0.648), human capital (0.737), the creative class (0.470) and technology (0.601).

When we check the correlation between housing values and our control variables, we find a significant relationship for population, income change and patent growth, indicating that these may have some explanatory value. Employment change is not correlated with the housing value variable and is excluded from the analysis. It is also worth noting that the Bohemian-Gay index is significantly related to all four control variables.

Figure 3 continues this line of analysis, providing scatter-graphs for housing and income, wages, human capital and the Bohemian-Gay Index. Not surprisingly, the slope is steepest for the scatter-graph of income and housing, with few outliers and observations clustered close to the line. But the line for the Bohemian-Gay Index is very similar. The slope is steep with observations clustered close to the line and outliers pulling slightly to the left.

7. OLS results

We ran OLS regressions to further investigate the relationships between income, human capital and the Bohemian-Gay Index and housing values, controlling for other factors, related to regional size and recent economic growth, which may explain housing values. All variables are in logged form, except those showing changes over time. Table 3 presents the results.

The Bohemian-Gay Index is positive and significant when used in all three alternative versions, including both talent and income factors as well as earlier changes. The adjusted R^2 values for the equations that include the index are significantly higher than the one where it is not included. Excluding the Bohemian-Gay Index from Equation (3) decreases the adjusted R^2 from 0.683 to 0.594 (Eq. 4). Even in Equation (1), in the full model, the Bohemian-Gay Index is positive and highly significant, and it is robust in all four model estimations, with a coefficient of ~0.45–0.50. The VIF values, as well as the earlier correlations, indicate a collinearity between the talent variables (human capital and creative class) on one side and income per capita on the other. To exclude any such effects, Equation (3) includes only income per capita, changes in income and the Bohemian-Gay Index.

While some might argue that artistic and gay populations are a reflection of higher incomes, the Bohemian-Gay Index remains positive and significant alongside the income variable and adds additional explanatory power. Also, when we test for multicollinearity between income and the Bohemian-Gay Index in Equations (3) and (4), the VIF value is 1.749–2.493, which leads us to believe that they do not contain the same information. Thus we find that the presence of bohemian and gay populations is not a reflection of higher incomes, and that it affects housing values independently.

Table 2. Correlation matrix for key variables

	Human capital	Creative class	Boho-Gay	Technology	Wages	Income	Population	Income Change	Employment Change	Patent Change	Housing
Human capital	1										
Creative class	0.727**	1									
Bohomian-Gay	0.737**	0.470**	1								
Technology	0.558**	0.516**	0.601**	1							
Wages	0.653**	0.840**	0.557**	0.610**	1						
Income	0.701**	0.474**	0.648**	0.578**	0.723**	1					
Population	0.316**	0.335**	0.522**	0.665**	0.512**	0.453**	1				
Income change	0.063**	0.160**	–0.140*	–0.225**	0.032	–0.086	–0.235**	1			
Employment change	0.123*	0.101	0.149*	0.142*	0.153**	0.076	–0.131*	0.170**	1		
Patent growth	–0.153**	–0.192**	–0.237**	–0.077	–0.269**	–0.213	0.437**	0.158**	–0.020	1	
Housing	0.643**	0.291**	0.731**	0.544**	0.494**	0.747**	0.425**	–0.211**	0.066	–0.218**	1

*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).

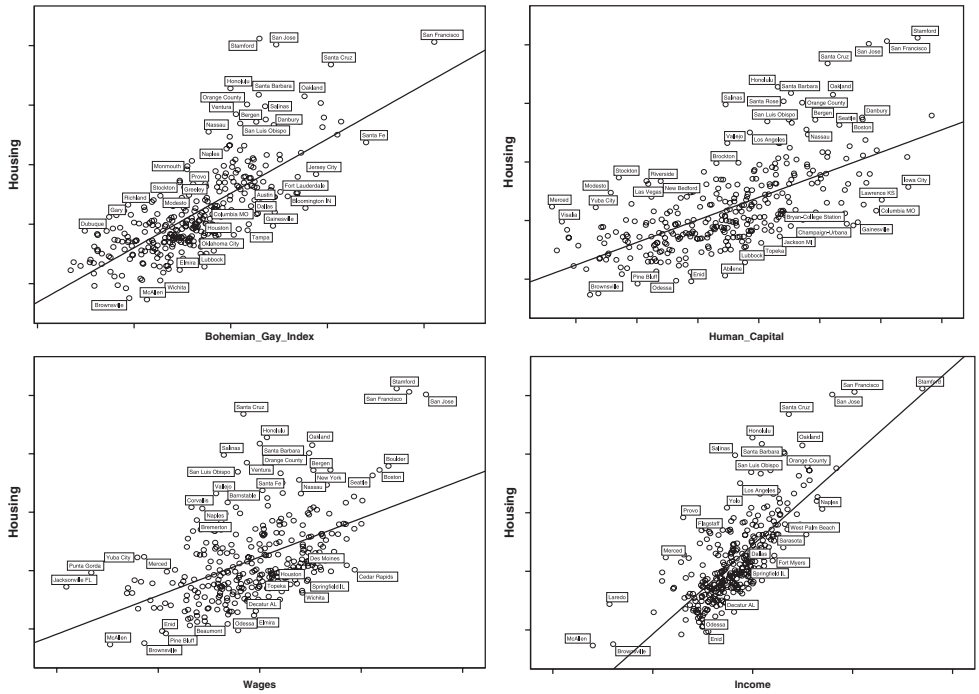

Figure 3. Scatter graphs of housing in relation to the Bohemian-Gay Index, human capital, wages and income.

8. Findings from structural equation models and path analysis

We now turn to the results from the structural equation models and path analysis, which we constructed based on the information from the OLS regressions. These models include variables for income, wages and technology; human capital and the creative class; and the Bohemian-Gay Index. We also include income change as an explanatory variable for housing values, since this was significant in the OLS regression (Table 3). These models allow us to isolate the effects of each variable within a system of relationships.

Table 4 summarizes the SEM results. The Bohemian-Gay Index is consistently strong, both in its direct correlation with housing and in its indirect relationships, working through income and wages regardless of the measure of human capital used.

Figure 4 presents the results for the first set of path models. These test the relationships among variables for housing, income, human capital and the Bohemian-Gay Index.

The Bohemian-Gay Index performed well in all versions of this model, with a coefficient between the index and housing (0.41) similar to that between housing and income (0.48). However, the Bohemian-Gay Index has an additional relation via human capital (0.74) and income (0.29), giving it an additional indirect effect on housing via income. Income change is negative and significant in relation to housing value (–0.12). We also ran a revised version of this model in which the human capital and creative class variables had direct effects on housing as well as

Table 3. OLS regression results

Variable	Eq. 1	VIF	Eq. 2	VIF	Eq. 3	VIF	Eq. 4	VIF
Human capital	0.208 (1.946)	7.266	0.203* (2.330)	4.836				
Creative class	–0.354** (–2.634)	10.189	–0.288 (–4.564)	2.254				
Technology	0.014 (1.703)	3.023						
Income per cap	0.951** (5.594)	6.537	1.027** (10.218)	2.254	1.000** (11.681)	1.728	1.515** (20.488)	1.007
Wage per cap	0.052 (0.341)	11.458						
Population	–0.005 (–0.305)	2.359						
Income change	–0.403* (–0.343)	1.280	–0.489** (–3.034)	1.127	–0.531** (–3.501)	1.010	–0.688** (–4.032)	
Employment change	–0.049 (–0.628)	1.090						
Patent growth	0.093 (0.264)	1.202						
Bohemian-Gay	0.463** (6.480)	3.064	0.478** (7.423)	2.493	0.496** (9.320)	1.749		
Obs.	315		315		315		315	
R^2 Adj.	0.705		0.706		0.683		0.594	

Significant level: *0.05, **0.01.

Table 4. Overall SEM results

Variables	Human capital			Creative class		
	Human capital Eq. 1	Wages Eq. 2	Housing Eq. 3	Creative class Eq. 1	Wages Eq. 2	Housing Eq. 3
Wages						
Bohemian-Gay	0.771***	0.155***	0.792***	0.470***	0.187***	0.792***
Talent		0.474***			0.710***	
Wages			0.195***			0.195***
Income change			–0.593***			–0.593***
Observations	331	331	331	331	331	331
R^2	0.543	0.439	0.552	0.224	0.751	0.552
Income						
Bohemian-Gay	0.771***	0.177***	0.512***	0.455***	0.335***	0.512***
Talent		0.287***			0.139***	
Income			0.961***			0.961***
Income change			–0.539***			–0.539***
Observations	331	331	331	331	331	331
R^2	0.543	0.529	0.669	0.221	0.457	0.669
Technology						
Bohemian-Gay	0.771***	3.372***	0.790***	0.457***	4.110***	0.790***
Talent		2.178***			2.823***	
Technology			0.020**			0.020***
Income change			–0.550***			–0.550***
Observations	331	331	331	331	331	331
R^2	0.543	0.391	0.550	0.222	0.434	0.550

R^2 is the squared multiple correlation between each endogenous variable and the variables (other than residual variables) that directly affect it.
Significant level: *0.1, **0.05, ***0.01.

on income. The Bohemian-Gay Index again performed well, while the coefficients between housing and human capital and the creative class were small, negative or insignificant. These findings further confirm the importance of the Bohemian-Gay Index in acting directly on housing values and indirectly through its effects on both human capital and income.

The next series of path models substitute wages for income (see Figure 5). Wages are a core measure of regional productivity and account for roughly 70% of income (see Florida, Mellander, Stolarick, 2008). Figure 5 provides the results for these paths.

The Bohemian-Gay Index performs even better in these models. The coefficients between it and housing are consistently the highest (0.64), outperforming the wage effect on housing (0.15). The Bohemian-Gay Index also has a significant relation to human capital (0.74) and to income (0.17), having an additional indirect relation with housing through its effects on income. Income change is still negative and significant, with a coefficient of –0.13. As above, we ran a revised model in which human capital and the creative class variables had a direct effect on housing. Other than the Bohemian-Gay Index, the only positive and significant coefficient was for human capital (0.20)—considerably smaller than that for the Bohemian-Gay Index (0.44).

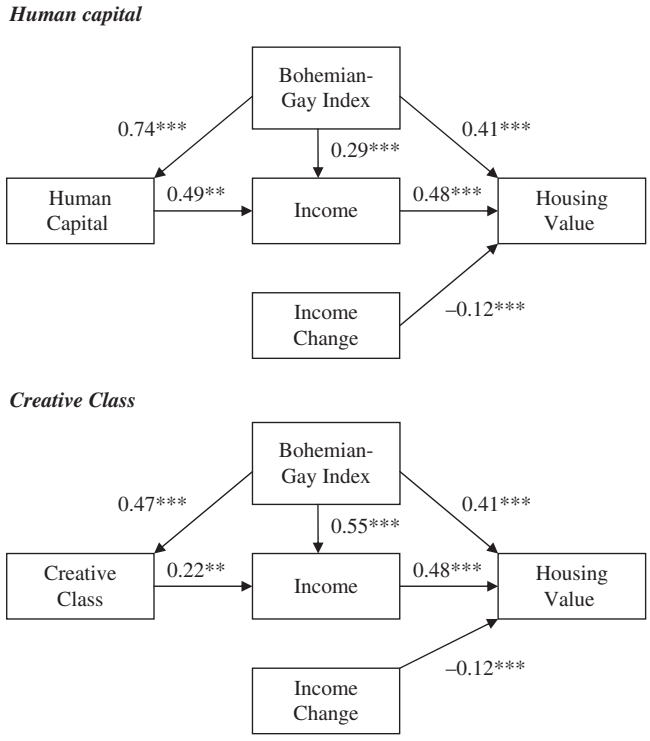

Figure 4. Path models for housing, income and the Bohemian-Gay Index.

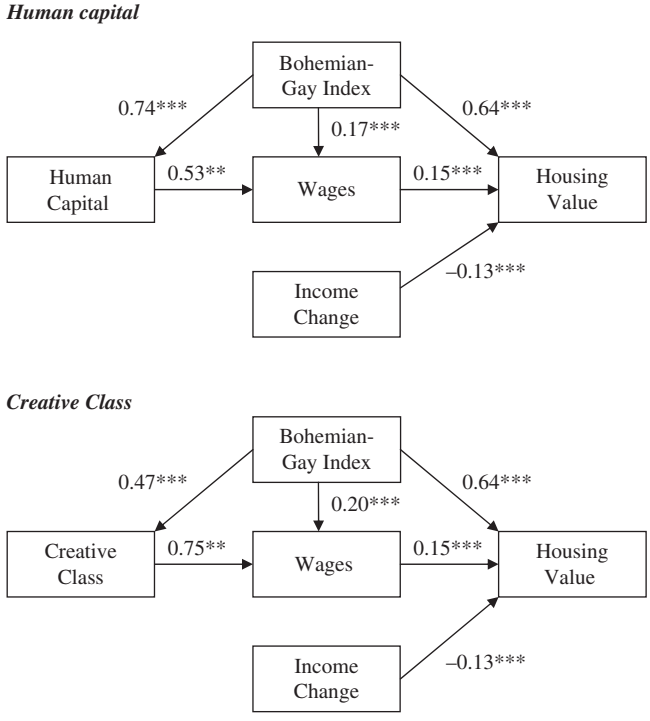

Figure 5. Path models for housing, wages and the Bohemian-Gay Index.

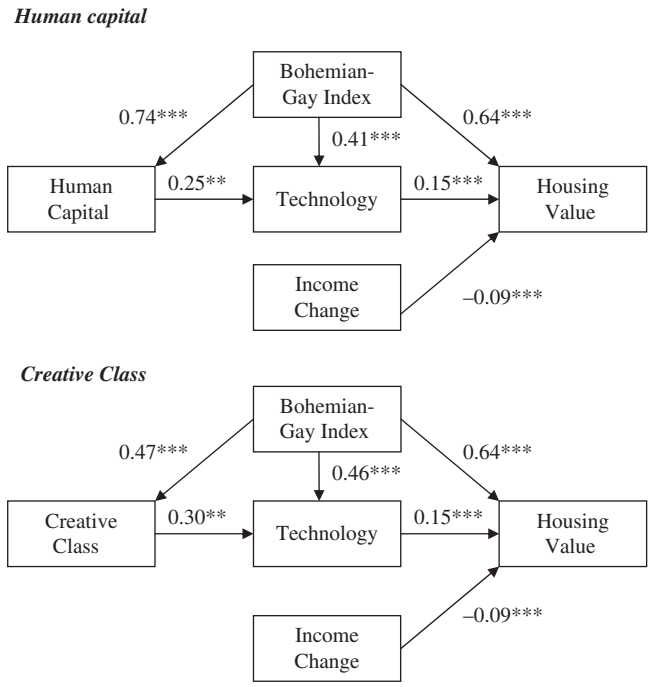

Figure 6. Path models for housing, technology and the Bohemian-Gay Index.

We run a third version of the paths, substituting an aspect of industrial structure—high technology industry—for income. Recall that Landis et al. (2002) found that new economy industry concentration affects housing prices. Figure 6 presents the results.

The Bohemian-Gay Index again performs well. The coefficient between the index and housing is 0.64, far larger than the 0.15 coefficient between technology and housing. The Bohemian-Gay Index is also significantly related to human capital (0.74) and technology (0.41), meaning it also affects housing values indirectly, through its effect on technology. We also run the revised version of the basic path model in which the talent variables have a direct effect on housing. Other than the Bohemian-Gay Index, only human capital has an effect (the coefficient between it and housing is 0.20, compared to 0.55 for the Bohemian-Gay Index).

9. Region size effects

It might be argued that the effects of the Bohemian-Gay Index vary by size of region, with large regions having an advantage in attracting gays and bohemians (or in the latter case providing the resources that produce them). Recall that the population size variable was insignificant in relation to housing values in the OLS estimation (Table 3). Still, we decided to look more closely at the effects of region size. So we ran the basic SEM model for four regional size groups: regions with a population greater than 1 million; between 500,000 and 1 million; between 250,000 and 500,000; and fewer than 250,000. Table 5 summarizes the results.

Table 5. SEM results by region size

Variables	Human capital			Creative class		
	Talent Eq. 1	Income Eq. 2	Housing Eq. 3	Talent Eq. 1	Income Eq. 2	Housing Eq. 3
Over 1 million population						
Bohemian-Gay	0.455***	0.023	0.623***	0.350***	0.207***	0.623***
Talent		0.596***			0.249***	
Income			1.514***			1.514***
Income change			−0.706***			−0.706***
Observations	61	61	61	61	61	61
R^2	0.265	0.705	0.712	0.132	0.331	0.712
500,000 to 1 million population						
Bohemian-Gay	0.705***	−0.074	0.415**	0.117	0.325***	0.415**
Talent		0.613***			0.281***	
Income			1.023***			1.023***
Income change			−1.225***			−1.225***
Observations	42	42	42	42	42	42
R^2	0.390	0.611	0.596	0.013	0.309	0.596
250,000 to 500,000 population						
Bohemian-Gay	0.992***	0.170	0.939***	0.580***	0.515***	0.939***
Talent		0.370***			0.037	
Income			0.783***			0.783***
Income change			−0.517*			−0.517*
Observations	79	79	79	79	79	79
R^2	0.614	0.531	0.722	0.193	0.413	0.722
Less than 250,000 population						
Bohemian-Gay	0.835***	0.165***	0.464***	0.380***	0.240***	0.464***
Talent		0.139***			0.107***	
Income			0.720***			0.720***
Income change			−0.152			−0.152
Observations	144	144	144	144	144	144
R^2	0.531	0.400	0.566	0.159	0.386	0.566

R^2 is the squared multiple correlation between each endogenous variable and the variables (other than residual variables) that directly affect it.

Here again the findings confirm the significance of the Bohemian-Gay Index. The coefficients for it and housing are positive and significant across all regional size groups, no matter whether it is combined with income, wages or technology. The Bohemian-Gay Index coefficient is positive and significant in all but one of the models where it is combined with human capital and the creative class—the exception being the model with the creative class in medium-sized regions.

We also note that income has a substantial effect on housing values. Income explains more of housing values than wages across all region sizes. Wages are significant only in the largest regions. Technology is significantly related to housing in the largest and smallest regions but not in between. While income is slightly more important in affecting housing values directly, the Bohemian-Gay Index relates to all three variables—housing values, incomes and human capital.

For these reasons, we can conclude that the results for the Bohemian-Gay Index are not simply a reflection of higher incomes or higher human capital, but that it works independently alongside as well as through other key and well-established factors to condition housing values.

10. Conclusion

Our research has examined the effects of artistic, bohemian and gay populations on housing values across US metropolitan regions. We advanced a novel theory for the effects of bohemian and gay populations on housing values. We argued that artistic and gay populations affect housing values through two classes of mechanisms: an *aesthetic or amenity premium* which acts on the supply side; and a *tolerance* or *open culture premium* which acts on the demand side (by reducing barriers to entry for human capital; increasing the efficiencies of human capital externalities and knowledge spillovers; promoting self-expression and new idea generation; and facilitating entrepreneurial mobilization of resources, thus acting on regional income and real estate prices).

We represented our theory in a simple equation: Regional Income + Regional Amenity Premium + Regional Openness Premium = Regional Housing Values. To study this, we introduced a combined measure of bohemian and gay populations—the Bohemian-Gay Index, a combination of two factors that qualitative literature on gentrification and inner-city revitalization indicates have an important effect on housing values. We conducted a variety of statistical analyses to test the efficacy and performance of this measure against other more established factors such as income, wages, technology and human capital—that have been shown to effect housing values, as well as regional control variables.

The key findings confirm the general theory and hypotheses. The Bohemian-Gay Index demonstrates a substantial relationship with housing values across all permutations of the model, regardless of what other variables are included, and across all region sizes. It remains positive and significant alongside well-established factors like regional income, wages, technology, recent economic growth and human capital. In addition to its direct relation to housing values, the Bohemian-Gay Index has a substantial direct relation to other key variables, particularly income, indicating an additional indirect effect on housing values. The findings clearly show that the influence of bohemian and gay populations operates independently of those factors as well as in combination.

We suggest two caveats in interpreting our results. First, the Bohemian-Gay Index may be picking up effects of other omitted variables. This is not a problem unique to this measure, but it is always possible that factors for which we can collect data and statically measure are proxies for other related but unmeasured phenomenon. This is always a possibility one needs to be aware of in a empirical research—and in a good deal scientific inquiry broadly. We have tested this measure to the best of our ability in models which account for well-established factors and find it to be consistently robust. The contribution of this research can thus be seen as identifying a previously omitted proxy measure for regional amenity and openness as a key factor in regional housing values. This is how research is supposed to progress by identifying new factors, which future research vets and examines further. Indeed, we wish to encourage future

research to probe these aesthetic and openness effects more deeply using other data and modeling approaches. Second, we recognize the limits of our research which is done at the regional or metropolitan level. Housing values diverge widely within regions and reflect factors which operate on the local or neighborhood level. We suggest that the openness and aesthetic effects we have identified here are likely to be even more pronounced at the county, city and neighborhood scales and wish to encourage further research to systematically probe for them. Finally, we note that our statistical analysis and structural equation modeling should be understood as reflecting direct and indirect associations among variables and not as specifying the direction of causality.

That said, the salience, consistency and robustness of our findings convince us that the regional concentration of artists, bohemians and gays—and of the Bohemian-Gay Index—really does matter—especially for housing prices, the best indicator we can devise to measure effective demand for location—even if it does so in unexpected ways.

Acknowledgement

We thank Kevin Stolarick for developing and assisting with data, and the editor and referees for their helpful comments.

References

Alonso, W. (1964) *Location and Land Use*. Cambridge, MA: Harvard University Press.
Amabile, T. (1996) *Creativity in Context*. Boulder: Westview Press.
Berry, C. R. and Glaeser, E. L. (2005) *The Divergence of Human Capital Levels Across Cities*, NBER Working Paper No. 11617, September 2005.
Black, D., Gates, G., Sanders, S., Taylor, L. (2002) Why Do Gay Men Live in San Francisco? *Journal of Urban Economics*, 51: 54–76.
Castells, M. (1983) Cultural identity, sexual liberation and urban structure: The gay community in San Francisco. In *The City and the Grassroots: A Cross-Cultural Theory of Urban Social Movements*, pp. 138–170. London: Edward Arnold.
Clark, T. N., Lloyd, R., Wong, K. K., Jain, P. (2002) Amenities Drive Urban Growth. *Journal of Urban Affairs*, 24: 493–515.
Clark, T. N. (2003) Urban amenities: Lakes, opera and juice bars – do they drive development? In *The City as an Entertainment Machine, Research in Urban Policy*, Vol. 9, pp. 103–140. Oxford: Elsevier Ltd.
Currid, E. (2006) New York as a global creative hub: A competitive analysis of four theories on world cities. *Economic Development Quarterly*, 20: 330–350.
Currid, E. (2007) *The Warhol Economy*. Princeton, NJ: Princeton University Press, forthcoming.
Florida, R. and Gates, G. (2001) Technology and Tolerance – The Importance of Diversity to High-Technology Growth, Centre on Urban and Metropolitan Policy, The Brookings Institutions, Washington DC.
Florida, R. (2002a) *The Rise of the Creative Class*. New York: Basic Books.
Florida, R. (2002b) The economic geography of talent. *Annals of the Association of American Geographers*, 92: 743–755.
Florida, R. (2002c) Bohemia and economic geography. *Journal of Economic Geography*, 2: 55–71.
Florida, R. (2005) *Cities and the Creative Class*. New York: Routledge.
Florida, R. (2006) Where the brains are. *The Atlantic Monthly*, 298: 34.
Florida, R., Mellander, C., Stolarick, K. (2008) Inside the Black Box of Regional Development. *Journal of Economic Geography*, 8: 615–649.
Fredrickson, B. L. (2001) The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56: 218–226.

Fujita, M. (1989) *Urban Economic Theory*. Cambridge, UK: Cambridge University Press.
Gates, G. and Ost, J. (2004) *The Gay and Lesbian Atlas*. Washington DC: Urban Institute Press.
Glaeser, E. L. (2000) The new economics of urban and regional growth. In C. Gordon, G. Meric, M. Feldman (eds) *The Oxford Handbook of Economic Geography*, pp. 83–98. Oxford: Oxford University Press.
Glaeser, E. L., Kolko, J., Saiz, A. (2001) Consumer city. *Journal of Economic Geography*, 1: 27–50.
Glaeser, E. L. and Saiz, A. (2003) The rise of the skilled city. *Brookings-Wharton Papers on Urban Affairs*, 5: 47–94.
Glaeser, E. L., Gyourko, J., Saks, R. (2005) Why have housing prices gone up? *American Economic Review Papers and Proceedings*, 95: 329–333.
Glaeser, E. L., Gyourko, J., Saks, R. (2006) Urban growth and housing supply. *Journal of Economic Geography*, 6: 71–89.
Gyourko, J., Mayer, C., Sinai, T. (2006) *Superstar Cities*, NBER Working Paper No. 12355, July 2006.
Inglehart, R. and Norris, P. (2003) *Rising Tide*. New York and Cambridge: Cambridge University Press.
Inglehart, R. and Weltel, C. (2005) *Modernization, Cultural Change and Democracy*. New York and Cambridge: Cambridge University Press.
Jacobs, J. (1961) *The Death and Life of Great American Cities*. New York: Random House.
Jacobs, J. (1969) *The Economies of Cities*. New York: Random House.
Jöreskog, K. G. (1973) Analysis of covariance structures. In P. R. Krishnaiah (ed.) *Multivariate Analysis*, Vol. III. New York: Academic Press.
Landis, J. D. and Elmer, V. (2002) New economy housing markets: Fast and furious – but different? *Housing Policy Debate*, 13: 233–274.
Ley, D. (1994) Gentrification and the politics of the new middle class. *Environment and Planning D: Society and Space*, 12: 53–74.
Lloyd, R. and Clark, T. N. (2001) The city as an entertainment machine. In Fox Gatham, K. (ed.) *Research in Urban Sociology: Critical Perspectives on Urban Redevelopment*, Vol. 6: pp. 357–378. Oxford: JAI/Elsevier.
Lucas, R. (1988) On the mechanics of economic development. *Journal of Monetary Economics*, 22: 3–42.
Markusen, A. and Schrock, G. (2006) The artistic specialization and economic development implications. *Urban Studies*, 43: 1661–1686.
Mills, E. S. (1967) An aggregative model of resource allocation in a metropolitan area. *American Economic Review*, **May**, 197–210.
Muth, R. F. (1969) *Cities and Housing: The Spatial Pattern of Urban Residential Land Use*. Chicago: University of Chicago Press.
Noland, M. (2005) Popular attitudes, globalization and risk. *International Finance*, 8: 199–229.
Page, S. (2007) *The Difference*. Princeton: Princeton University Press.
Rauch, J. (1993) Productivity gains from geographic concentration of human capital: Evidence from the cities. *Journal of Urban Economics*, 34: 380–400.
Roback, J. (1982) Wages, rents, and the quality of life. *Journal of Political Economy*, 90: 1257–1278.
Shapiro, J. M. (2006) Smart cities: Quality of life, productivity, and the growth effects of human capital. *The Review of Economics and Statistics*, 88: 324–335.
Simon, C. (1998) Human capital and metropolitan employment growth. *Journal of Urban Economics*, 43: 223–243.
Simon, C. and Nardinelli, C. (1996) The talk of the town: Human capital, information and the growth of English cities, 1861-1961. *Explorations in Economic History*, 33: 384–413.
Smith, N. (1996) *The New Urban Frontier: Gentrification and the Revanchist City*. London: Routledge.
Stenberg, R. J. (ed.) (1999) *Handbook of Creativity*. New York: Cambridge University Press.
Zukin, S. (1995) *The Cultures of Cities*. Cambridge, MA and Oxford: Blackwell Publishers.

Appendix

Table A1. SEM results for wages and technology by region size

Variables	Eq. 1 Talent	Eq. 2 Wages	Eq. 3 Housing	Eq. 1 Talent	Eq. 2 Technology	Eq. 3 Housing
More than 1 million population						
Human capital						
Bohemian-Gay	0.455***	0.060	0.833***	0.455***	0.929	0.861***
Talent		0.738***			4.777***	
Wages/technology			0.629***			0.071***
Observations	61	61	61	61	61	61
R^2	0.265	0.623	0.511	0.265	0.438	0.504
Creative class						
Bohemian-Gay Index	0.350***	0.141**	0.833***	0.350***	2.113**	0.861***
Talent		0.727***			2.823***	
Income/wages/technology			0.629***			0.071***
Observations	61	61	61	61	61	61
R^2	0.132	0.774	0.511	0.132	0.309	0.504
500,000 to 1 million population						
Human capital						
Bohemian-Gay Index	0.705***	–0.323**	0.795***	0.705***	–0.138	0.784***
Talent		0.847***			4.313***	
Wages/technology			0.132			0.016
Observations	42	42	42	61	61	61
R^2	0.390	0.595	0.304	0.390	0.385	0.303
Creative class						
Bohemian-Gay Index	0.132	0.171*	0.795***	0.150	2.368**	0.784***
Talent		0.783***			3.558***	
Wages/technology			0.132			0.016
Observations	42	42	42	42	42	42
R^2	0.016	0.679	0.304	0.021	0.371	0.303
250,000 to 500,000 population						
Human capital						
Bohemian-Gay Index	0.992***	0.011	1.349***	0.992***	1.227	1.283***
Talent		0.620***			3.309***	
Wages/technology			0.022			0.018
Observations	79	79	79	79	79	79
R^2	0.614	0.499	0.620	0.614	0.369	0.625
Creative class						
Bohemian-Gay Index	0.584***	0.266***	1.349***	0.580***	2.962***	1.283***
Talent		0.617***			2.666***	
Wages/technology			0.022			0.018
Observations	79	79	79	79	79	79
R^2	0.196	0.733	0.620	0.194	0.412	0.625

(continued)

Table A1. Continued

Variables	Eq. 1 Talent	Eq. 2 Wages	Eq. 3 Housing	Eq. 1 Talent	Eq. 2 Technology	Eq. 3 Housing
Less than 250,000 population						
Human capital						
Bohemian-Gay Index	0.835***	0.025	0.658***	0.835***	2.451****	0.615***
Talent		0.341***			1.123	
Wages/technology			0.034			0.016**
Observations	144	144	144	144	144	144
R^2	0.531	0.238	0.485	0.531	0.183	0.499
Creative class						
Bohemian-Gay Index	0.388***	0.046	0.658***	0.379***	2.823***	0.616***
Talent		0.682***			1.449*	
Wages/technology			0.034			0.016**
Observations	144	144	144	144	144	144
R^2	0.154	0.684	0.485	0.158	0.194	0.499

R^2 is the squared multiple correlation between each endogenous variable and the variables (other than residual variables) that directly affect it.
Significant level: *0.1, **0.05, ***0.01.