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It Takes a Village

A Test of the Creative Class, Social Capital, and Human Capital Theories

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Richard Florida argues that the "creative class" is inextricably connected with surges in urban growth. This article, using data from 276 metropolitan statistical areas, empirically tests the creative class theory as compared to the human and social capital models of economic growth. Our results demonstrate that the creative class is not related to growth, whereas human capital predicts economic growth and development and social capital predicts average wage but not job growth. Additionally, we found that clusters of universities correlated highly with economic growth. Our findings should warn policy makers against the use of "creative" strategies for urban economic development.

Keywords: urban economic development; creative class; social capital; human capital

Richard Florida's idea of the "creative class" as an economic growth machine has been among the most popular of recent economic development policy prescriptions embraced by cities. This article will test to determine if the creative class is in fact linked to economic growth and development more than other urban growth models are—particularly those of human capital and social capital. Richard Florida argues in *The Rise of the Creative Class* (2002) that cities identified as "creative centers"—defined by densities of innovative people rather than businesses—are best positioned to

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experience economic growth in the twenty-first century. In recent publications, Florida (2005a) has argued that the creative class theory outperforms the human and social capital theories in predicting urban innovation and economic success. The three distinct theories of creative class, human capital, and social capital are adjudicated here in an attempt to understand which theory (or theories) best predicts urban economic growth.

Contrary to the findings of creative class scholars, Edward Glaeser (2005)—a leading proponent of the human capital theory—found that human capital variables when pitted against the creative class theory in a test of economic growth and development outperformed the creative class model. Another rival explanation for growth that is popular among sociologists and political scientists is social capital. Richard Florida has taken aim at social capital, arguing that certain types of social capital actually restrict innovation and economic development. Florida (2002, p. 1) writes in the article "When Social Capital Stifles Innovation" that "relationships can get so strong that the community becomes complacent and insulated from outside information and challenges."

The three theories have been found, in separate studies by their proponents, to successfully facilitate economic growth in cities. We intend to adjudicate among these independent theories by testing the three models quantitatively across 276 American metropolitan statistical areas (hereafter, MSAs) during the past decade. As such, this article will address the following questions: Does the presence of a creative class correlate with economic growth? Does the variable of human capital account for positive economic results across urban areas? Does social capital, as represented by the density of voluntary associations, which is a new measure developed by the authors, relate to economic performance? Finally, when all three theories are tested in one model, does one theory account for most of the urban income and job growth across cities? To be specific, our final three measures of growth are job growth from 1990 to 2004, average annual wage change from 1990 to 2004, and the average annual wages in 2004.

This article proceeds in the following order: First, the creative class theory is presented along with its relation to economic development and previous critiques of the creative class. Second, we offer an explanation of social capital, including an operational definition that will allow for testing the social capital theory with economic measures across time and space. Next, we explore the role of human capital theory and discuss past research about the connection between clusters of educated populations, or human capital, and income and job creation. In the following section, we explain the data and methodology used in testing the three economic models—each implying a different strategy for growth. We use Richard Florida's own

measures to test the creative class theory, along with several newly constructed variables that allow for a test of human and social capital. We present our results, analysis, and discussion of some of the implications of our findings, and we end our analysis with some concluding thoughts.

The Creative Class Theory

The creative class theory as presented by Richard Florida in *The Rise of the Creative Class* (2002) is a multifaceted concept that represents a new class, an emerging sector of the economy, and an urban plan for economic growth and development. We focus our attention on the creative class theory of economic growth and development. It is asserted in this theory that the presence of technology clusters, talented populations, and tolerance attracts a significant number of creative workers, and the presence of this "creative class" drives innovation and economic growth in cities.[1]

In more recent publications, such as *The Flight of the Creative Class* (Florida 2005b), the creative class is held responsible for differences in growth across a range of industrialized countries around the world. The implication is that "creative countries" are attracting more foreign researchers, computer scientists, and entrepreneurs than countries that have not developed open and tolerant cities. The creative class theory is woven together from seemingly unrelated past research on diversity, human capital, and cultural elements of economic growth. Similar to the human capital theory, the creative capital theory rests on the presence and attributes of people—rather than businesses—as being the key to economic success. The creative class has two strata: the supercreative class (computer scientists, academics, architects, and artists) and creative professionals (managers, accountants, lawyers, and health care professionals), both of whom are related through the process of "create[ing] meaningful new forms" of goods and services (Florida 2002, 68).

Creative City Qualities: Technology, Tolerance, and Talent

Urban economic development policy is being based on the creative class hypothesis before academic studies have been able to conclusively verify the validity of the creative class proposition. City leaders are taking seriously the policy implications of the creative class theory, presumably that they need to promote diverse and open spaces to attract and retain young, talented workers. It is well established from the public policy literature that amenities matter in terms of the attractiveness of cities to inmigrants and

tourists (Judd 1999, 2003; Lloyd 2002; Lloyd and Clark 2000; Clark et al. 2002). The creative class theory stresses the importance of place in attracting talented workers—specifically, that areas blessed with technology, talent, and tolerance (referred to by creative class scholars as the three Ts) will experience population and economic growth. The concentration of creative workers has not been directly tested in relation to urban innovation or growth of jobs or wages. In the absence of these critical tests, we are left to review previous research on the role of creativity, technology, talent, and tolerance in growing regional economies.

The Creative Class and Economic Growth

The creative class theory recognizes that modern workers have much different utility functions than the "organizational man" (Whyte 1956) of the industrial economy. Contrary to industrial-age employees, "creative" workers seek diverse and tolerant metropolitan areas that cater to individualized activities and expression. In *The Rise of the Creative Class* (Florida 2002), cities are rank-ordered on a creative index that contains the combined presence of technology firms, talented individuals (the percentage of adults in the city with at least a college degree), and various measures for tolerance (bohemians, ethnic diversity, and gay populations). Recently, cities have implemented policies designed to increase their rankings on these various scales of "creativity" (Peck 2005). Before turning to statistical tests of the three Ts—technology, talent, and tolerance—we review the previous literature on these variables and their individual relation to job and income growth in urban centers.

In the creative capital theory, technology is treated as central to economic growth, yet scholars have shown that the transferability of technology to a region or other industries is conditional upon environmental factors. Basu and Weil (1998) outline various conditions under which technology spreads, such as when a region, using new technology, is below the national average growth rate. They argue that past research has been too sanguine in claiming the positive benefits to a region from the clustering of technological firms. Additionally, Jorgenson and Stiroh (1999) challenge the premise that rapid increases in technological advancement have spillover effects to third parties. Their results show technology producers capture the vast majority of returns to investment from research and development within their own firm or industry, rather than transferring the benefits outward to the city as a whole. These studies, collectively, indicate that technology is limited or conditional as a characteristic that promotes regional economic growth.

In addition to technology, tolerance is posited as a requirement for cities in attracting talented employees that will grow the regional economy. Tolerance in "creative class" terms is a collection of diversity measures that differs from the revealed attitudinal trait of political scientists and social psychologists (Sullivan, Piereson, and Marcus 1993). In previous studies, tolerance has been found to be correlated with urban living, yet the causal arrow between diversity and tolerance is unclear. The term *tolerance*, in creative class studies, assumes that populations of gays, artists, and foreign-born residents capture an underlying dimension of regional open-mindedness. There is inadequate evidence from past studies that artists, homosexuals, and ethnic groups stimulate innovation and economic expansion. A recent study from Binnie and Skeggs (2004) addresses the branding of gay space within cities as "cosmopolitan" in an effort to create new markets for leisure consumption. It is argued that the branding of the space is the most probable attraction for gays—therefore making tolerance the effect of growth, rather than the cause. Furthermore, regarding artists and bohemians, Markusen (2006) argues that their distribution across cities is a function, mainly, of an individual decision-making process, that the possibility that artist communities will draw these types of workers is implausible, and that the causal arrow might be pointing in the other direction with clusters of wealthy patrons attracting artists. In the creative class theory, tolerance is also represented by the acceptance of foreign-born populations as well as artists and homosexuals. Although there is some independent support for the notion that a high density of ethnic immigrants in a city is related to growth, it may be caused by the established presence of individual ethnic enclaves in cities and not diversity or communication across ethnic groups (Borjas 1994). Large cities may be Balkanized into distinct social enclaves that are functionally homogenous, yet when viewed in the aggregate, seem diverse and related to growth.

Our literature review reveals both the limits and conditions upon which technology and tolerance depend for positive economic results. We will address the relationship between talent clusters and income growth later, in the review of the human capital theory. According to Richard Florida, it is people who directly create entrepreneurship and the economic vitality of cities. Therefore, technology, talent, and tolerance may correlate with growth by working through the intervening variable of the creative class.

Policy Precedes Proof: Critiques of the Creative Class

We found the wide adoption of creative class–based policies to be surprising given that in the academic literature, there is little evidence

supporting the relationship between creative clusters and actual economic indicators. The most damning charge that can be brought against the creative class theory is that it lacks any causal mechanism. Jamie Peck (2005, 757) captures the circularity of the creative class theory in writing "so growth derives from creativity and therefore it is creative types that make growth, and the creative types will come if they get what they want. They want tolerance and openness. If they find it, they will come and then growth will follow." Not only do "creative" professions have a loose connection to creativity, it is overly optimistic to refer to these workers as being members of a class. As Ann Markusen (2006, 1921) has argued, "in the creative class, occupations that exhibit distinctive spatial and political proclivities are bunched together, purely on the basis of educational attainment, and with little demonstrable relationship to creativity." Finally, Goonewardena (2004) posits that cities have always been creative and diverse, so this cannot be responsible for the new economy and growth in the 1990s. The malleable concept of a "creative class" proves problematic to policy planners and city managers looking to the creative class theory as a strategy for economic growth.

Social Capital Theory

The basic idea behind social capital is that personal associations represent a value-added resource, for social and economic affairs, that provides members with collectively produced capital or credit that can be used in the pursuit of individual goals (Putnam 1995). These systems of friendships or acquaintances often take one of two forms: long-term, sturdy relationships that build deep trust and reciprocity (Bourdieu 1986) or "weak ties" that allow members to gain access to salient information (Granovetter 1973). The earliest urban studies treated social capital as a community resource that built trust, facilitated cooperation, and solved collective-action problems block by block in cities (Jacobs 1965). A lack of social capital diminishes a region's ability to capture the gains of economic growth or can hurt workers' ability to advance professionally (Putnam 1993). In low-trust societies, advancement decisions are made more along the lines of which applicants are loyal instead of which applicants have attributes such as experience, training, or education (Wilson 1996). Poor people in urban areas are often neglected by social networks that provide information about job opportunities or associations that facilitate career mobility (Loury 1977). In a recent study, Putnam (2007) argues that ethnic communities in

cities can have negative effects on social capital in the short term but tend to bridge different urban communities over time. Conversely, social capital has been empirically shown to have negative consequences such as in the growth of illegal and illicit networks or in promoting exclusive social associations that inhibit growth or democracy (Woolcock 2001).

The Definition of Social Capital

Although most social capital scholars agree that social relationships provide potential resources to individuals and groups, they lack consensus on a single definition of social capital. There are primarily two components of social capital: one, the informal and formal institutions that produce social capital resources, and two, personal attitudinal measures, such as trust and reciprocity, that result from social institutions (Portes 1998; Putnam 2000). In this study, we operationalize social capital as the density of voluntary and civic institutions in a city. As Robert Putnam (2000) has argued, social capital is best operationalized as a sociological or institutional concept rather than a psychological or political one. Other scholars have noted that "the best and most coherent empirical research on social capital, irrespective of discipline, has operationalized it as a sociological variable" (Woolcock 2002, 22; also see Woolcock 2001; Foley and Edwards 1999). These scholars agree that a conceptual consensus can be formed around the institutional definition of social capital, since these measures are more stable over time than psychological variables. Putnam (2000) asserts that the psychological traits associated with social capital, such as trust or reciprocity, are functions of the sociological mechanisms that produce social capital and not in and of itself social capital.

Social Capital and Economic Growth and Development

Social capital is a pliable concept that has been used to explain both micro and macro level economic behavior. Scholars have found that social capital can lower transaction costs and solve regional collective-action problems through two mechanisms: increased trust and institutional density. Economic activities often require people to rely on the future promises or actions of others; these types of transactions can be executed at lower costs in high-trust environments. Kenneth Arrow (1972, 357) argued that "virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can plausibly be argued that much

of the economic backwardness in the world can be explained by the lack of mutual confidence." A number of recent studies measure the varying economic performance of countries that can be traced back to attitudinal differences in trust and cooperation (Fukuyama 1995; Glaeser, Laibson, and Sacerdote 2002). Trust has also been found to encourage more money lending and better government services that in turn correlate with stronger regional economies (Putnam 1993; Coleman 1988). As Putnam (1995) has noted, individuals in high-trust societies are also less likely to divert resources in protecting themselves—through tax payments, bribes, or private security services and equipment—from unlawful violations of their property rights.

There is a growing body of empirical evidence demonstrating a relationship between institutional social capital and regional economic performance. Putnam (1993) writes that the density of formal and informal institutions directly diminishes the costs of collective action for an area and therefore creates a regional comparative advantage. Helliwell and Putnam (1995) showed that, holding initial income constant, regions of Italy with a more developed "civic community" had a higher growth rate during the 1950 to 1990 period. Putnam (1993) attributes both the economic success and governmental efficiency of Northern Italy, relative to the South, in large part to its richer associational life, claiming that associations "instill in their members habits of cooperation, solidarity, and public-spiritedness" (Putnam, Leonardi, and Nanetti 1993, 89–90). Conversely, Keefer and Knack (1997) and Solt (2004) provide conflicting pieces of research on the influence of associational activity on economic growth and development.

In addition to testing aggregate social capital, we make a finer distinction between "bridging and "bonding" social capital. Putnam (2000) has separated between "bridging" social capital as links of connectedness that are constructed across dissimilar social groups and "bonding" social capital that solidifies just homogenous social groups. Recently, Richard Florida has taken aim at social capital, arguing that "bonding" social capital restricts innovation. He argues that "relationships can get so strong that the community becomes complacent and insulated from outside information and challenges. Strong ties can also promote the sort of conformity that undermines innovation" (2002, 1). Conversely, "bridging" social capital, the loose ties and relationships that Florida claims creative workers desire, leads to an ethos of tolerance and inclusiveness that encourages innovation. In our statistical analysis, we test the above criticism to determine if indeed one form of social capital outperforms the other in predicting economic vitality.

The Human Capital Theory of Economic Growth and Development

   Human capital theorists (Becker 1964; Glaeser 2005) argue that concentrations of educated individuals, along with training, will produce high levels of long-term economic growth. Early proponents of human capital research argued that if individuals acquired more education, they would receive a higher rate of return via their wages (Becker 1964; Barron, Black, and Loewenstein 1987). Schultz (1988, 543) argues for the importance of human capital in public policy by writing that "education is widely viewed as a public good (with positive externalities), which increases the efficiency of economic and political [institutions] while hastening the pace of scientific advancement." Recent works have treated human capital as a type of "social input" acting as an economic bonding agent in the formation of business clusters and a bridging mechanism by bringing together skilled workers across industries (Lucas 1988; Azariadis and Drazen 1990; Jovanovic and Rob 1989).

   The importance of human capital to regional economic growth has been well documented. Human capital has been proven to correlate with urban growth both in the service and knowledge economies (Barro 2001; Black and Lynch 1996; Zucker, Darby, and Brewer 1998). In Berry and Glaeser's study (2005) of human capital migration, they find that innovation is a function of the number of educated people residing in a region. Berry and Glaeser explain this through the increasing trend of educated business owners' being more likely to hire educated workers over time and the gentrification of the housing markets in cities that crowd out less educated people. They also find that the United States has transitioned from a period of relatively even distribution of skills across geographic areas to a place "where metropolitan areas increasingly differ from one another on the basis of their human capital levels" (Berry and Glaeser 2005, 11). Jovanovic and Rob (1989) argue that rational agents seeking to augment their existing knowledge will seek out connections in their environment and therefore are more likely to gain new knowledge through randomness or chance. This increased probability of chance meetings of skilled workers expedites growth and the diffusion of knowledge in an economically integrated urban area. Nahapiet and Ghoshal (1998) extend the theory of human capital by cultivating the idea of "intellectual capital," which posits that a density of institutions, such as universities, attracts educated populations and leads to clusters of human capital. We test the theory of intellectual capital along with a more traditional metric of human capital in the next section.

Data and Methodology

The creative class, social capital, and human capital theories will be tested as to whether they predict various measures of economic growth and development. The creative class variable is the number of individuals within an MSA employed in what Richard Florida categorizes as creative occupations divided by the number of individuals in all occupations. The following occupations are considered creative: mathematical, computer, architecture, engineering, life science, physical science, social science, education, training, library, arts, design, entertainment, sports, media, business management, financial management, legal, health care, and sales management. Additionally, we test the relationship among the creative class and alleged causal mechanisms of creativity: talent, technology, and tolerance clusters. The technology-share measurement is an MSA's technology output divided by total industrial output divided by the proportion of technology output nationally over total national industrial output. The following three variables are all tolerance measures: The gay index is the number of gay male partners in an MSA over the total number of partners in an MSA all over the number of gay male partners nationally over the total number of partners. The Bohemian index is the number of people in art, music, and other creative professions using the same location-quotient measure described above. The melting pot index is simply the percentage of foreign-born residents among a city's population.

Our second major measurement, as viewed in table 1, is the human capital variable, which is the percentage of the population in an MSA older than the age of 25 with a bachelor's degree or higher. We also create a new variable for institutional human capital or "intellectual capital" that is the density and quality of a region's university and college systems. This new intellectual capital variable measures the quality and quantity of universities and colleges in an MSA. The Carnegie Classifications from 2000 are used and coded as follows: Research I and II universities are assigned a score of 9 and 8, respectively, PhD schools I and II are assigned 7 and 6 points, respectively, and Master's I and II received 5 and 4 points, respectively. Bachelor's I and II are assigned 3 and 2 points, respectively, and community colleges and technical schools are allotted a value of 1. In each MSA, the number and quality of schools are aggregated into one intellectual capital score per capita for each of the 276 cities in our study.

The third major independent variable is the social capital variable, which is the density of voluntary organizations per capita for all MSAs. This variable was created by taking the absolute number of voluntary organizations

Table 1
Descriptions of the Independent and Dependent Variables

Variable	Measure	Source
Independent		
Creative class	% workers in an MSA in "creative" occupations 1990	Richard Florida/Kevin Stolarick
Human capital	% adult citizens in an MSA with a college degree 1990	U.S. Census
Intellectual capital	Aggregated Carnegie Classifications for all universities and colleges in an MSA 1990	Carnegie Foundation for the Advancement of Teaching
Social capital	All 501(c)3s in an MSA divided by population in 1995	National Center for Charitable Statistics via the Urban Institute
"Bridging" social capital	% evangelical Christians in an MSA 2000	Association of Religious Data Achieves (ARDA)
"Bonding" social capital	Religious Herfindahl index, designed to measure religious plurality in an MSA 2000	Association of Religious Data Achieves (ARDA)
Creative components		
Technology share	% MSA high-tech production as compared to economic output 1990	Milken Institute
Gay index	% gay couples in a region as compared to the U.S. totals 1990	Richard Florida/Kevin Stolarick
Bohemian index	% regional artists as compared to other professions and national figures 1990	Richard Florida/Kevin Stolarick
Foreign-born index	% foreign-born residents in MSA 1990	U.S. Census
Controls		
Region (NE, S, MW, W)	Geographic location of an MSA	U.S. Census
% Black	% African-Americans in an MSA 1990	U.S. Census
% Latino	% Latinos in MSA 1990	U.S. Census
Dependent		
Average wage	Average wage in an MSA in 2004	Glaeser, Harvard Cluster Mapping Project
Wage change	% change in average wage growth per year in an MSA from 1990–2004	Glaeser, Harvard Cluster Mapping Project
Job growth	Employment growth per year in an MSA from 1990–2004	Glaeser, Harvard Cluster Mapping Project
Patent growth	Patent growth per year from 1990–2004	Glaeser, Harvard Cluster Mapping Project
Knowledge worker migration	Net % growth in domestic migrants ages 25–34 with at least a college education in an MSA	U.S. Census

Note: We ran tests with 1990 and 2000 data for some of the independent variables, and there was no statistical difference, so we used the 1990 data as to capture any time lag for the data. MSA = metropolitan statistical area.

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(501[c] 3s) and then dividing it by the population of the MSA. The data, from the National Center for Charitable Statistics at the Urban Institute, are amalgamated into a summary social capital variable after combining 10 different categories (designated from the IRS National Taxonomy of Exempt Entities) based on the main mission of the organization. The categories are arts, culture and humanities, education, environment and animals, human services, international and foreign affairs, public and societal benefit, religion related, mutual and membership benefit, unknown, and unclassified.

The concept of social capital has been bifurcated into social associations that "bridge" disparate groups together and those associations that "bond," or form close in-group trust. To test these concepts, we use religious institutions, a primary form of social capital, in operationalizing "bonding" versus "bridging" (Putnam and Campbell 2007). Other scholars have argued that religious institutions are salient as cultural organizations that result in increased community activity and trust (Woolcock 1998; Putnam 2000; Barro and McCleary 2003). In our models, "bonding" social capital is measured through the percentage of evangelical Protestants in a city. Evangelical Protestants in an MSA is a measurement of social exclusivity, or cultural conservatism, which we predict will be negatively associated with growth (Barker and Cameron 2000).[2] Our second measurement represents the diversity of cultural institutions, or "bridging," in a metropolitan area, using religious pluralism. We use a religious Herfindahl index that is calculated by adding the percentage of religious adherents in four categories of faith: evangelical Protestants, "mainstream" Protestants and Catholics, and others and subtracting that figure from 1. A higher religious Herfindahl score indicates a more culturally plural MSA, as indicated by religious pluralism. To compile the Herfindahl score, we use the 2000 Glenmary Research Center enumeration of church membership for 111 denominations. We acknowledge the limitations of this measurement in that it assumes the external validity of religious organizations as a subset of all social organizations, and therefore, social capital. Also, these variables are limited in that they assume certain behavioral attributes are relatively homogeneous within religious affiliations.

The five dependent variables are measures of economic robustness drawn from the U.S. Census and the Cluster Mapping Project at the Institute for Strategy and Competitiveness at the Harvard Business School. The standard variables for economic health are the percentage change of nonagricultural employment from 1990 to 2004, the average wage in 2004, and the percentage average wage increase from 1990 to 2004. The economic development variable is the percentage of nonagricultural employment job growth change from 1990 to 2004. The fourth measure, from the

U.S. Census, is a region's ability to attract young knowledge workers. It is calculated by measuring the net migration of single 25- to 34-year-olds who have at least a bachelor's degree from 1995 to 2000. The fifth measure, also from the Cluster Mapping Project at Harvard, accounts for the innovativeness of the local economy by calculating the percentage increase in patents issued per 10,000 employees from 1990 to 2004. This innovation variable explained very little in our early statistical tests and therefore was deleted from the regression analysis.

There are two statistical tests that we perform; the first is a bivariate correlation matrix that presents the one-to-one relationship among all the independent and dependent variables. This measure allows us to determine which pairs of variables demonstrate a systematic relationship and the strength of the relationship. Our first bivariate correlation matrix addresses the specific claim that technology, talent, and tolerance result in more creative workers, and in turn, economic growth. The second bivariate table introduces the independent and dependent variables for all three models along with the five economic growth measurements. Cushing (2001) performed a similar test of the three theories; our measurements differ in significant ways. First, his measurement of regional growth is population growth; we use four metrics of economic growth and development as described in the above paragraph. Second, Cushing used survey data that measured attitudinal social capital across cities. We measure institutional social capital using voluntary organizations; this measure is a more stable representation of a region's social capital.

The second test is a series of ordinary least squares (OLS) regressions that produce the best linear unbiased estimators of our dependent variables. It is noteworthy that we included a time-lagged element between the independent and dependent variables by staggering the years from 1990 to 2004. We test the three theories controlling for various racial, ethnic, and regional effects against five measures of economic growth, development, and innovation: average wage, average wage growth, job growth, inmigration of knowledge workers, and innovativeness as indicated by patent growth.

Statistical Results and Analysis

The statistical tests reveal that the creative class variable does not correlate with any measure of economic growth, whereas the human and social capital theories display varying levels of correlation with wage and job measurements. The human capital theory accounts for most of the success in predicting income and job growth across cities in different regions. In the

following sections, we present the bivariate correlations that show the connection between the creative class magnets (technology, talent, and tolerance) and the variables of economic interest. The subsequent sections present the statistical results by each economic dependent variable.

The Creative Class and Economic Growth and Development

The major statistical finding in *The Rise of the Creative Class* (Florida 2002) is that a city's high level of talent, technology, and tolerance are connected to the clustering of a creative class. The technology-share variable is related to the percentage of college graduates in an MSA but not correlated with any of the diversity or tolerance measures. In further evaluating the share of technological firms in a city, we find that this measure is positively related with wage and wage growth but is not a predictor of any type of economic innovation or development. The percentage of college graduates in an MSA serves as the talent component in the creative class theory and is also a standalone measure of human capital. The human capital measure is positive and statistically significant across every economic measure of success. Interestingly, the percentage of college graduates in a city is negatively related to all three indicators of tolerance: percentage of gays, of artists, and of foreign-born residents. The poorest performing concept in the creative class theory is the tolerance measure, so poor that the number of foreign-born residents was the only measurement related to any one of the five economic variables. As an example, in table 2, there are 15 coefficients that represent the three measures of tolerance correlated with five measurements of economic performance; out of these, 12 are negatively correlated.

Technology, talent, and tolerance are supposedly important not just as an infrastructure for economic change but mainly as a magnet for attracting creative workers. Although we do not have data on the inmigration of the creative class, we are able to test the correlation between the creative class components and the influx of young, single, educated people with college degrees. We find no relation between the creative class and the migration into cities of young knowledge workers. Additionally, only two of Florida's original three Ts are connected to inmigration of knowledge workers: talent and technology. Considering that the talent index in the creative class theory is also a measure for human capital, it is intriguing that human capital and social capital are related to the migration of young workers but the creative class variable is not. Tolerance, which is actually the statistical amount of diversity, not an attitudinal measure of tolerance, is not correlated with any economic variables of interest.

Table 2
Bivariate Correlation Results of Creative Class Indicators and Economic Growth, Development, and Innovation

	Tech Share	Human Capital	Gay Index	Bohemian Index	Foreign-Born Index	Social Capital	Creative Class	% Black	% Latino	Average Wage 2004	Wage Change 1990–2004	Job Growth 1990–2004	Patent Growth 1990–2004	Knowledge Worker Migration 1995–2000
Tech share	1	.283**	.009	-.060	-.064	.297**	-.004	.065	.140*	.590**	.247**	.002	-.029	.286**
Human capital	.283***	1	-.036	-.006	-.103	.519***	.124*	-.054	-.100	.448***	.479***	.191**	.120*	.273**
Gay index	.009	-.036	1	.517**	.463**	-.021	.379**	.103	.002	.050	-.035	-.016	.002	-.062
Bohemian index	-.060	-.006	.517**	1	.299**	-.084	.481**	.139*	-.045	-.091	-.029	-.063	.030	-.080
Foreign-born index	-.064	-.103	.463**	.299**	1	-.053	.200**	.008	.063	-.035	-.087	-.058	.174**	-.025
Social capital	.297**	.519**	-.021	-.084	-.053	1	-.003	-.157**	-.040	.478***	.273**	-.045	.052	.234**
Creative class	-.004	.124*	.379**	.481**	.200**	-.003	1	.075	-.070	.001	.054	-.053	.037	.021
% Black	.065	-.054	.103	.139*	.008	-.157*	.075	1	-.203*	-.004	.050	-.125*	-.039	-.031
% Latino	.140*	-.100	.002	-.045	.063	-.040	-.070	-.203*	1	-.090	.077	.281**	-.007	-.152*

Note: $N = 276$.

*Correlation is significant at the .05 level (2-tailed); **correlation is significant at the .01 level (2-tailed).

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The critical tests of economic robustness, though, are not the characteristics that attract the creative class but the presence of creative class workers. In measuring the percentage of workers in creative professions within an MSA, there is no evidence of any positive, systematic relationship between a creative class and any of the five economic growth measures (see table 3).

Three Theories of Economic Growth: Regression Results

We have a fully specified regression that includes all three models: the creative class, human capital, and social capital. We report the results of three OLS tests that place the human capital, social capital, and creative class theories in the same statistical model so that the effects of one theory are discovered while controlling for the other two theories simultaneously.[3] The full models, as presented in table 4, include region since each area of the country has a unique economic history, mixture of industries, and starting baseline for economic growth. We also have included control variables that account for the possible effects of race, with the percentage African-American, and ethnicity, in the percentage Latino.[4]

Average wage results. In column 1 of table 4, we present the fully specified OLS regression with average wage in 2004 as the dependent variable. The average wage regression test is where two of the models demonstrate their best results: human and social capital. Educated populations and educational institutions both correlate positively and significantly with high average wages in MSAs. This is possibly a reflection of the maturation of the knowledge economy across U.S. cities in which a college degree is an asset to employers and a reflection of a skill set needed in an era of information. The density of volunteer and private organizations as represented by the social capital variable also performs well in predicting high wage levels. We argue that this is a function of institutional thickness that allows new information to be synthesized and disseminated at a faster pace in creating economic goods in cities with high amounts of social capital. Finally, we discover that a high wage structure is certainly not a function of the creative class occupational density in a city.

Average wage change between 1990 and 2004. The middle column of table 4 displays the regression outcome for average wage change from 1990 until 2004. Note that communities initially with a low baseline are going to

Table 3
Bivariate Correlations of Three Theories on Economic Growth and Dependent Variables

	Creative Class	Human Capital	Intellectualy Capital	Social Capital	"Bonding" % Evan. Protestants	"Bridging" Religious Pluralism	% Black	% Latino	Average Wage 2004	Wage Change 1990– 2004	Job Growth 1990– 2004	% Growth 1990– 2004	Knowledge Worker Migration 1995– 2000
Northeast	.012	.055	.176*	.066	-.297**	-.128*	-.053	-.140*	-.160*	-.020	-.205*	-.099	.005
South	.108	-.195*	-.109	-.300**	.619**	-.152*	.512*	.087	-.276**	.041	.174*	-.051	-.218*
Midwest	-.038	.076	-.036*	.150*	-.171**	-.088	-.263*	-.243*	.085	-.132*	-.268**	-.020	.275**
West	-.109	.107	.011	.134*	-.291*	.411**	-.284*	.314*	.100	.122*	.280**	.195*	-.052
Creative class	1	.124*	.015	-.003	.114	-.087	.075	-.070	.001	.054	-.053	.037	.021
Human capital	.124*	1	.359**	.519**	-.253**	.250**	-.054	-.100	.448**	.479**	.191**	.120*	.273**
Intellectual capital	.015	.359**	1	.375**	-.182**	.016	.135*	.097	.673**	.302**	-.037	-.084	.364**
Social capital	-.003	.519**	.375**	1	-.195**	-.014	-.157*	-.040	.478**	.273**	-.045	.052	.234**
"Bonding" % Evan. Protestants	.114	-.253**	-.182**	-.195**	1	-.324**	.466**	-.195*	-.224**	-.143*	-.163**	.004	-.087
"Bridging" religious pluralism	-.087	.250**	.016	-.014	-.324**	1	-.005	-.036	.047	.169**	.301**	.140*	-.058
% Black	.075	-.054	.135*	-.157*	.466**	-.005	1	-.203*	-.004	.050	-.125*	-.039	-.031
% Latino	-.070	-.100	.097	-.040	-.195**	-.036	-.203*	1	-.090	.077	.281**	-.007	-.152**

Note: $N = 276$.

*Correlation is significant at the .05 level (2-tailed); **correlation is significant at the .01 level (2-tailed).

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Table 4
The Ordinary Least Squares (OLS) Regression Tests of Capital
Theories of Urban Economic Growth

	Average Wage 2004	Wage Change 1990–2004	Job Growth 1990–2004
Northeast	.070	–.188	–.428***
Midwest	.095	–.254***	–.505***
West	.165**	–.094	–.192**
Creative class	–.017	.001	–.062
Human capital	.135*	.408***	.259***
Intellectual capital	.570***	.121*	–.065
Social capital	.144*	.065	–.093
"Bonding" social	–.019	–.124	–.223**
"Bridging" social	–.057	.018	.141
% Black	.003	.026	–.196**
% Hispanic	–.151**	.026	.115*
Adjusted R^2	.542	.268	.336

Note: $N = 276$.
*Correlation is significant at the .10 level (2-tailed); **correlation is significant at the .05 level (2-tailed); ***Correlation is significant at the .01 level (2-tailed).

have the greatest potential for large wage increases. In this measurement of economic growth, only the human and intellectual capital theories predict large increases in people's wages across cities. Intellectual capital predicts wage growth, and these results are potentially caused by payoffs that regions receive from academic research and development. Regionally, the Northeast and Midwest experienced decreases in average wage levels during this period. The industrial sectors' continual decline is potentially responsible for these negative outcomes.

Average job growth across cities from 1990 to 2004. The last column in table 4 presents the final OLS regression for nonagricultural job growth between 1990 and 2004. This test produces some of the most interesting findings of the article. These results provide insight into the role of various forms of social capital and race in economic development. Human capital remains positive and significant now across all three main economic measures, even with all the controls in place. The creative capital variable correlates negatively with job growth. The measure of "bonding" social capital performs as expected in that it is negatively associated with job growth. There has been research on racial competition for jobs in urban areas that

seems to be borne out by our results in that Black populations are negatively correlated with growth and Latinos are positively correlated. Paula McClain (1993) has found that there is competition between Blacks and Hispanics for public jobs in cities. All of the regions outside of the South lost jobs during the past decade,[5] and there are regional differences in average wage.

Conclusion

The important question, for scholars and policy makers, posed in this article is what evidence is there that the creative class theory generates growth in cities? The creative class failed consistently across multiple statistical tests to explain either job growth, growth in wages, or absolute levels of wages. Additionally, the individual characteristics of the creative class—talent, technology, and tolerance—were negatively correlated with all our economic measurements. The totality of results regarding the creative class model should halt policies that cities are adopting to spur job growth and innovation based on creative class strategies. It is possible that creative measurements may be a lagged indication of economic growth, but they are not the foundation for a sound strategy to attract or grow business. Although we were not able to test for this, given the availability of the creative class data for only certain years, we think future research in a time series model may be fruitful.

On the other hand, human capital is a strong and consistent predictor of job growth, average wage, average wage change, and the net inmigration of college graduates. For years, human capital had been established by economists as a robust predictor of per capita income levels. Our results indicate that human capital is also correlated with job growth and the influx of young, educated workers. On a related note, we found that the communities with high intellectual capital—as measured by the density of research universities—along with human capital were significantly related to both average wage growth and to average wages in an MSA. Investment in human capital is a more long-term strategy than the creative class strategies. For example, cities that invest in higher education could create and attract more educated workers and ensure the employability of their residents. Policy recommendations that may flow from the strong performance of intellectual capital would include the nurturing of public and private research universities, as well as research parks, as well as sponsorship of high-tech incubators and startups.

Our research addressed the very subtle and complex way that social capital may affect growth. First, there are two types of social capital, "bridging" and "bonding," which imply different causal mechanisms and

economic effects. Our findings confirm that the more exclusive social capital, "bonding," has negative effects on job growth. We cannot say from our tests that "bridging" capital or organizations known for building out-group trust can produce growth. Although social capital is promising for economic growth and development, it is difficult for political leaders to manufacture. City leadership could consider programs designed to create space for nonprofits to cluster and could design local programs such as AmeriCorps. Social networks have been shown to be an important factor in the development of human capital (Coleman 1988). So the relationship between social capital and economic production could be captured by the intervening variable of human capital. We would recommend that future work examine more closely the relationship between the two theories that displayed significant results: human and social capital.

Notes

1. Although Richard Florida oscillates between different terms, he labels his theory of economic growth *creative capital* as opposed to *creative class*—so for the purposes of clarity and consistency, we will use the term *creative class*.

2. It is important to note that these are voluntary organizations, not institutions, from these categories. For example, under the category of education for a particular MSA, the area universities are not listed. Rather than the teachers' associations, the organization of principals, the organization of school administrators, the parent–teacher organizations, and groups such as these are listed. Similarly, under health care for a particular MSA, the hospitals are not listed, but the nurses associations, the local American Medical Association (AMA), the Hospital Administrators' Professional Association (HAPA), and the community health advocacy nonprofits are listed.

3. We do not report the results of the fifth test on innovation, since no model had any statistically significant relation to the growth in patents per 10,000 employees in an MSA.

4. We also tested for percentage American-Indian (not native) and percentage Asian across the 276 cities. There were not high enough percentages in these ethnic categories for us to exchange the variable for degrees of freedom in the model.

5. Again, we dropped the innovation and migration results, the former because of the lack of the statistical performance of the models and the latter because of the theoretical relation only to the creative class.

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