"Go West, Young Woman?": The Geography of the Gender Wage Gap through the Great Recession

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Abstract

Despite headline-grabbing accounts of the 'Man-cession' and childless metropolitan-dwelling women who earn more than men, the gender wage gap remains persistent. The spatiality of the gender wage gap has received little attention, despite geographers' historic concerns with patterns of inequality under economic shifts and economic sociologists' increasingly geographic focus. In this paper, I ask whether, where, and how the gender wage gap has changed with the recession. Using American Community Survey pooled surveys for 2005-7 and 2011-13, I model counterfactual wage distributions for full-time male and female workers in the top 100 metropolitan areas of the U.S., controlling for education, age, and experience. Results indicate that gender inequality is spatially polarizing, both across the wage distribution and across the country, and that the recession exacerbates this pattern. Gender gaps decline most in the Rustbelt, but show relative increases in many Western metropolitan areas (especially the Pacific Northwest and northern California). Further, the declines are mostly amongst below-median earning workers, whereas the increases are most likely to be at the 75^{th} or 90^{th} percentiles. The combination of geographical and distributional analysis makes clear that the gender wage gap, even adjusting for labor force characteristics, remains strong. It also reveals a more thorough picture of how gender inequality shifts with the recession, especially as previous patterns of uneven development under economic restructuring are still evident here. Most importantly, the analysis signposts regions of emerging gender inequality where relative gender equality is often presumed, suggesting critical research directions for feminist and economic geographers.

“If you're paying attention to the numbers, you could be forgiven for thinking that the recession represents some kind of feminist watershed”

Dana Goldstein, 2009. “Pink-Collar Blues: Does the Recession Provide an Opportunity to Remedy Occupational Gender Segregation?” *The American Prospect*.

Introduction

Gender wage inequality has received significant attention in US academic and policy research for the nearly five decades since women first formed significant proportions of the labor force. During the recent Great Recession, however, frequent media profiles of disproportionate job loss among men and higher-earning female partners gave many the impression that the gender wage gap might have evaporated. Stories of women’s relative economic gains fronted much media and public analysis under the heading of the ‘Man-cession’, and the approximately ¼ of married US households (Pew 2013) where women earned more than their partners warranted concern with emasculating gender relations and marital stability (Rampel 2009, Roisin 2010). In many ways, the recession hit men harder than women because of men’s overrepresentation in the same types of jobs that had been declining for the previous several decades, under globalization and the transition from industrial to post-industrial economy. As Goldstein’s comment above points out, the recession was seen, at least in the popular imagination, as a boon to gender equality, if only through its acceleration of increasingly depressing outcomes for male workers, especially those who had benefitted from the last vestiges of a once-vibrant manufacturing economy.

However, despite women's relative gains, largely attributable to men's greater employment losses, the gender wage gap in 2010 remained only a few percentage points lower than a decade previously (Goldin 2014). President Obama's 2014 State of the Union address placed the .77 ratio of female to male annual earnings strongly back on the agenda, although this generated critical attention to the calculation of the gender wage gap. Debate over the magnitude of the gender wage gap hinges in on whether or not gender differences in skills and attachment to the labor force are taken into account, as controlling for these differences greatly diminishes the gender wage gap. The gender gap in *weekly* earnings, (reflecting women's greater time out of the labor force) is just under 20%, but still does not account for skills or other differences between men and women (Hegewisch et al 2014). However, both of these estimates include only full-time workers, thus controlling for a significant difference in earnings between male and female workers. While we know that both the gender wage gap and differences between men's and women's labor force characteristics have continued to diminish with the recession, we know little about the spatial variation in this diminution, and attention to the patterns of gender inequality across the wage distribution has been scant. This is significant because both the spatiality of the gender earnings gap and the shape of its distribution are critical to understanding its recent shifts. In addition, as I hope to demonstrate here, the gendered *distribution* of earnings has a spatiality itself, one intricately connected to major economic shifts in the US economy.

Thus, this paper attempts to add spatial variance in the gender wage gap and its constitution to reports of how gender inequality declined during the recent recession. Using 2005-2007 (pre-recession) and 2011-2013 (post-recession) pooled files from the American Community Survey for the largest 100 metropolitan areas, I model overall counterfactual distributions of full-time full-year men's and women's wages using quantile regressions that

allow effects of labor market characteristics to vary across the distribution. Examining the overall relative distribution of wages and skills (rather than a single or aggregated point) allows better understanding of gender wage inequality and its shifts with the recession. Considering the varying geographic paths of the recession and differently gendered labor markets begs the question of whether women have improved their position relative to men everywhere and to the same extent. Further, if the geography of the recession has been variable, as has often been asserted in studies of the housing market (Wyly and Ponder 2011, Lichtenstein and Weber 2015) has this variability affected how the gender wage gap is assessed?

Although the gender wage gap is diminishing somewhat overall, there are several large metropolitan areas where it increases throughout the wage distribution, and others where it remains static as the recession proceeds. Many metro areas have polarizing distributions, such that the gender wage gap increases above the median even as it decreases below. The suggestion that women fared well compared with men as the recession proceeded masks spatial and distributional variation in gender wage inequality, and limits understanding of how they are related. Attention to the spatiality of overall wage distributions of men and women suggests that even those places with advantages for highly-skilled women may still not have been as beneficial for them as for comparable men during the recession. Further, the spatiality of the distribution (by which I mean the spatial variation in how the gender wage gap and its level varies over the wage distribution) and how it changes with the recession point to gendered shifts in the American economy. Some of these are old patterns that shift into new places, some are continuations or intensifications or diminutions of old patterns, and some point to emerging geographies of gender wage inequality.

Explaining the Gender Wage Gap Across Time and Space

Explanations of the gender wage gap have focused on women's lower labor force attachment and working hours, differences between men and women in educational attainment or labor market experience, and imbalances between men's and women's industries and occupations and related levels of unionization (Blau and Khan 2007, Autour 2011, Shen 2014). Reductions in all of these gendered differences over time have thus been used to explain the diminishing gender wage gap. Women's wages become more similar to men's as their labor market characteristics become more similar, but also as discrimination decreases. Confusingly, however, shifts in the economy that have occurred alongside declining gender inequity have been used to explain reduced gender wage gaps, although these same economic shifts have relative as well as absolute benefits for men. Changes associated with post-Fordism and economic restructuring have arguably explained both the reduction in gender inequality and its intransigence. For example, the reduced significance of manufacturing employment is usually associated with disproportionately negative effects for men, given their overrepresentation in manufacturing employment, and the historically good wages and contracts surrounding these jobs (Harrison and Bluestone 1988). Debates around skills-based technological change have thus emphasized globalization's detrimental effects for less-educated male workers (Autour 2011, Kalleberg 2011). However, globalization's polarizing effects have been presumed to disproportionately benefit men with high-level managerial or technical positions, relative to women who are more likely end up in poorly-remunerated service jobs (McCall 1998).

Following geographers Massey (1984) and Peck (1989) and their attempts to theorize local labor markets with regard to how they affected different groups of workers, McCall (1998) asked whether the spatiality of globalization and economic restructuring affects different groups

of workers differently. She found that in declining labor markets with high levels of labor casualization less-educated workers fare very poorly but women fare worse than men, and also that educational gains benefit women less than men in high-wage labor markets. Overall, regions that retain manufacturing employment benefit less-educated men (increasing the gender wage gap) and regions rich in service employment show reduced gender wage inequality because less-educated men fare poorly. McCall's pioneering work was extended in *Complex Inequality* (2001), where she found more evidence that local labor market configurations of inequality between different groups of workers translated the effects of economic restructuring such that postindustrial labor markets could either increase or diminish gender, racial, and class inequities. Subsequent analyses along these lines have utilized US metropolitan labor markets to explore variation in gender inequality and its causes. Ranking occupation-industry employment cells across metro areas, Huffman finds gender wage inequality greatest where female-dominated jobs are ranked lower on the wage hierarchy (2004). Dinovitter and Hagan (2013) find that labor markets with greater gender dissimilarity in employment depress the wages of women in law. And Gauchat, Kelly, and Wallace (2012) find that gendered occupational segregation matters more than globalization in terms of explaining gender inequality. Although this seems a deviation from McCall's emphasis on large-scale structural shifts in the economy, it empirically extends her analysis of how such shifts have varying local labor markets implications for the gender wage gap.

With the most recent shift to recession, academic attention to occupational gendering increases. First, as mentioned above, 'the Man-cession', as it is quickly dubbed, is largely due to male job loss in industries hardest hit by economic downturn (construction, as well as ongoing manufacturing losses). Second, recently-unemployed men begin to enter booming and relatively-

secure health care jobs (Dwyer 2013), gaining employment in an industry that had been dominated by women's employment from the 1970s onward (McDowell 2015). Although men working in this industry face lower wages overall than in manufacturing jobs, more-educated white men climb into more technical, better-paid jobs within this relatively-secure employment sector (Dill, Price-Glynn, and Rakovski 2016). Within this industry, as in overall economy, feminist scholars find evidence that women's poorer employment conditions 'buffer' men's higher wages and/or more secure 'core' employment from the negative effects of the recession (Reskin and Roos 1990, Grimshaw and Rubery 2007, Rubery and Rafferty 2013). Focusing on the geography of women's increasing creative class employment, Florida, Mellander and King (2014) suggest that "… we should expect states that are more open and tolerant, and where talent and technology are more concentrated to be better places for women to succeed economically". In an analysis of the state-to-state variance in women's wages and creative class employment, they find some support for this hypothesis, whilst noting the striking persistence of the gender wage gap everywhere. However, with the exception of looking at women's share of the workforce, their analysis of ACS data relies on comparing women (and sometimes, creative class women) across states, rather than comparing women to men.

Explanations of the gender wage gap are different from explanations of how it is changing (Kassenboehmer and Sinning 2014), whether over the long-term of the past half-century or the short-term of the recent recession. The two types of explanations rely upon each other but also critically upon understanding the shape of men's and women's wage distributions and how they are changing. Too often, discussions of gender inequality focus on men and women in only one part of the wage distribution (as amongst the creative class, for example), or postulate women and men in different parts of the wage distribution or women as totally absent

from the manufacturing-dominant middle of the distribution. Since the 1970s, gender inequality has declined much more at the bottom of the wage distribution (due to women's increased participation) than at the top, where smaller declines are more attributable to women's educational gains (Blau and Kahn 2007, Kassenboehmer and Sinning 2014). Bernhardt, Morris and Handcock's 1999 caveat that gender inequality can diminish with only minimal gains (or even absolute losses) for women, if men's earnings are stagnating or in decline, is evident in the current research I present here as well. In addition to greater attention to gendered wage distributions, looking at their geography is crucial to linking the above accounts of differences between men and women and broader economic shifts. The current paper is not the first to realize this, although its linking of distributional analysis and geography is new, as well as its application to analysis of recessionary change.

Despite McCall's emphasis on varying local labor market configurations of inequality and Florida et al's suggestions that women should fare relatively better in creative class locations, there is very little examination of gender wage inequality in geography. This is especially notable as sociologists like McCall have turned to spatial examinations of economic inequality. However, geographers' analysis of economic restructuring and poverty (Kodras 1997, Glasmeier 2005), and the sub-urban scale of gender inequality (Hanson and Pratt 1991, England 1993, McLafferty and Preston 1993, Carlson and Persky 1999), have inspired many of the more-recent geographical inquiries of sociologists (Lobao, Hooks and Tickamyer 2008), as well as the analysis presented here. I am also mindful of the repeated calls of feminist geographers for more empirical investigation of the spatialities of structural inequality. (Valentine 2007, McLafferty and Preston 2010, McDowell 2013). The thickly descriptive exploratory analysis presented here is an attempt to tease out some of those empirics: those that govern one piece of how places

shape changing gender inequality on a daily basis in the workforce. I will return to implications for future geographic research in the conclusions.

Data and Modelling Approach

Data come from 3-year pooled samples of the American Community Survey. The ACS was designed to replace the decennial PUMS long form of the US Census. As such, its sample sizes are considerably larger than the Current Population Survey data often used for earnings research. Large annual samples and pooled 3-year estimates make the ACS ideal for analyzing economic shifts across metropolitan areas during the recent recession. Since each year of the ACS reflects the previous year's data, the 2005-7 and 2011-2013 samples analyzed here include a pre-recession 2004-6 period and a post-recession 2010-12 period. Multi-year samples are adjusted for inflation using the Bureau of Labor Statistics-provided Consumer Price Index for the third year of each cycle and adjusting weights 1/3 for each year (BLS). The samples are restricted to nearly full-time (at least 35 hours worked per week) full-year (at least 50 weeks worked) non-self-employed workers aged 25-55 in the previous year, who are not resident in group or institutional quarters. The intent of the age restriction is to as nearly as possible capture only prime-age workers not in an introductory job or nearing retirement, as these workers would have been disproportionately affected by economic shifts. In the quantile regressions described below, the dependent income variable includes each worker's total pre-tax income from wages and salaries in the previous year. All positive wage income is logged, and regressed on continuous Mincerian variables of age, years of education, and experience (age-6-education). All workers with less than 1 year or more than 40 years of experience by this calculation are removed from

the sample. The ACS topcodes income at the 99th percentile for each state and averages all values above this point.

Like similar studies, I have not controlled for occupational segregation. In part, this is due to methodological considerations in that modelling overall distributions rather than averages demands some reduced model parameters for tractability (Lemieux 2004, Melly 2005). From a more theoretical perspective, I argue that occupational choice cannot be seen as exogenous to gendered patterns of labor market outcomes. This choice is supported elsewhere in the literature, as well as by studies that show that occupational segregation is less deterministic of the gender wage gap than either globalization or within-occupational differences (Gauchat, Kelly and Wallace 2012, Kassenboehmner and Sinning 2014).

Research on the gender wage gap often employs Oaxaca-Blinder-type decomposition techniques in order to account for the portion of the gender wage gap due women's generally lower levels of education and experience. Differing women's characteristics are generally expressed as covariates, whereas the differing returns to these covariates are expressed in the coefficients on these covariates. Although the idea is often to measure gender discrimination, that interpretation can be incomplete where additional differences such as occupational gaps and gender differences in firm size are omitted from the analysis. As such, I do not report on decompositions here (although these model estimates are available upon request). Instead, I attempt to consider geographic variation in the gender wage gap that is robust to gendered differences in education and experience that partially explain different outcomes for men and women. This represents a minimal specification of labor force characteristics, although one commonly employed in assessment of the gender wage gap, and certainly one that is more sensitive to the differences than the summary estimates provided in the introduction and

elsewhere. Remaining differences between men and women are arguably due less to individual differences than to differences in how they experience labor market sorting and allocation processes.

The challenge is estimating a counterfactual wage distribution, when in fact no such thing exists in pure empirical form. Recent approaches have attempted to model overall wage distributions, often over two time periods, conditional upon a series of characteristics that explain wage densities, and then decomposing these distributions for characteristics across the distribution (Machada and Mata 2005, Melly 2006, Fortin, Firpo and Lemieux 2011). The approach chosen here follows Melly most closely, using bootstrapped quantile regressions to estimate conditional wage distributions (in this case for men and women). Integrating the conditional wage distribution over the range of the covariates of worker characteristics yields an unconditional wage distribution. Here, this allows for identification of the counterfactual expressing women's wages if they shared men's characteristics and were paid accordingly, and the decomposition of the unconditional quantile function into the effects of characteristics/covariates and returns/coefficient, such that

$$\hat{q}\,(\hat{\beta}^{w}, \chi^{m}) = inf\{q: \frac{1}{N}\sum_{i=1}^{N}\sum_{j=1}^{J}\left(\tau_j - \tau_{j-1}\right) 1(\chi_i^{m}\,\hat{\beta}^{w}\left(\tau_j\right) \leq q\,) \geq \theta\}$$

is the θth quantile of the counterfactual distribution for women's characteristics and men's prevailing wage distribution. Unlike Oaxaca-Blinder models, where the influence of covariates is explained only at the mean rather than across the entire wage distribution, this formulation allows the effects of the covariates to vary over the distribution. This is especially important in

that the effects of workplace characteristics, especially education, presumably have different effects on the gender wage gap amongst higher-earning and lower-earning workers. The decomposition of characteristics and coefficients is saved for further analysis, in favor of reporting the geographic variance in counterfactual-estimated gender inequality pre- and post-recession, as well as the change in these estimates.

100 counterfactual quantile distributions are estimated for men's and women's wages in the top 100 metropolitan areas of the United States, all with over 500,000 population by 2010. The distributions were estimated at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentile with 50 bootstraps in each case.[1] Thus, we can see how the adjusted gender wage gap differs for some of the lowest-paid workers, those at the top of the bottom quarter, those at the median, those at the bottom of the top quarter, and those just entering the top decile of workers (due to topcoded rounding of income above the 99^{th} percentile this is approximate). The choice of the top decile rather than the top 1% or 5 % was made to examine the top-earning professionals, rather than elites whose pay structures and job characteristics are significantly different and rare. The 90^{th} percentile is much higher in New York than in Janesville-Beloit, although the concepts of relative place in a labor market's wage distribution are reasonably intact. More percentiles would have increased resolution but greatly increased computation time as well as interpretation of results. The models employed shed light on the varying shapes and magnitude of gender inequality across metro areas both before and after the recession.

[1] These were performed using Melly's *cdeco* command in Stata. The results are not reported in a table as they are bulky and are summarized in the Figures. All estimates were bootstrapped and only Durham (at the 10^{th} and 25^{th} percentiles in 2005-7) and Fresno (at the 10^{th} percentile in 2011-13) were not statistically significant at the .05 level. Tabular results are available upon request from the author.

Results

Counterfactual wage distributions

<< Figure 1 about here>>

In Figure 1, I have divided the top 50 metro areas (all with over 1 million population in 2010) into regions (based more or less on census region divisions). Although the gender wage gap increases steeply across the wage distribution with few exceptions, there are significant variations in the magnitude and shape of the gender wage gap across regions of the US. One of the steepest shapes is in New York City, where the gender wage gap is about 15% at the 10^{th} quantile (11% post-recession) but more than 40% at the 90^{th} quantile (35% post-recession). Research Triangle Raleigh has a similarly steep gender wage gap, although one that increases with the recession. In both of these metros, low-earning women face relatively low penalties compared with men but high-earning men earn much more than high-earning women. This pattern demonstrates the effects of comparing overall distributions rather than simply an average, in that the gender wage gap is somewhat lower than is often reported at the bottom of the wage distribution, but considerably more than is often reported at the top. In contrast, women in Riverside earn 20-25% less than men throughout the wage distribution, and gender gaps in Detroit are higher but similarly flat. Low-earning and high-earning women in these metros fare similarly poorly relative to men with similar characteristics.

Post-recession, most metro areas preserve their overall shapes in the distribution of the gender wage gap. Polarization (where the gap declines much more at the bottom, or even increases at the top) is the most common shape shift as the recession proceeds. In other words, the documented decline in the gender wage gap has mostly occurred amongst the lowest-earning workers, where men's and women's wages are closest. These patterns have been produced over 3

decades by men's absolute earnings gains at the top of the labor market, and women's absolute gains at the bottom (Gould 2016).

In the South Atlantic (Figure 1a) and Southern (1b) regions, the gap is about 15-20% at the 10th quantile (slightly lower post-recession), rising steeply from the median to attain gaps of 30-40% at the top of the distribution. Charlotte, Atlanta, and the Florida and Texas metros look less steep than Raleigh, mostly due to higher wage gaps at the bottom. Virginia Beach, New Orleans, and Birmingham have significantly higher inequality through the median, resulting in a consistent, level mid-30s-40s gap, and DC and Baltimore also have more consistent (if lower) wage gaps throughout the distribution. Most gender wage gaps decline a few points with the recession, although top earning men pull away from women in Raleigh, DC, and Jacksonville. Slight increases in inequality are also seen in Miami, Tampa, Nashville, and Dallas (at the top) San Antonio (at the bottom), and Oklahoma City (throughout). Charlotte shows mostly stagnant gender wage gaps. Thus a polarizing in the gender wage gap (declines at the bottom and increases or stagnation at the top) is the dominant shape shift in these metros, although some metros have increases throughout.

The gender wage gap in Figure 1c's Northeastern metro areas (excepting New York City and Boston) is more compressed and shows less variation across the distribution, as would be expected in older economies with labor force characteristics that often benefit working-class men more. Midwestern metros (1d) are similar if even more compressed. Below-median gender wage gaps are in the mid-20s (lower in New York), a few points higher at the 75th quantile, and rise into the high 30s at the 90th quantile. Gender wage gaps generally drop 5-10 percentage points with the recession, although Providence, Rochester and Buffalo decline more. Hartford and Pittsburgh stand out with increases above the median. Many of the Midwestern metro areas have

steeper gender wage gaps *after* the recession, because wage gaps drop significantly below the median whilst showing stagnation at the top. However, declines are evident throughout all metros across the wage distribution, and no significant increase in is seen. Not surprisingly, Detroit and Cleveland even see substantial reductions in gender wage inequality for their highest-paid workers. These metros mostly show the decline in gender inequality discussed in the media and popular accounts, although the decline is still minimal at the top of the wage distribution.

Metro areas in the Western region of the US (Figure 1e) show generally lower levels of gender wage inequality. Excepting a few California metros, pre-recession gender wage gaps are lower than anywhere else, especially at the top of the wage distribution. The gap is particularly steep in Los Angeles and Las Vegas because of very small differences between low-paid men and women (the same is true of Phoenix and Sacramento post-recession). Conversely, Riverside's very flat gender gaps are in the low-20s overall, and Seattle has a similarly flat shape if one marked by greater and increasing inequality. Unlike in other regions, few of these metros show significant declines in the gender wage gap post-recession. High-inequality San Jose and Salt Lake City sees increases in gender wage inequality across the wage distribution, as does Seattle from the median. All other cities show some declines in the gender wage gap for workers below the median, but significant increases or stagnation in gender inequality at the top. Las Vegas and Riverside are the only metros where the gender wage gap drops overall; still with minimal declines amongst those workers at the top of the wage distribution.

Mapping the gender wage gap

>> **Figure 2 about here**<<

The maps in Figure 2(a) detail the geographic variance in the gender wage gap just prior to the Great Recession (2004-2006) for all 100 metro areas, while Figure 2(b) replicates the analysis post-recession (2010-2012). The geographic variation in the magnitude of the gender wage gap is evident here, as well as how assessment of the gender wage gap is dependent on differences between low and high wage workers and their geographic patterns. More critically, this analysis points to the spatiality of unequal wages for working men and women, as well as how this spatiality may be evolving. Attention to various points in a counterfactual wage distribution allows for greater understanding of these patterns, especially as the recession affected low-wage and high-wage men and women differently, and in different places.

At the 10^{th} quantile, the gender wage gap is very low in Los Angeles, San Francisco, and El Paso. Post-recession, a bevy of California metros have dropped into this lowest category, as have neighboring Phoenix, Tucson, Las Vegas, and most of Florida. The distinctive geography of diminished gender inequality amongst the lowest-paid workers is predictable, given accounts of diminished prospects of immigrant men (Pew 2015). In other words, womens' relative gains may be little more than mens' absolute losses. Otherwise, inequality between the lowest-paid men and women is relatively higher in northern metros and lower in southern metros. The major exceptions are New York and Columbus (where the gap is moderately low) and New Orleans and Baton Rouge, where men still amassed 30-40% more than women at the 10^{th} percentile. The recession attenuates this north-south divide because of marked declines in inequality in the upper Midwest and Northeast.

At the 25th quantile, only Los Angeles remains at the lowest level of inequality, joined by Fresno and Las Vegas post-recession. Although inequality is higher in the northern (especially Midwestern) metros, few metros in the southeast have less than moderate gender inequality. Post-recession, these gaps have declined significantly across the country. A pre-recession array of high inequality metros throughout the upper Midwest and the Northeast has been reduced to only a few outliers (Youngstown, Bridgeport, Baton Rouge, and Provo/Ogden) post-recession. The Midwest and Northeast again show the most significant declines in generally declining gender wage inequality. California cities decline as well, although San Francisco and San Diego's moderately high and San Jose's high gender wage gaps seem untouched by the recession. It is worth noting that these are low-paid (but probably not undocumented) workers in high-wage global economies.

From the median the lowest inequality category disappears, and only a handful of metros (Sacramento, Fresno, Los Angeles, McAllen and El Paso, Durham and Lakeland, FL) are below 20%. While moderately-high gender inequality drops in Midwestern and Northeastern metros, and some of Southern California and Florida, it remains otherwise stagnant across the Western half of the US. The dozens of high inequality metros scattered across the country pre-recession are reduced to resiliently-high San Jose, Provo/Ogden, Baton Rouge, Palm Bay, Raleigh, Bridgeport, and Youngstown by recessions' end. In short, although the levels of gender wage inequality increase between the bottom and the median of the wage distribution, the places of high and low gender wage gaps remain similar and diminish similarly with the recession. The median sees significant declines in gender inequality in Southern California, the Upper Midwest and Northeast, and Florida. However, much of the Pacific Northwest, the Southwest, and the East Coast remains solidly high.

At the 75th quantile, the lowest inequality metros are the familiar array of Los Angeles, Fresno, Stockton and McAllen, TX (pre-recession), joined by Riverside, Vegas and Albany post-recession. Most of these areas are notable for having large migrant worker populations and agricultural employment, conditions that many have associated with low gender inequality (McCall 1988, 2001), although they would be expected to diminish gender inequality mostly at the lower end of the wage distribution. However, the majority of the top 100 metros have differences greater than 30%. Recessionary declines are mostly in the upper Midwest, but also in larger Florida metros (Orlando and Miami) and smaller California ones (Fresno and Riverside). As at the median, gender inequality in the western half of the country looks remarkably stagnant.

At the 90th quantile the gender wage gap is higher still, with only agricultural Stockton and Fresno remaining below 20%. A dozen metros have gender gaps above 40%, although those in the north decline with the recession leaving only a swathe of southern metros and Provo at these highest levels by 2012. In other words, the north-south divide is nearly the inverse of that at the 10th percentile (pre-recession), where there was higher inequality in the northern metros. California's gender inequality declines in San Diego and Oxnard while increasing significantly in San Francisco, and there are some declines from high to medium gaps in the Northeast and East: Youngstown, Cleveland, New York City, Buffalo and Rochester, Providence, Baltimore, Reading, and Virginia Beach. Otherwise gender inequality amongst these top-paid workers is resilient.

The result overall is that much of the Northeast and Midwest look much less unequal post-recession compared with the rest of the country. However, the same period intensifies gender inequality at the top of the wage distribution in the western US and in parts of Florida. This means that at the end of the recession gender inequality looks like a much more Western

phenomenon, and much less like a Northeastern/Midwestern one. However, it also looks to be intensifying at the top of the income distribution. This is exacerbated by the fact that the gender wage gap below the median was more pronounced in the old economy Rustbelt, and the declines were more concentrated there (both in the Rustbelt and in the bottom half of the wage distribution).

Finer-grained changes in the Gender Wage Gap

>> **Figure 3 about here** <<

Figure 2 allows consideration of the spatiality of the gender wage gap and its levels overall, but in doing so its broad categories obscure detailed shifts that occur. For this reason, Figure 3 provides a more granular summary of the change in the gender wage gap with the recession. Although the percentage point changes seem very small, they are simply subtracting the pre-recession wage gap (as a percentage) from the post-recession wage gap (as a percentage). For example: Seattle's gender wage gap decreases from 22-18% at the 10^{th} quantile, a decrease of 14% (or 3.8 percentage points); and increases from 31-35% at the 90^{th} quantile, an increase of 17% (or 4.3 percentage points). Thus although these changes as presented seem very small their magnitude is considerable. These maps make quite clear that the recession was not accompanied by a strong decline in the gender wage gap for male and female workers, controlling for education and hours worked. The distributional and spatial analysis explains why and how. Figures 2 and 3 need to be examined together in order to tell where there were large/small changes where inequality was high initially versus similar changes where inequality had been low.

Figure 3 reinforces that the majority of the decreases in the gender wage gap occurred at the bottom of the distribution. The most significant decreases are below the median in the greater Los Angeles area, Stockton and Fresno, Wichita and Kansas City, the most heavily industrial Rustbelt metros of the upper Midwest and Northeast, and New Orleans (which sees declines through the 90th quantile). All of these are economies with historically strong advantages for male blue-collar workers, but they are also economies that are either largely immigrant agricultural (in California) or had started to decline long before the recession plunged them down again. In many ways then, the decline in gender inequality had pre-recessionary roots. There are some increases in the gender wage gap with the recession even below the median, most notably in perennially-unequal Utah and border Texas. At the median, the gender wage gap looks more stable over the course of the recession, although Durham, McAllen, Tucson, San Jose and Seattle see significantly increased gender inequality while parts of the upper Midwest, Southern California, and Las Vegas show declines. At the 75th quantile, there are fewer declines overall, and additional increases mostly in Pittsburgh and the western US. And at the top of the wage distribution there are more significant increases in gender wage inequality than significant decreases, and a good many smaller increases or stagnation. The biggest increases are in the new economy West: Seattle, Portland, San Francisco and San Jose, and Colorado (as well as always-high Utah); the western Midwest (Wichita, Springfield), Scranton, and the deep South and Florida. There are more moderate but still significant increases in DC, Pittsburgh, Akron, Nashville, and Knoxville, as well as much of the southwest. There are few significant declines at this quantile and they are overwhelmingly in the Rustbelt.

Discussion

Although the gender wage gap declined overall during the recession, this is far from the entire story. A handful of cities show consistent significant increases throughout the wage distribution (Salt Lake City, Provo, El Paso, Oklahoma City, and Jackson, MS), below the median (Durham), and above the median (Ogden, Tucson, and Lakeland FL). Some of these places have received attention for gender inequity at the state scale: Utah, Oklahoma, and Mississippi have all ranked very low over time on multiple measures of gender inequality (DiNoia 2002), and and Utah is at the bottom of the list of all of Florida et al's rankings of women's total and creative class employment and wages (2014). Raleigh-Durham and Tucson provide examples of broadly increasing gender inequality, in that their transition to a post-industrial economy has been rapid, while an older manufacturing labor force still remains strong (Moretti 2012), conditions that advantage men over women across the wage distribution. This transition has been overlooked as a possibility in a literature that emphasizes more complete shifts between industrial and post-industrial economies. Hartford, Scranton, Pittsburgh, Springfield, Wichita, San Antonio, Colorado Springs, Phoenix, San Jose, and Seattle show significant increases in gender wage inequality at or above the 75th percentile of the wage distribution as the recession proceeds, and Jacksonville, Cape Coral, Deltona, Knoxville, Baton Rouge, Ogden, Denver, Bakersfield, Sacramento, San Francisco, Portland, and Akron do so at the 90th percentile. The increases are particularly significant and visible in a few large west coast cities, including San Jose, Seattle, and San Francisco. Many of these cities also show declining gender wage gaps amongst the lowest-earning men and women, meaning that increasing inequality at the top and the polarization of the gender gap would be obscured in analysis of mean wages. And New York, Atlanta, Dallas, Washington DC, Memphis, and San Diego have essentially static gender wage

inequality. Thus, the story that the gender wage gap has continued to decline significantly, or increased its decline with the recession, is completely true in fewer than half of the top 50 US metropolitan areas when overall wage distributions are taken into account.

The maps of Figure 2 and 3 thus show that the gender wage gap shifted in two important ways during the recession. The most significant changes overall were reductions in gender inequality in metros in the upper Midwest including New York and Pennsylvania, as well as in smaller agricultural metros in California. These were much more significant below the median, and much rarer above it. With significant below-median declines, a mix of increases and decreases at the median, and quite significant increases at or above 75th percentile, the gender wage gap becomes much more about top earners with the recession. The maps also demonstrate a general spatial shift of the gender wage gap from Midwest/Northeast metros to metros on the West Coast. These two shifts are intertwined: the distributional pattern of the gender wage gap was dominated by differences between lower-waged men and women in the Midwest and Northeast pre-recession, but post-recession gender inequality was increasingly about higher-waged workers in Western metro areas. Gender inequality shifted from areas of the country where it had been more compressed (moderately high at the bottom and not much higher at top, as in Figure 1c) to areas where it is low at bottom and high at top (as in Figure 1e). Where declines in these second more peaked distributions occur, they decline significantly more at the bottom of the wage distribution than at the top, and in most cases the gender wage gap is stagnant or increases.

The intersection of the distributional and spatial analysis provides unique insights into how gender inequality is geographically-configured, and how this changes with the recession. At the very bottom of the distribution, the gender wage gap is lowest in immigrant metros in the

West and is lower in a broader array of these, especially hard-hit housing markets, after the recession. Below the median, women experience the greatest gaps with men in the Midwest and Northeast, although the highest gaps only remain post-recession in the the worst-hit Rustbelt metros, and in solidly unequal Baton Rouge and Utah. Amidst median workers, post-recession gaps remain high in the Silicon Valley and Research Triangle, Baton Rouge and Utah, whilst declining in California, Florida, and Rustbelt metros. Above the median, only the most agricultural of California and Texas border metros (Stockton, Fresno, Riverside, McAllen, Los Angeles) have low levels of gender inequality. There are declines across the Midwest and Northeast, especially in the Rustbelt, and some increases in the postindustrial cities of the West (San Francisco, San Jose, Seattle).

In essence, gender inequality is spatially polarizing. The sticky floors of older Rustbelt manufacturing economies no longer explain the gender wage gap to the extent that the glass ceilings of Silicon Valley or Seattle tech firms do, although it is still present. This is critical to understand for several reasons. First, even accounting for differences in education and participation across the entire wage distribution, the gender wage gap is persistent. This is not surprising when we think about different types of jobs in different labor markets, as McCall did nearly two decades ago. Average gender inequality can be low and declining in places like Los Angeles or New York simply because already small differences between lower-wage men and women diminish even further with the recession. However, at higher earnings levels, a very high gender wage gap may diminish only slightly, stagnate, or even increase. These large, highly unequal cities are often considered to have low levels of gender inequality. In part, this is due to their polarized wage structures, wherein rewards for those at the top are high and those at the

bottom are low, perhaps especially for immigrant men.[2] It would also be interesting to consider the effects of reduced immigration during the recession (Pew 2015) on gender inequality. Given the spatial and distributional patterns in evidence here, it is reasonable to assume that reduced immigration has played a part in attenuated gender inequity. Many of those affected by the Man-cession may not be visible in US census data, although their absence from the US would shift analysis toward women's advantage at the lower end of the labor market, even as men's advantages at the top remain and increase. Redirecting focus from women's *dis*advantages, Kassenboehmer and Sinning assert that while women's wage growth is explained by significantly increased education, skills, and experience "men's average wage growth remains unexplained" (2014). This male advantage is no-less explained post-recession. In contrast, the more traditionally-configured economies of the Midwest, upstate New York, and some other metros, demonstrate less steep patterns of gender wage inequality, where differences between men and women are moderately high at the bottom and not so high at the top. In these places, sticky floors result from jobs and working conditions that benefit men more than women (like unionized manufacturing jobs), but the glass ceilings are lower (and the 90th quantile as well). And also in these places, the gender wage gap declines across the wage distribution with womens' increased similarity to men through both educational gains and through men's relatively greater recessionary losses. However, if post-industrial knowledge economy cities are more open to highly-skilled women (Florida et al 2014), they seem decreasingly likely to pay them equally.

[2] This also makes clear why the median statistics so often reported are misleading, in that they reflect none of the runaway inequality amongst top earners, where gaps are increasing most.

Conclusions

As McDowell and her colleagues (2005) have pointed out, most analysis of the transition to post-industrial economies has neglected the significance of gender. As a result, the ability to understand gender inequality under major economic shifts is limited by a focus on the shifts from a manufacturing economy that benefitted men to a polarized post-industrial economy characterized by increasing numbers of women both in service and in the knowledge economy. This research demonstrates that this shift has a geography with implications for the gender gap and how it is assessed. If, as many scholars have asserted, women have acted to buffer male employment even where it is declining, then understanding the geography of the gender wage gap is also critical to understanding the geography of the post-industrial economy and indeed of the post-recessionary economy.

The analysis presented in this paper is frustratingly limited in its ability to answer to reasons for continuing gender inequality or its spatiality, especially compared with feminist geographers' more intensive forays into the structures of specific local economies, labor markets, or workplaces. Yet the detailed empirics of this middle ground mapping establish how little we understand the gender wage gap, let alone how it changed with the recession. That said, it establishes the continuing dominance of older patterns of economic space. Pre-recession, especially among workers in the low-middle portions of the wage distribution, gender inequality was Rustbelt-dominant. This pattern diminishes strongly with the recession, continuing longer-term declines. At the very bottom of the wage distribution, where declines in the gender wage gap are obvious, it is apparent that declines for male workers in agricultural regions with large undocumented immigrant populations are important. This means that declines in the gender

wage gap below and at the median are tied to male declines, the long-term or recessionary-focused decline in male labor markets, and possibly selective immigration and return migration.

The increases in gender inequality at the top of the wage distribution have a different geography that is more difficult to explain; one that pops up in knowledge economy cities in Western states where gender inequality is often asserted to be low. We know much less about this gender gap. This paper uncovers its increasing significance, and it appears to be critical to understanding the changing map of American inequality. The gender wage gap is not declining, when we look across the income distribution and across American spaces, although it is shifting. This is an important corrective to those accounts that gender inequality is over. Further, understanding where and how it is not signals critical interactions of social inequality and labor market allocation emerging from differing local regimes of accumulation and enforcement mechanisms. Although models were estimated for metro areas, in order to best approximate a labor market, there are also clearly some effects of state and regional political economies, and of uneven development more broadly at work. These can only be glimpsed here, but I hope to address these inter-scalar place effects in future research. Writing twenty years ago on the changing map of American poverty, Kodras argued that "Economic restructuring thus spatially reorganizes the relative advantage of different places according to the shifting needs of capital, with previous layers of investment and the legacy of social relations creating a context from which each place seeks to compete" (1997). Although our analyses are different, her portrait of gender inequality in Silicon Valley is eerily amplified two decades and several economic shifts later. There is little doubt that ongoing gender inequality is both context and outcome of the shifting inequalities of post-recessionary America, and that geographers could usefully contribute much further research in this area.

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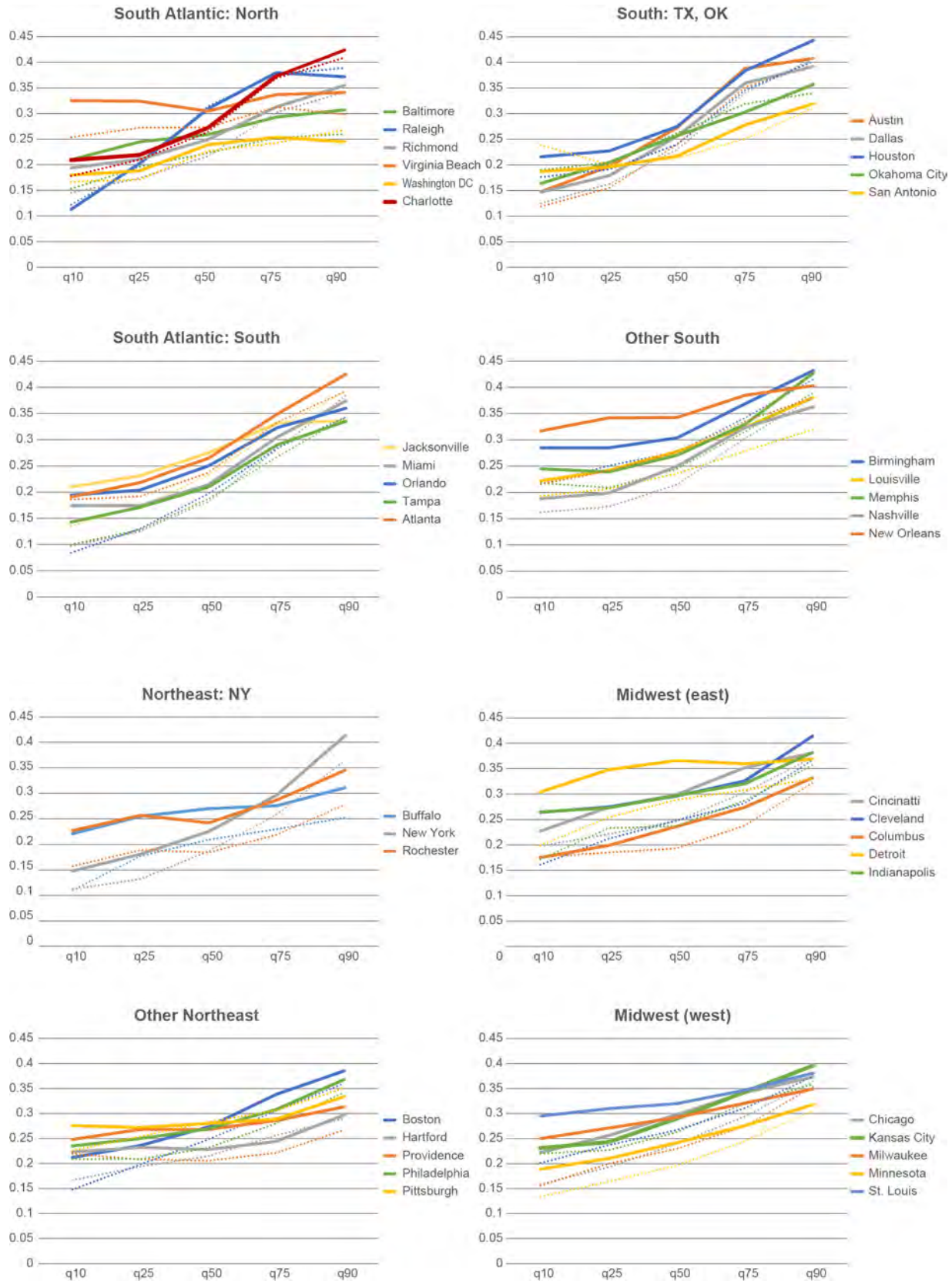
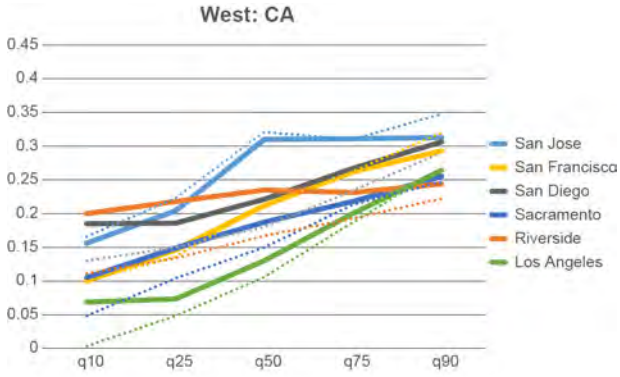
Figures

Figure 1: Adjusted Gender Wage Gap: 2005-7 and 2010-12 for Top 50 Metro Areas
(2005-7 are solid lines, 2010-12 are dotted lines)




West: CA
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
q10
q25
q50
q75
q90
San Jose
San Francisco
San Diego
Sacramento
Riverside
Los Angeles

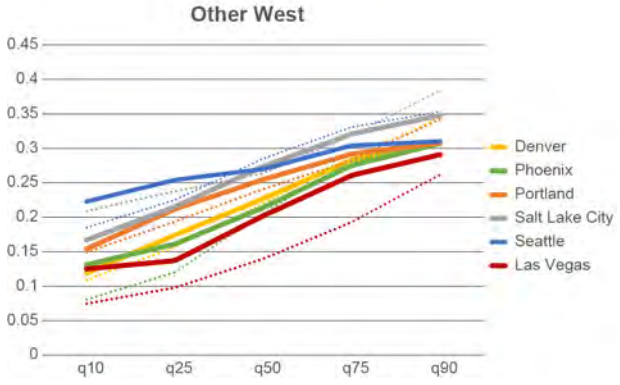

Other West
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
q10
q25
q50
q75
q90
Denver
Phoenix
Portland
Salt Lake City
Seattle
Las Vegas

Figure 2: Adjusted Gender Wage Gap for Top 100 Metro Areas: 2005/7

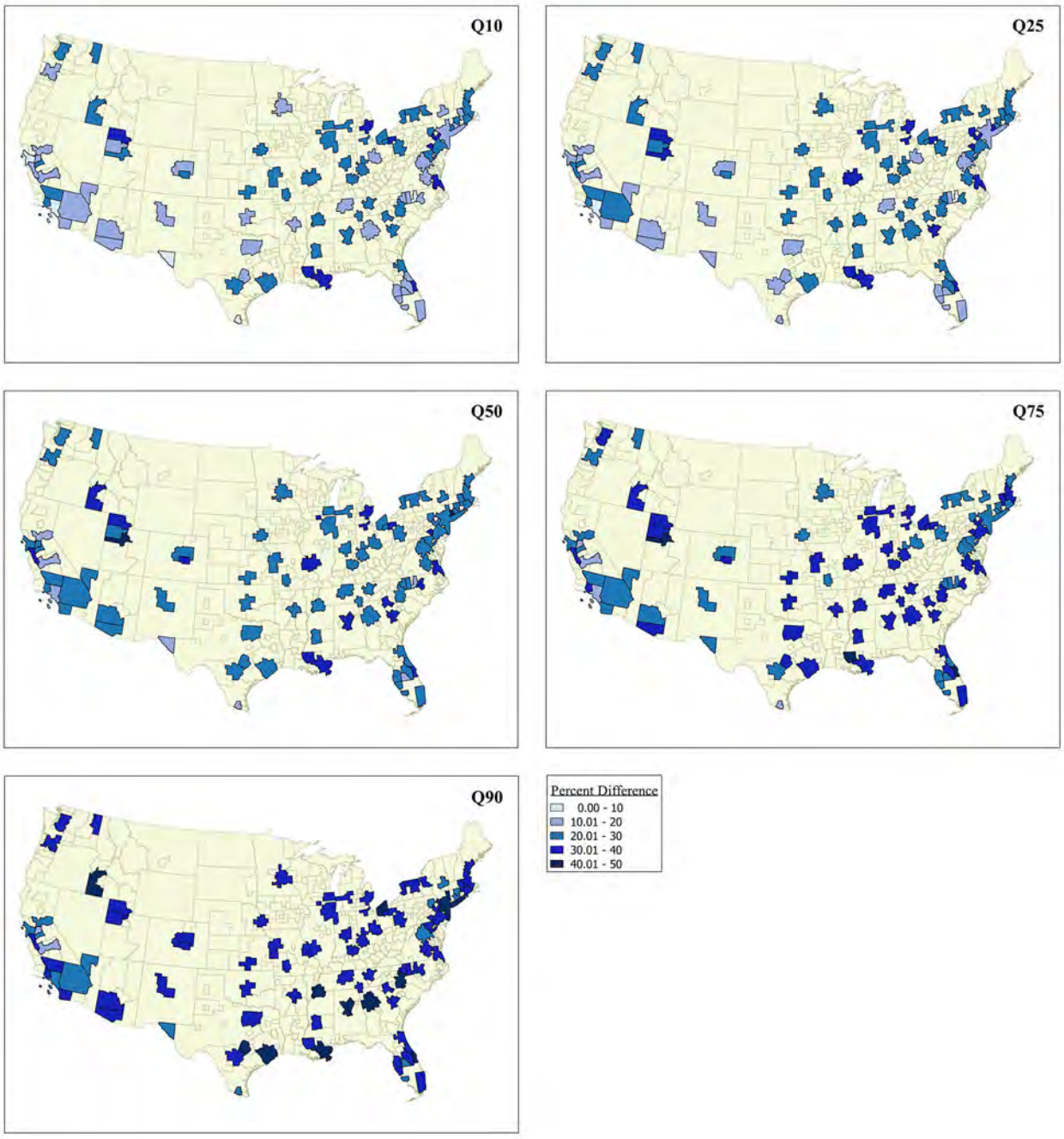


Figure 2: Adjusted Gender Wage Gap for Top 100 Metro Areas: 2010/12

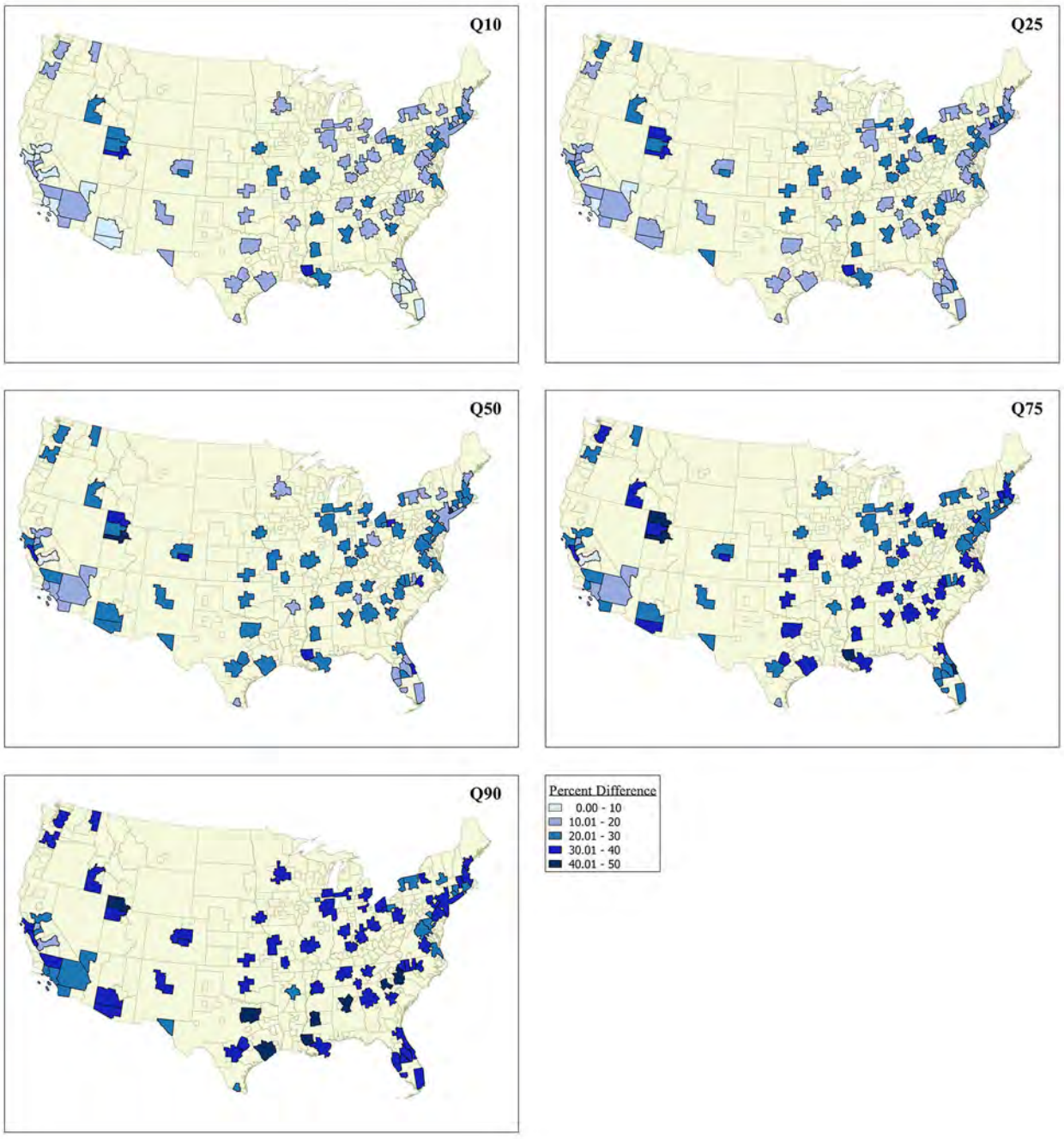


Figure 3: Changes in the Gender Wage Gap: 2005/7-2010/12