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Baptism by fire: did the creative class generate economic growth during the crisis?

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Scholars have long argued that creativity drives economic prosperity. Recently, much of this debate has revolved around the creative class. Most of this research, however, has been done during times of strong economic growth. What is the economic effect of the creative class after the financial crisis? Looking at regional unemployment variation in 2007–2011 against baseline unemployment in 2005, we study if specific subgroups within the creative class have different relationships with regional unemployment. Throughout the entire timeframe all of the creative subgroups are associated with lower unemployment. We conclude that creativity matters but the influence of each subsector is dependent on region size.

Keywords: economic development, creative class, financial crisis, culture, economic growth, regional growth
JEL Classifications: O16, R11, R12

Introduction

The theory of creativity as the central force in economic development goes back as early as Schumpeter's (1942) seminal concept of 'creative destruction'. More recently, Hall's (1998) 'Cities and Civilization' and Landry's (1995) 'The Creative City' have broadly asserted the importance of creativity to vital urban economies. Whilst the notion of creativity has been bubbling in scholarly and practitioner circles for over a decade, creativity as a central focus within the economic development debate has become most pronounced with the inception of Florida's (2002) 'creative class.'

Florida (2002) has found that the creative class explains growth across a wide number of metropolitan areas, with better explanatory power than human capital (Florida et al. 2008). However, most of this analysis rests on data from economic prosperous years. Most of the research done on the creative class has been conducted during times of great prosperity, and yet for the past several years cities and regions have experienced dramatic economic decline not seen since the Great Depression. The focus of this article is to test whether the creative class as a driver of growth holds up

during times of economic crisis. Recent work has found that the creative class as a whole remains a robust indicator of metropolitan growth. Stolarick and Currid-Halkett (2012) find that the presence of the creative class as a whole is strongly correlated with pre-crisis growth, lower unemployment levels during the crisis and post-crisis rebound.

For the purpose of this article, we go beyond looking at the creative class as a whole. We seek to understand how different sectors within the creative class may be important to growth and rebound after the crisis. There are two important purposes to our article: first, we examine the extent we can unpack which aspects of the creative class influence economic growth and measure their impact during prosperous times, crisis and thereafter. Second, we investigate variation in this relationship by region size. Thus, we undertake a time series analysis looking at the impact of the creative class prior, during and after the economic crash. We study if specific subgroups within the creative class have different relationships with regional unemployment, rather than as a whole as conventionally analysed.

We look at unemployment from five periods between the years 2007 and 2011: Stable, Crisis, Expansion, Peak, and Post-Peak and break down our analysis by subsector and metropolitan size. We compare regional unemployment to a baseline of unemployment for the region in 2005. For each time period, specific creative occupations from the previous year are used. Throughout the entire timeframe, with the possible exception of legal occupations, all of the creative subgroups are associated with lower unemployment. We find that Education and Health Care Professionals along with Computer & Math end up having the strongest impact on reducing unemployment. We conclude that creativity matters in the aftermath of the crisis but particular occupational groups interact with the economy in significantly different ways depending on region size.

Theories and Concepts

Creativity has long been thought to drive economic development. Schumpeter's (1942) notion of 'creative destruction' and Jacobs's (1961, 1969) 'new work' identify creativity as the central explanation for successful economies. Hall (1998, 2000) and Landry (1995) have both made the case for the role of creativity in the economic development of cities. However, the most prolific, and simultaneously most controversial, discussion of creativity and cities has emerged from Florida's (2002) 'creative class'. Florida defines the 'creative class' as a group of individuals whose diverse jobs (ranging from engineers to actors) are linked by the premise that they "generate meaningful new forms" in their quotidian working life. Florida's argument rests on both theoretical and empirical analysis of the role of the creative class in generating economic vitality and a host of other developmental effects including tolerance, diversity, perpetual innovation and other high human capital individuals (Florida, 2002, 2002a, 2002b; Mellander and Florida, 2006, among others). Further, Mellander and Florida (2006) find that the creative class explains growth better than education (BA or above). The creative class theory has catalyzed a deluge of empirical research that has been conducted looking at various economic conditions and geographic scales. In a study of 450 European regions, Boschma and Fritsch (2009) report that the creative class is positively correlated with both entrepreneurship and employment growth and that it is a better measure of growth than high human capital, a finding that Stolarick et al. (2011) corroborate. The creative class is strongly associated with artists (Wojan et al. 2007) and entrepreneurs (Stolarick et al. 2011; Kalsø et al. 2005) which pinpoints a causal link between the creative class and regional growth. Looking at the presence of the creative class in rural

economies, McGranahan and Wojan (2007) find a positive association between this group and employment levels and finds that the creative class' impact is consistent across both metro and rural areas alike.

Notwithstanding the empirical research linking the creative class to growth, the theory has a myriad critics challenging the entire premise on which the creative class rests (Hansen and Niedomysl, 2009; Malanga, 2004; Peck, 2005). Storper and Scott (2009) challenge the argument that the creative class explains growth better than human capital, arguing that jobs do not simply follow creative individuals and that education is still a stronger explanatory variable. Gabe (2006) finds that the creative class does not consistently explain growth across metros nor does it beget future growth. More generally, Peck (2005) and Markusen (2006) argue that the occupational groups underpinning the creative class form too broad a category to truly measure its relationship to growth. Markusen, for example, argues that the concept "bunches together" too many occupations and that, in particular, artists and their ideologies cannot be "conflated with neoliberal urban policy regimes". Peck (2005) questions the very notion of the creative class as a group, quite explicitly claiming it is elitist. Kotkin (2006) suggests that by inserting the creative class into economic development cities essentially forgo urban middle class denizens and their needs (for example, schools, basic services and public transportation) in favour of the "antics of celebrities".

Specific scholars challenge the idea of the creative class as even capturing the essence of creative work. Scott (2000, 2009) and Pratt (2008) argue that creativity is a function of the cultural economy rather than a broad umbrella of loosely connected occupations. Pratt's discussion of the culture and creative industries and Scott's (2009) "cognitive cultural economy" outline the case for cultural industries to be the central force within the creative city framework and urban policy dialogue.

Not so much diametrically opposed to the creative class but more focused on cultural industries as significant production systems, Molotch (1996) and Currid-Halkett (2007, 2009) have pinpointed the significance of cultural and artistic industries and occupations to urban economic development. Rantisi (2004) has looked at the winner-take-all market of New York City's fashion industry as a part of the cultural economy. Looking at how cultural goods and services act as amenities, Clark (2004) and Glaeser et al. (2001) find that cultural amenities underpin growth by attracting residents and offering diverse preferences.

In this article, we unpack whether particular aspects of the creative class not only weather the recession but participate in the rebuilding of urban economies during and in its aftermath. Taking into account the criticism that the creative class is a broad measure of growth, we isolate occupational subsectors within the creative class to measure the separate influence of these groups. We now turn to our methods and analysis.

Data and Methods

Stolarick and Currid-Halkett (2012) find that having a larger creative workforce has helped regions better weather and more quickly recover from the crisis. Our main line of inquiry is to understand whether specific subgroups within the creative class have different relationships with regional unemployment. McGranahan and Wojan (2007), Wojan et al. (2007), Florida et al. (2008); Stolarick et al. (2011), among others have all shown in various ways that the regional relationship between creativity and growth is associated with specific types of workers employed within subsectors of the creative class. For example, managers, scientists, and artists/performers are often found to have stronger relationships with regional outcomes like wages, wage growth, population growth and entrepreneurship (Wojan et al. 2007 and

Boschma and Fritsch, 2009). At the same time educators and high-skill health care workers (for example, physicians) tend to have either no significant or even a negative and significant relationship with regional economic outcomes. Our overall strategy is to understand the significance of the creative class workforce in the post-crisis era. However, in capturing its post-crisis influence, we also study the role of creative class subgroups both prior to and in the midst of the economic crisis. We extracted detailed regional occupational information from the BLS Occupational Employment Statistics programme.

Figure 1 shows the monthly average unemployment rates for the entire USA; all metro areas; and the 25 and 10 largest (by workforce size) metro areas. The graph shows unemployment rates from July 2007 to February 2011. Average unemployment ranged from 4.36% in November 2007 to 10.52% in January 2010. The 10 largest metro areas consistently had lower unemployment than the 25 largest and were generally at or below the US metropolitan average. Some basic trends emerge across all metros: relatively stable unemployment through 1Q2008; then a rapid uptick in unemployment through 2009; a more slowly but still increasing unemployment rate through 1Q2010; followed by stable or falling slightly unemployment. The Stable period (July 2007–April 2008) represents unemployment for the USA leading into the crisis. The Crisis period (May 2008–December 2008) is defined as a period of significant rise in unemployment (before, during and just after the period of the 'financial crisis'). During Unemployment Expansion (January 2009–January 2010) unemployment continued to climb but at a slower rate. The Peak period is the highest unemployment rate in any given month for a metro area, and generally falls in the 4Q2009–1Q2010 period. Our final identified period, Post-Peak (February

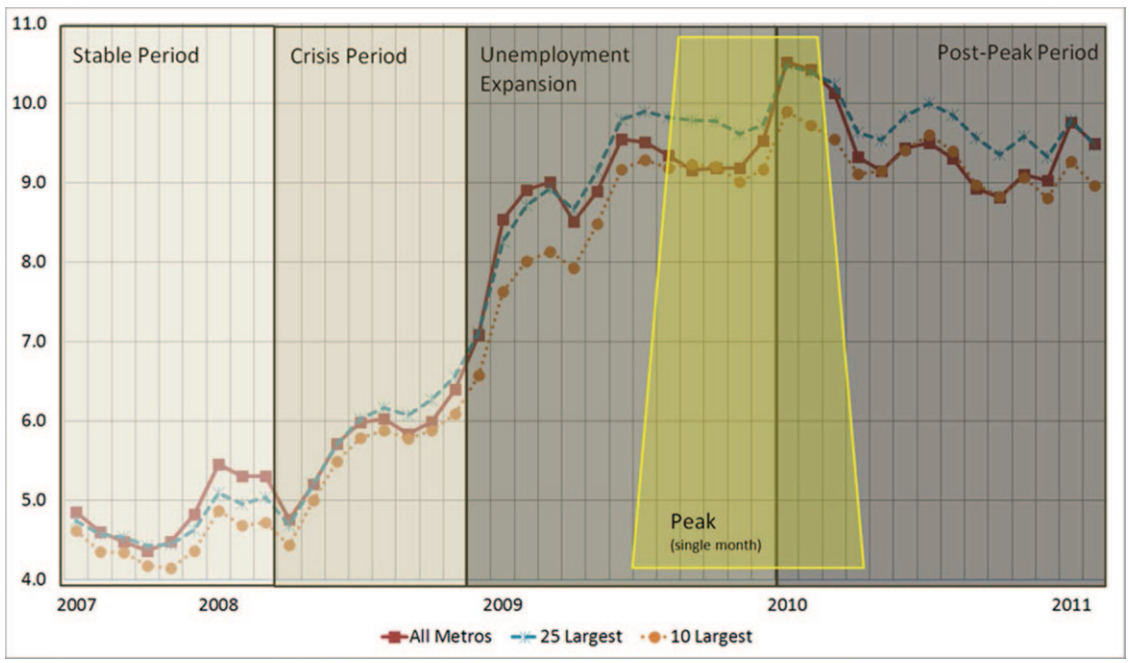

Figure 1. *US Unemployment Crisis Stages (from Stolarick and Currid-Halkett, 2012).*

2010–February 2011) exhibits slightly declining unemployment rates. We use these time periods throughout our analysis but calculate regional unemployment levels against a baseline of average unemployment for the region in 2005. For each time period, specific creative occupations from the previous year are used.

We approach this data through a number of lenses. We divide the creative class into a series of subgroups by their two digit SOC (standard occupational classification) code: Management (11); Business & Finance (13); Computer & Math (15); Architect & Engineering (17); Life & Physical Sciences (19); Law (23); Education (25); Arts, Design, Media (27); Health Care Professionals (29). These categories are taken from Florida, Mellander, and Stolarick (2008). Our overarching question is this: do particular subgroups of the creative class more or less influence economic outcomes during the pre-crisis, crisis and post-crisis periods? For example, there is a possibility that creative class occupations are only helpful during times of prosperity rather than upholding regional economies during the actual crisis. Overall, we are interested in whether subgroups within the creative class influence economic outcomes during different periods and how this effect may vary across metropolitan area and time period. For each selected time period, correlations are analyzed, and then the regional unemployment rate will be regressed against share of each identified creative class subgroup.

Specifically, we will evaluate the following models:

$$\begin{aligned}\text{UnempDiff}_{it} = {} & \beta_0 + \beta_{1\ldots9}\text{Creative Sub Groups}_{it} \\ & + \beta_{10\ldots13}\text{Controls}_{i2005} \\ & + \beta_{14\ldots16}\text{Region}_{i} + \varepsilon_{it} \qquad (1)\end{aligned}$$

UnempDiff is the difference between average regional unemployment rate for the given time period and the average regional unemployment rate in 2005. The time period will be 2007–2008 (stable), 2008 (crisis), 2009 (expansion), 2009–2010 (peak), or 2010–2011 (post-peak). The average of monthly unemployment numbers (a single monthly number for the peak period) is used.

CreativeSubGroups is the r employment share in each of the nine subgroups (Management through Health Care Professionals) for the given time period. The time period will be in the year prior to the unemployment period. The resulting time periods for the creative subgroups are 2006 (stable), 2007 (crisis), 2008 (expansion), 2009 (peak) and 2009 (post-peak). Annual numbers for the creative subgroups are used.

Controls are baseline 2005 values for each region:

- Average Unemployment
- Share of Workforce in Creative Class
- Total Employed Workforce (logged; to control for region size)
- Share of Employment in Manufacturing and Construction

Region is the Census region for each metro (Northeast, Midwest, South, West). Midwest is the excluded dummy variable. For a metropolitan region that crosses regional boundaries, the metro is assigned to the Census region that contains the largest number of counties.

i indexes the 369 metropolitan regions, and *t* indexes the five time periods (stable, crisis, expansion, peak, post-peak).

We will also evaluate model 1 with share of working age population with a BA or above and will develop separate estimates by for each of the four regional size ranges.

As we are also interested in how creative class subgroups influence different sized metro areas, regressions are also computed by workforce size across cities. To that end, we divide the metros into four groups by total workforce size (the 2009 workforce size was used). The size ranges are: under 100,000 (161 metros), 100,000 up to 250,000 (107 metros), 250,000 up to 500,000 (50 metros) and over 500,000 (52 metros). Below we discuss our results.

Results

Overall, in this analysis, we find that the detailed breakdown affirms the larger conclusion that presence of creative class occupations influences economic growth. Despite the criticism that the creative class is too broad a definition, the breakdown by sectors demonstrates that each subgroup within the creative class is negatively associated with unemployment. Thus those places with creative class subgroups experience less unemployment. Through our time series analysis we find that the creative class is helpful not only during times of prosperity (as previously studied) but also through the crisis and in aiding the recovery of metropolitan economies. However, the devil is in the details: different creative sectors are more or less positively correlated to metropolitan prosperity depending on metro size and time period.

Table 1 shows the average share of metropolitan workforce for each of the creative occupational subgroups across all four years. As the Table indicates, there was little change in the average share of the subgroups across all metropolitan areas, but there was variation across metropolitan areas within and between years. On average, the largest creative subgroups were education (5.9–6.7%) and health care (5.5–6.0%) professionals followed by management and business and finance (See Table 1). Law consistently remained the smallest subgroup with only about half of one percent of the regional workforce. Table 2 shows the correlations between the various creative occupational subgroups and the average unemployment rates across the various timeframes.

Some very clear patterns emerge from the occupational groups. The first is the relationship between the share of the workforce in education and regional unemployment (See Table 2). Before the crisis, places with a higher share working in education had *higher* unemployment. Once the crisis commenced education was no longer a hindrance. However, unlike all the other creative class occupational subgroups, a higher share in education was not associated with lower unemployment rates. Essentially, in simple correlation analysis, education neither hurt nor helped unemployment rates. In contrast, higher shares of Arts, Design & Media, Life & Physical sciences and Computer & Math were consistently, significantly and strongly associated with lower regional unemployment rates (Table 2). The remaining occupational subgroups were negatively and significantly associated with lower unemployment, but the relationship was not that strong. Additionally, the share of health care professionals, while still negative, had an even weaker relationship. Our results for education and health care occupations are in line with earlier work that found no influence or even a negative relationship between regional economic outcomes and a higher share of the workforce in those areas (McGranahan et al. 2007; Wojan

Table 1. *Average share of creative class subgroups (2006–2009), all metros (N = 369).*

Average Share (%) (Std Dev)	Mgmt (11)	Bus & Fin (13)	Comp & Math (15)	Arch & Eng (17)	Life & Phys Sci (19)	Law (23)	Ed (25)	Arts, Design, Media (27)	Health Profs (29)
2006	4.1 (0.011)	3.7 (0.013)	1.6 (0.012)	1.6 (0.010)	0.8 (0.006)	0.5(0.003)	5.9 (0.022)	1.1 (0.004)	5.5 (0.014)
2007	4.0 (0.011)	3.7 (0.014)	1.7 (0.012)	1.7 (0.010)	0.8 (0.007)	0.5 (0.003)	6.4 (0.017)	1.1 (0.004)	5.7 (0.015)
2008	4.1 (0.011)	3.7 (0.014)	1.7 (0.013)	1.7 (0.010)	0.9 (0.006)	0.6 (0.003)	6.5 (0.020)	1.1 (0.004)	5.7 (0.014)
2009	4.2 (0.011)	3.8 (0.014)	1.8 (0.013)	1.7 (0.010)	0.9 (0.006)	0.6 (0.003)	6.7 (0.021)	1.1 (0.004)	6.0 (0.015)

Note: Number after subgroup is SOC code.

Table 2. *Creative class subgroup and unemployment correlations (2005–2011)*

	Mgmt (11)	Bus & Fin (13)	Comp & Math (15)	Arch & Eng (17)	Life & Phys Sci (19)	Law (23)	Ed (25)	Arts, Design, Media (27)	Health Professionals (29)
Stable (2007/2008; 2006)	–0.181***	–0.172***	–0.294****	–0.219****	–0.225****	–0.212****	0.211****	–0.298****	–0.113*
Crisis (2008; 2007)	–0.119*	–0.174***	–0.276****	–0.159**	–0.258****	–0.158**	0.055	–0.298****	–0.123*
Expansion (2009; 2008)	–0.151**	–0.226****	–0.295****	–0.167**	–0.321****	–0.193***	–0.004	–0.295****	–0.179***
Peak (2009/2010; 2009)	–0.176***	–0.222****	–0.311****	–0.170***	–0.294****	–0.187***	0.006	–0.309****	–0.102*
Post-peak (2010/2011; 2009)	–0.166**	–0.181***	–0.286****	–0.182***	–0.287****	–0.140***	0.019	–0.306***	–0.116*
Stable difference (2005–2007/2008; 2006)	–0.140**	0.126*	0.028	–0.049	–0.088	–0.006	–0.049	0.084	–0.102*
Crisis difference (2005–2008; 2007)	–0.081	0.039	–0.060	–0.060	–0.149**	0.000	–0.133**	–0.023	–0.106*
Expansion difference (2005–2009; 2008)	–0.130*	–0.100*	–0.172***	–0.107**	–0.281****	–0.108*	–0.131**	–0.120*	–0.165*
Peak difference (2005–2009/2010; 2009)	–0.158**	–0.131*	–0.227****	–0.148**	–0.0262****	–0.109*	–0.087	–0.168**	–0.103*
Post-Peak difference (2005–2010/2011; 2009)	–0.136**	–0.051	–0.167**	–0.155**	–0.238****	–0.024	–0.088	–0.128**	–0.118*
Share BA Plus (2009; 2009)	0.477****	0.510****	0.705****	0.360****	0.595****	0.375****	0.167****	0.730****	–0.084

Notes: First year(s) averaged for unemployment; second for creative subgroup. Number after subgroup is SOC code.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.0001$.

et al. 2007; Florida et al. 2008). The 'Meds and Eds' approach to regional economic development (Harkavy and Zuckerman, 1999) may need to be revisited. These results show that during the crisis while other creative class occupations helped to mitigate unemployment growth, a higher education share may have even increased unemployment. Related, a higher health care share may not limit unemployment growth very much.

We next look at the regression results of running OLS (ordinary least squares) regressions of these creative subgroup shares, regional dummies and control variables against the change

in unemployment from 2005 for various timeframes. To note, when combined, all of these shares will sum up to near 1.0, thus multicollinearity will have to be considered. However, with the additional variation from the subgroups, the VIF (variance inflation factor) for the subgroups stays at or below 3.0. The creative class share in 2005 occasionally has a VIF above 3.0 but below 10, which is not unexpected given the stability of total creative employment across regions over time and the combined subgroups equally creative class employment. (See Stolarick and Currid-Halkett, 2012, for detailed reporting of the results and findings comparing total regional creative employment share to working and service shares and analysis of stability of occupational employment shares over time.)

The regression results (See Table 3) put the subgroups in a different context and generate somewhat different results. The regressions have change in unemployment rate between the current period and the average unemployment in the region in 2005 as the dependent variable. This means that a negative coefficient is associated with a smaller variation

Table 3. *Regression Results for Creative Subgroups Stable through Post-Peak Periods.*

	Stable (2005–2007/2008)	Crisis (2005–2008)	Expansion (2005–2009)	Peak (2005–2009/2010)	Post-Peak (2005–2010/2011)
Intercept	0.015**	–0.003	–0.006	0.025	0.006
Management (11)	–0.147***	–0.125*	–0.119	–0.168	–0.215*
Business & Finance (13)	0.122**	0.185**	0.181	0.247*	0.280**
Computer & Math (15)	–0.030	–0.067	–0.058	–0.002	–0.006
Architect & Engineering (17)	–0.141**	–0.104	–0.084	–0.224	–0.274**
Life & Physical Sciences (19)	–0.215**	–0.154	–0.521***	–0.599**	–0.576***
Law (23)	–0.297	–0.186	–0.009	0.128	0.161
Education (25)	–0.039	–0.541	–0.026	–0.052	–0.019
Arts, Design, Media (27)	–0.110	0.006	0.062	0.160	–0.085
Health Care Professionals (29)	–0.082**	–0.017	–0.014	0.015	–0.003
Unemployment 2005	–0.163*****	–0.029	0.097	0.339	0.144*
Creative Class 2005	0.020	–0.018	–0.069*	–0.105***	–0.073*
Log Total Employment 2005	0.0003	0.004*	0.009**	0.006**	0.008***
Share Manufacturing Employment 2005	–0.004	0.023*	0.084*****	0.069*	0.048***
Northeast region	0.001	0.002	0.0003	0.004	0.005
South region	–0.002	0.002	0.0003	–0.001	0.004
West region	0.002*	0.006***	0.009	0.015*****	0.020
Adjusted R2	0.144	0.047	0.184***	0.228	0.213*****

Notes: Years shown for unemployment, difference from 2005; creative subgroups from previous year.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$; ****$p < 0.001$; *****$p < 0.0001$

in wage between 2005 and till date, and a positive coefficient is associated with a greater increase in unemployment rate. Management is negative and generally significant—regions with more managers experienced reduced unemployment growth. This is also the case for Architects & Engineers and especially strong for Life & Physical Sciences. However, business and finance was generally positive—the crisis was a financial crisis and it hit the financial industry in a significant way. The control variables are as expected (when significant), especially the positive relationship between change in unemployment and share of manufacturing. The West seemed to be the only regional effect that was significant, and it was positive—unemployment increased more in the West. Although not always significant, the change in sign for some of the coefficients on the occupational subgroups indicates that looking at this data using these time periods seems warranted.

When the human capital variable, bachelor's degree or above, is added to the regressions, it is not significant, does not increase the adjusted R2 and does not impact the estimates or significance of the other estimated coefficients. High human capital is correlated with lower overall unemployment and is important for metropolitan economic robustness during the studied period. However, as the purpose of this analysis is to parcel out and understand specific creative subgroups' relationship to metropolitan and regional unemployment, human capital is not a useful measure. Including BA or above does not alter our overall results: the estimated coefficients of the creative subgroups and the other occupational groups do change slightly in absolute terms, but maintain their relative sizes, significance levels, and directions.

Throughout the entire timeframe, with the exception of some occupations, the creative subgroups had negative relationships to changes in regional unemployment rates. This result reinforces previous findings that a region having a greater share of its workforce in the creative class is associated with lower rates of unemployment throughout the pre-crisis, crisis and post-crisis periods (Stolarick and Currid-Halkett, 2012). For metropolitan areas with higher concentrations of the creative class subsectors, the unemployment 'hit' was not as severe and the recovery faster.

Table 4 shows the relationship between regional unemployment rates by time period for cities by size category and creative occupational subgroups. Our analysis indicates that not all creative subgroups are correlated with metropolitan growth in similar capacities. The results clearly show that these subgroups mitigate unemployment differently, depending on metropolitan size. For smaller metro regions, an increased share of employment in Architecture & Engineering and Life & Physical Sciences is associated with lower unemployment growth. For medium-small regions, Life & Physical Sciences employment was a benefit, but educational employment was associated with increased unemployment. For medium-large regions there a few significant results except for Education and Health Care Professionals being negative and significant only in the period before the crisis. For the largest regions, higher shares of employment in Management, Finance, and Computer occupations do appear to be positively associated with a larger increase in regional unemployment. The significance seems to mostly be driven from multicollinearity with share of creative employment in 2005, which is negative and significant. With share creative employ in 2005 excluded (Table 4), the VIF values not only show little multicollinearity but also show that overall model has little predictive power for explaining regional variation in unemployment levels during the crisis for large cities.

For the largest cities, the smaller sample size and multicolinearity among the independent variables do not generate strong or highly significant results. Removing creative class share in 2005 eliminates the multicollinearity.

Table 4. *Regional Unemployment Rates (2005–2011) by Metropolitan Size Category and Creative Class Occupational Subgroups*

	Stable (2005–2007/2008)	Crisis (2005–2008)	Expansion (2005–2009)	Peak (2005–2009/2010)	Post-Peak (2005–2010/2011)
			Size 1 (under 100,000)		
Intercept	0.04**	0.01	0.012	0.006	0.013
Management (11)	–0.139*	–0.101	0.008	0.062	–0.008
Business & Finance (13)	0.117	0.126	0.057	0.186	0.258
Computer & Math (15)	0.014	0.048	–0.195	–0.153	–0.061
Architect & Engineering (17)	–0.117	–0.135	–0.047	–0.246	–0.383**
Life & Physical Sciences (19)	–0.212	–0.133	–0.624+	–0.606+	–0.556**
Law (23)	–0.287	–0.464	0.476	0.484	0.296
Education (25)	–0.037	–0.118+	–0.049	–0.05	–0.039
Arts, Design, Media (27)	–0.402	0.062	–0.46	–0.315	–0.356
Health Care Professionals (29)	–0.122**	–0.08	–0.173	–0.072	–0.07
Unemployment 2005	–0.108**	0.144**	0.185*	0.454****	0.286***
Creative Class 2005	0.02	–0.01	–0.064	–0.112**	–0.06
Log Total Employment 2005	–0.004	0	0.008	0.01	0.005
Share Manufacturing Employment 2005	–0.019	0.021	0.078***	0.073**	0.047**
Northeast region	0.001	0.004	–0.002	0	0.002
South region	–0.004*	0.002	–0.004	–0.006	–0.001
West region	0	0.006	0.004	0.012**	0.015***
Adjusted R2	0.067	0.046	0.250	0.285	0.249
			Size 2 (100,000–250,000)		
Intercept	0.004	–0.043	–0.127	–0.07	–0.085
Management (11)	–0.064	–0.041	–0.28	–0.341	–0.387
Business & Finance (13)	0.082	0.111	0.286	0.312	0.21
Computer & Math (15)	–0.054	–0.115	–0.279	–0.222	–0.03
Architect & Engineering (17)	–0.14	0.044	–0.012	–0.055	0.005
Life & Physical Sciences (19)	–0.284	–0.356	–0.615	–0.862*	–0.831*
Law (23)	–0.225	0.139	–0.366	0.28	1.028
Education (25)	0.019	0.275**	0.202	0.272	0.38**
Arts, Design, Media (27)	0.027	–0.383	0.537	0.452	–0.108
Health Care Professionals (29)	–0.053	0.013	0.066	0.026	0.043
Unemployment 2005	–0.307****	–0.409***	–0.082	0.085	–0.164
Creative class 2005	–0.001	–0.076	–0.105	–0.158	–0.182*
Log Total Employment 2005	0.004	0.016	0.036*	0.029	0.032*
Share Manufacturing Employment 2005	–0.001	–0.002	0.039	0.02	0.014
Northeast region	0	–0.006	–0.001	0	0
South region	–0.004	–0.005	0	–0.004	0
West region	0.003	0.001	0.01	0.014	0.016**
Adjusted R2	0.169	0.043	0.069	0.117	0.135
			Size 3 (250,000–500,000)		
Intercept	0.078	0.106	0.127	0.286	0.277
Management (11)	–0.528**	0.023	0.215	–0.072	0.008
Business & Finance (13)	–0.392	0.237	0.648	0.255	0.407
Computer & Math (15)	–0.358	–0.076	–0.055	–0.055	–0.036
Architect & Engineering (17)	–0.385*	0.334	0.559	0.334	0.328

Table 4. *(Continued)*

	Stable (2005–2007/2008)	Crisis (2005–2008)	Expansion (2005–2009)	Peak (2005–2009/2010)	Post-Peak (2005–2010/2011)
Life & Physical Sciences (19)	0.237	0.356	0.386	0.517	0.442
Law (23)	0.332	0.634	0.019	0.754	0.875
Education (25)	–0.36***	0.042	0.141	–0.274	–0.174
Arts, Design, Media (27)	0.856	0.492	1.165	1.063	0.419
Health Care Professionals (29)	–0.332*	0.418	0.805	0.494	0.519
Unemployment 2005	0.014	–0.29	0.078	0.385	0.161
Creative class 2005	0.224*	–0.227	–0.428	–0.317	–0.345
Log total employment 2005	–0.014	–0.015	–0.022	–0.042	–0.04
Share Manufacturing Employment 2005	0.02	0.036	0.123	0.072	0.051
Northeast region	0.004	0.004	0.007	0.011	0.014
South region	0	0.005	0.006	0.002	0.006
West region	0.005	0.011	0.015	0.019	0.023*
Adjusted R2	0.289	0.091	0.088	0.160	0.163
Size 4 (over 500,000)					
Intercept	0.019	0.018	0.039	0.069	0.085
Management (11)	0.209*	0.419**	0.86***	0.683*	0.587*
Business & Finance (13)	0.272*	0.388	0.665*	0.439	0.287
Computer & Math (15)	0.255	0.319	0.819**	0.864*	0.749*
Architect & Engineering (17)	–0.046	0.088	0.134	–0.08	–0.143
Life & Physical Sciences (19)	–0.729**	–0.907	–1.07	–0.756	–0.684
Law (23)	–0.402	–0.516	–0.554	–0.632	–0.472
Education (25)	0.223**	0.323*	0.347	0.135	0.183
Arts, Design, Media (27)	–0.189	–0.479	–0.47	–0.666	–1.028
Health Care Professionals (29)	0.054	0.08	0.242	0.221	0.033
Unemployment 2005	–0.764*****	–0.872****	–1.027***	–0.914**	–1.054***
Creative class 2005	–0.172***	–0.306***	–0.622*****	–0.629****	–0.555****
Log Total Employment 2005	0.006	0.012*	0.018*	0.02*	0.02**
Share Manufacturing Employment 2005	0.024	0.037	0.132	0.093	0.043
Northeast Region	0.001	0.003	0.009	0.016	0.013
South Region	–0.005	–0.001	0.001	0.004	0.003
West Region	0	0.006	0.013	0.018+	0.021**
Adjusted R2	0.447	0.388	0.389	0.302	0.396
Size 4 (over 500,000) with Creative Class Share 2005 excluded					
Intercept	–0.003	–0.005	–0.01	0.024	0.045
Management (11)	–0.002	0.051	0.02	–0.141	–0.14
Business & Finance (13)	0.153	0.144	0.297		0.044
Computer & Math (15)	0.104	–0.156	–0.061	0.056	0.036
Architect & Engineering (17)	–0.225	0.106	–0.032	–0.331	–0.364
Life & Physical Sciences (19)	–0.764*	–1.244**	–1.187	–1.108	–0.996
Law (23)	–0.62	–0.448	–1.333	–1.23	–0.999
Education (25)	0.147	0.167	–0.033	–0.313	–0.212
Arts, Design, Media (27)	–0.18	–0.298	–0.137	–0.283	–0.69
Health Care Professionals (29)	0.007	–0.115	–0.276	–0.255	–0.388
Unemployment 2005	–0.598****	–0.689***	–0.598	–0.537	–0.721*

Table 4. *(Continued)*

	Stable (2005–2007/2008)	Crisis (2005–2008)	Expansion (2005–2009)	Peak (2005–2009/2010)	Post-Peak (2005–2010/2011)
Log Total Employment 2005	0.005	0.009	0.015	0.016	0.016
Share Manufacturing Employment 2005	0.013	0.019	0.102	0.096	0.046
Northeast region	–0.001	–0.002	0.001	0.009	0.006
South region	–0.005	–0.003	–0.001	0.003	0.002
West region	0.001	0.004	0.008	0.016	0.019*
Adjusted R2	0.295	0.202	0.054	0.036	0.170

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$; ****$p < 0.001$; *****$p < 0.0001$.

Although not always significant, the results show at least limited support that higher employment shares in Life & Physical Sciences and Arts, Design and Media is associated with lower unemployment growth in the largest cities.

Discussion and Conclusion

This article looks at how the creative class may shape economic growth in cities. Previous work on this topic has been limited by two assumptions. First, most research on the creative class has looked at its effect during times of prosperity, rather than considering how it performs under more stressful economic conditions. Second, this research has looked at the creative class as a unified whole, which has been criticized for its generalities and possible overreaching in its effect on economic growth (Markusen, 2006; Peck, 2005). While recent work has found that the creative class as a whole does positively influence metropolitan regions during economic stress and did mitigate unemployment levels during the economic crisis (Stolarick and Currid-Halkett, 2012), until now we have not pinpointed the extent to which particular subgroups influence regional economic outcomes. Using the 'natural experiment' of the financial crisis and the years immediately before and after, we find that specific creative class occupational subgroups are positively and significantly associated with overall economic growth. While these results are contextual, they have a number of economic development implications.

First, our findings indicate that the occupational composition of a city greatly shapes its fortunes through both prosperous and depressed times. Thus rather than simply attributing the 'creative class' to economic growth, our more precise analysis pinpoints specific types of creativity that perform well controlling for a number of different economic climates. Additionally, we have found that the creative subgroups most correlated to economic robustness very much hinge on metropolitan size. Smaller metros appear to benefit more from shares of creative class employment, particularly in Life & Physical Sciences and Architecture & Engineering. Our analysis suggests that one-size-fits-all models of economic development are not appropriate in the most literal sense. While medium and large-size metros do attain some benefits of having a share of the creative class, our results are less pronounced. We suspect that these results are explained by the greater economic diversity of larger metropolitan regions and the higher instance of other occupational groups outside of the creative class. Unsurprisingly, bigger, more diverse cities are less vulnerable and sensitive to fluctuations in particular occupational sectors, a point made by Jacobs (1969) decades ago.

Our results lead to a second more general implication. Through the Great Recession, the creative class as a whole is less correlated to economic resilience than its various parts. In short, while the creative class has significant developmental effects—particularly in the aftermath of the crisis—its effects are specific to city type and size. Thus the practical application of our results suggests that economic development schemes employing the creative class ought to be targeted towards specific subsectors rather than as a part of a generalized initiative. With regards to human capital, our analysis indicates that once creative occupational differences are accounted for, this variable is no longer a significant component to urban stability throughout the crisis. Simply having a concentration of individuals with bachelor's degree does not actually provide a clear path as to how an educated workforce upholds an economy. Rather, we find that occupations give greater insight into how human capital actual manifests itself in jobs and industrial sectors. Human capital matters, of course, but the more important outcome rests on the employment of human capital. In other words, what people do is a far more telling proxy of regional robustness than simply the concentration of a highly educated work force.

This study is not without its limitations. First, our analysis consists of a sequence of cross-sectional regressions rather than a longitudinal study. The lag in availability of contemporaneous occupational data makes a longitudinal study that is focused on the impact of creative workers and the economic crisis near impossible. As a result, we are unable to tease out causal relationships. Instead, our results are meant to show the relationships among these various subsectors and regional unemployment rates and should be interpreted as such.

The second limitation relates to the interpretation of the findings on regional unemployment levels and employment shares of Health Care Professionals and Educators (Meds & Eds). As our results are in line with recent results that have found little to no positive regional economic impact from employment in these two areas, we have focused on that interpretation. However, since our analysis looks at unemployment levels and not measures of economic impact (wages or productivity as in the earlier studies), it is possible that the levels of employment of Health Care Professionals and Educators in a region would be completely unrelated to unemployment levels or other aspects of the economic crisis. This result may be due to the fact that doctors and teachers are generally public employees who are a necessary component for the effective functioning of a region and their employment is less sensitive to economic shocks. Therefore, it is not that Meds & Eds do not offer a particular benefit to the region but that we are expecting to find a relationship that does not really exist.

Through our analysis of the creative class by sector, we find that creative class subgroups are positively correlated to economic resilience and growth and that this relationship remains important both in good and bad economic times. We feel this result upholds the strength of the creative class particularly as its nuances are examined. However, as different sectors are metro-size specific in their influence, economic development approaches using the creative class must be tailored. Our larger point is that economic development policy is not generalizable, and this finding applies to types of development approaches, not just the creative class. Thus, the age old discussion of where to put the next Silicon Valley or arts district is place-specific and larger trends and boldface success stories ought not to be followed per se (Currid-Halkett and Stolarick, 2011).

Theoretically, the creative class remains a potent and important construct in the economic development debate. However, the role of the creative class and its explanatory power must be clarified through a systematic study of its various components. In this article we have

attempted to unearth the dynamics within the creative class that may explain its resilience. Without question, the creative class has helped uphold the economies of cities small and large, but its relationship to prosperity remains in the details of where and who rather than simply a far reaching and ubiquitous silver bullet. Thus, a rigorous analysis of localized occupational dynamics go a long way in explaining the role of creativity in our cities' past, present and future fortunes.

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