

It Takes a Village: A Test of the Creative Class, Social Capital and Human Capital Theories

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ABSTRACT

Richard Florida in *The Rise of the Creative Class* introduced one of the most widely adopted urban growth strategies in decades. However, scholars have found little theoretical support for the connection between the creative class and economic development. This article 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 is a good predictor of all economic growth and development measures. We found mixed results for social capital although it outperformed all models in predicting average wage.

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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 attempt to see if the creative class is in fact linked to economic growth and development more than other urban growth models – particularly that 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 the densities of innovative people rather than businesses - are best positioned to experience economic growth in the 21st century. In recent publications, Florida (2005) has argued that the creative class theory outperforms the human and social capital theories in predicting urban innovation and economic success.

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, which 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 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" (2002, 1).

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 theories by testing the three models quantitatively across 276 American Metropolitan Statistical Areas (hereafter MSA) over the last decade. As such, this article will address the following questions: Does the presence of a creative class correlate with economic growth? If creative classes predict growth, does the variable of human capital account for any or all of the positive economic results? Does social capital, as represented by the density of voluntary associations, 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?

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 growth models. 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. Finally, we present our results, analysis and a discussion of the implications.

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 super creative class (computer scientists, academics, architects and artists) and creative professionals (managers, accountants, lawyers, and health care professionals), both of which 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 in-migrants and tourists. (Judd 1999, 2003; Lloyd 2002;

Lloyd and Clark 2000; Clark, Lloyd, and Jain 2002). The creative class theory stresses the importance of place in attracting talented workers, specifically, privileging metropolitan areas that are blessed with technology, talent and tolerance (referred to by creative class scholars as the three Ts). The concentration of creative workers has not been directly tested in relation to urban innovation, job or wage growth. 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 (2002)* cities are rank-ordered on a creative index that contains the combined presence of technology firms, talented individuals, (the percentage of people 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, employing 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. Conversely, Lilan (1995) writes that an area's natural resources and technological infrastructure are extremely salient in growing a local economy in the science industries. 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, which 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. Tuch (1987) demonstrates that not only does urbanism positively correlate with tolerance; it also travels with people as they move to suburban areas. 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. We question whether there is an important distinction between diversity and tolerance that complicates the use of three diversity measures that serve as a proxy for tolerance in the creative class model.

There is inadequate evidence from past studies that artists, homosexuals and ethnic groups stimulate the 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. Both Clark (2003) and Glaeser (2005) find the gay index, used in the creative class research, is highly correlated with educational attainment and therefore these concepts load on the same variable – human capital. Further, regarding artists and bohemians, Markusen (2006) argues that their distribution across cities is a function, mainly, of an individual decision-making process and the location of urban centers that support artists. Additionally, Markusen (2006) argues that the possibility of artist communities drawing these types of workers is implausible and the causal arrow might be pointing in the other direction with clusters of wealthy patrons attracting artists (2006). 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 due to 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 article in the review of the human capital theory. These limitations, articulated by past scholars, make Florida’s simple ranking of technological, talent

and tolerance concentrations a blunt instrument for measuring the potential for economic growth. 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 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 (2005,18).

Other studies have shown that creativity in the economic literature is ambiguous and therefore creative, personal characteristics do not necessarily translate to work performance or market activity (Landry and Bianchini 1995; Healy 2002). 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 has argued, “the creative class bunches together, purely on the basis of educational attainment, occupations that exhibit distinctive spatial and political proclivities and with little demonstrable relationship to creativity” (2006, 1). 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.

Finally, as critiqued by Peck (2005) the creative class theory as a fiscal plan is a “form of supply-side intervention” that appeals to progressive city leaders who can gain credit from the business community for implementing a novel plan for economic growth while providing public monies to liberal-leaning constituency groups. Goonewardena (2004) posits that cities have always been creative and diverse so this can not be responsible for the new economy and growth in the 1990’s. The lack of theory behind exactly how and why an urban environment of technology and tolerance attract creative workers forces cities to evaluate their performance on a “creative” index, which may or may not be related to economic growth.

SOCIAL CAPITAL THEORY

The basic idea of social capital is that personal associations represent a value-added resource, for social and economic affairs, that provide 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 can take 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). Some early studies also emphasized the individual utility of social capital, in the various ways family and community organizations assist in the nourishment of children (Loury 1977). James Coleman (1990, 301) wrote about social capital that “authority relations, relations of trust, and consensual allocations of rights which establish norms” can be viewed as resources for individuals.

Not only are high levels of social capital attributed to better societies, communities with less social capital experience a comparative economic disadvantage. 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, hiring 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); these attributes are related to productivity and ignoring them could stymie economic performance. 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). 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). However, the vast majority of literature demonstrates that the direction of the relationship between social capital and economic growth is positive.

THE DEFINITION OF SOCIAL CAPITAL

Although most social capital scholars agree that social relationships provide for the potential of 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 second, personal attitudinal measures such as trust and reciprocity (Portes 1998; Putnam 2000). In this study, we operationalize social capital as the density of voluntary institutions in cities. As Robert Putnam (2000) has argued, social capital is best operationalized as a sociological, or relational, concept rather than a psychological or political one. He 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. 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 2001; Foley and Edwards 1999). These scholars agree that a conceptual consensus can be formed around the institutional definition of social capital and that "institutional" variables are more stable over time than psychological variables.

As a practical issue, there is no data on the social capital attitudes of trust and cooperation that span across hundreds of American cities over the past decade. Therefore trust cannot be tested with other economic growth variables in a statistical model. Previous studies that have used attitudinal variables as measurements of social capital have been limited to either individual case studies, limited to a small number of cities in one year or limited to geographical areas that do not constitute integrated economic communities.

SOCIAL CAPITAL AND ECONOMIC GROWTH AND DEVELOPMENT

Social capital is a pliable concept that has been employed 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 argued:

...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 (1972, 357).

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, Laibon, 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, there is a strong bivariate relationship between trust and group membership across countries. He goes on to argue that 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. Entrepreneurs in high trust regions will spend less time monitoring activities of partners and associates. Finally, 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.

There is a growing body of empirical evidence demonstrating a relationship between social capital and regional economic performance. Helliwell and Putnam (1995) showed that, holding initial income constant, regions of Italy with a more developed “civic community” had a higher growth rates over the 1950-1990 period. Putnam (1993) attribute 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 (1993) and Solt (2004) provide conflicting pieces of research on the influence of associational activity on economic growth and development.

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 he claims creative workers desire, lead 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, 43) 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; Jonanovic 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 already residing in a region. Berry and Glaeser (2005) 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). Jonanovic and Rob (1989) demonstrate that rational agents that seek to augment their existing knowledge will seek out connections in their environment and most likely gain new knowledge through randomness or chance. Therefore cities with greater densities of educated people increase the probability of a person creating new knowledge or augmenting his or her current level of information. This increased probability of chance meetings of skilled workers expedites the growth and diffusion of knowledge in an economically integrated urban area.

In recent studies on the connection between human and social capital, human capital is found to be an intervening variable in the production of social capital (Coleman 1988; Nahapiet and Ghosal 1998). Nahapiet and Ghoshal (1998) posit that dense social networks reduce the cost of new learning and information exchange thereby increasing the likelihood of coordinating relationships that create community intellectual capital. Nahapiet and Ghoshal (1998) extend the theory of human capital by cultivating the idea of "intellectual capital" that posits a density of institutions, such as universities, attract educated populations and lead to clusters of human capital. Their theory claims that regions rich in social capital and intellectual capital will stimulate entrepreneurship and new economic growth.

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 the individuals within a metropolitan statistical area employed in what Richard Florida categorizes as creative economy 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 creative class relationship to urban magnets such as talent, technology and tolerance clusters. The technology share measurement is an MSA's high technology output divided by total industrial output divided by the proportion of high 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 a MSA over the total number of partners in a 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 is the human capital variable that is the percentage of the population in a MSA over the age of twenty-five 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 a metropolitan statistical area. The Carnegie Classifications from 2000 are used and coded as follows: Research I and II universities were assigned a score of 9 and 8 respectively, Ph.D. schools I and II are assigned 7 and 6 points, respectively, Master's I and II received 5 and 4 points.¹ Bachelor's I and II are assigned 3 and 2 points respectively with community colleges and technical schools being

¹ The Carnegie Commission on Higher Education developed a classification of colleges and universities to support its program of research and policy analysis. For over three decades, the Carnegie Classification has been the leading framework for describing institutional diversity in U.S. higher education.

allotted a value of one. In each MSA, the number and quality of schools are aggregated into one intellectual capital score for each of the 276 cities in our study.

The third major independent variable is the social capital variable that is the density of voluntary organizations per capita for all MSAs. This variable was created by taking the absolute number of voluntary organizations (501(c) 3's) 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 ten 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.²

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. In order to test these concepts we employ religious institutions, a primary form of social capital, in operationalizing "bonding" versus "bridging" social capital (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 percent of evangelical Protestants in a city. Evangelical Protestants in a metropolitan statistical area is a measurement of social exclusivity, or cultural conservatism, which we predict would be negatively associated with growth (Barker and Cameron 2000). 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, other and subtracting that figure from one. A higher religious Herfindahl score indicates a more culturally plural MSA. To compile the Herfindahl score, we employ the 2000 Glenmary Research Center enumeration of church membership for 111 denominations.

The five dependent variables are all measures of economic robustness drawn from the Cluster Mapping Project at the Institute for Strategy and Competitiveness at the Harvard Business School. The standard variables for economic health are: the percent non-agricultural employment change from 1990 – 2004, the average wage in 2004 and the percent average wage increase from 1990 – 2004. The economic development variable is the percent non-agricultural employment job growth change from 1990 – 2004. This does not tell us whether they are good or poorly paying jobs, but it gives us a broad gauge of overall community development. The average annual earnings in 2004, is a measure of the standard of living for the population in a city. The next economic growth dependent variable is the average wage change between 1990 and 2004, and gives us a metric for cities that have improved their standard of living over the last decade. 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 twenty-five to thirty-four year olds who have at least a bachelor's degree from 1995-2000. 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 – 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

statistical test allows us to determine which pairs of variables demonstrate a systematic relationship and the strength of the relationship. Our first bivariate correlation matrix tests the specific claim that technology, talent and tolerance results 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.

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 - 2004. We test the three theories controlling for various racial and ethnic effects against five measures of economic growth, development and innovation: average wage, average wage growth, job growth, in-migration of knowledge workers and 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 paragraphs 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. We do not report any innovation results, since innovation was not significant in the simple bivariate correlations.

THE CREATIVE CLASS AND ECONOMIC GROWTH AND DEVELOPMENT

The major statistical finding in *The Rise of the Creative Class* (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 a 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 a MSA serves as the talent component in the creative class theory and is also a stand alone 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, artists and foreign-born residents. The poorest performing concept in the creative class theory is the tolerance measure, so poor that only the number of foreign-born residents related to any one of the five economic variables. As an example, in Table 1 there are 15 coefficients that represent the three measures of tolerance correlated with five measurements of economic performance. Out of these 15 tests, 12 of the numbers are *negatively correlated*; meaning that not only did the individual tolerance predictors fail to achieve statistical significance, in 80% of our cases they were inversely associated with economic growth.

[PLACE TABLE 1 ABOUT HERE]

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 in-migration 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 in-migration of knowledge workers: talent and technology. Considering that the talent in the creative class is also a measure for human capital, it is intriguing that human capital and our social capital measure 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.

The critical tests of economic robustness though are not the characteristics that attract the creative class but the creative class itself. In measuring the percentage of workers in creative professions within a metropolitan statistical area there is no evidence of any positive, systematic relationship between a creative class and any of the five economic growth measures.

[PLACE TABLE 2 ABOUT HERE]

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. These fully specified models allow us to move beyond simple, independent tests of the one to one correlation between the theoretical components and specific economic variables. We report the results of four OLS tests that place the human capital, social capital and creative capital 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 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 percent African-America, and ethnicity, in the percent Latino.⁴

[PLACE TABLE 3 ABOUT HERE]

Average Wage Results

In Column 1 of Table 3, 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 metropolitan statistical areas. 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.

Average Wage Change between 1990 and 2004

The middle column of Table 3 displays the final regression outcome for average wage change from 1990 until 2004. Note that communities initially with a low baseline are going to have the greatest potential for large wage increases. In this measurement of economic growth, only the human capital theories predict large increases in people's wages across cities. The institutional version of human capital, or intellectual capital, predicts wage growth; these results are potentially due to pay-offs 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 during this time is potentially responsible for these negative outcomes.

Average Job Growth across Cities from 1990 - 2004

The last column in Table 3 presents the final OLS regression for non-agricultural 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 measures of "bridging" and bonding" social capital performs as expected in that "bridging" social capital is positively associated with job growth and "bonding" capital is negatively related. There has been research on racial competition for job in urban areas that seem to be borne out by our results; in that Blacks populations are negatively correlated with growth and Latinos 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 over the last decade⁵ and there are regional differences in average wage.

The creative class failed consistently across multiple statistical tests to explain any urban income or job growth. Additionally, the most controversial characteristic of creative cities, tolerance, was negatively correlated with all our economic measurements. Human capital is a strong predictor of job growth, average wage, average wage change and the net in-migration of college graduates. In the model predicting average wage, social capital is significant and outperforms human capital. The policy implications of our findings are interesting in that the robustness of human capital over several economic indicators means that increased educational investment may be a winning strategy for cities in a knowledge-based economy. Finally, social capital although relevant in growing an area's standard of living may be difficult for a city to control through policy prescriptions.

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 employ 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 the teachers associations, the organization of principals, the organization of school administrators, the parent-teachers organizations and groups such as this 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 a MSA.

⁴ We also tested for percent American-Indian (not native), and percent 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 due to the lack of the statistical performance of the models and the later due to its theoretical relation only to the creative class.

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TABLES

Table 1: 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	Percent Black	Percent 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
Percent Black	.065	-.054	.103	.139*	.008	-.157*	.075	1	-.203*	-.004	.050	-.125*	-.039	-.031
Percent Latino	.140*	-.100	.002	-.045	.063	-.040	-.070	-.203*	1	-.090	.077	.281**	-.007	-.152*

NOTE: N=276

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 2: Bivariate Correlations of Three Theories on Economic Growth and Dependent Variables

	Creative Class	Human Capital	Intellectual Capital	Social Capital	"Bonding" % Evan. Protestants	"Bridging" Religious Pluralism	Percent Black	Percent Latino	Average Wage 2004	Wage Change 1990-2004	Job Growth 1990-2004	Patent 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
Percent Black	.075	-.054	.135*	-.157*	.466**	-.005	1	-.203*	-.004	.050	-.125*	-.039	-.031
Percent Latino	-.070	-.100	.097	-.040	-.195**	-.036	-.203*	1	-.090	.077	.281**	-.007	-.152**

NOTE: N=276

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 3: The 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
Percent Black	.003	.026	-.196**
Percent Hispanic	-.151**	.026	.115*
Adjusted R ²	.542	.268	.336

NOTE: N=276

*** Correlation is significant at the 0.01 level (2-tailed)

** Correlation is significant at the 0.05 level (2-tailed)

* Correlation is significant at the 0.10 level (2-tailed)

