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“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. However, the spatiality of the gender wage gap has received little attention. I ask whether, where, and how the gender wage gap changed with The Great 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, experience, and occupation. Gender inequality is polarizing spatially and across the wage distribution, and the recession exacerbates this pattern. Gender gaps decline most in the Rustbelt, but show relative increases in many Western metropolitan areas. Further, declines are mostly amongst below-median earning workers, whereas increases are likely at the 75<sup>th</sup> or 90<sup>th</sup> percentiles. Disproportionate returns to men’s characteristics explain much of these geographic and distributional shifts. The combination of geographic and distributional analysis reveals a more thorough picture of how gender inequality shifted with the recession, as previous patterns of uneven development under economic restructuring are still evident. The analysis also 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 since women first formed significant proportions of the labor force nearly five decades ago. During the recent Great Recession, however, media profiles of male job loss and higher-earning female partners signaled that the gender wage gap might have all-but evaporated. Stories of women’s relative economic gains fronted media 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). 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. More recent analysis points out that men have been regaining jobs more quickly in the recovery (Norris, 2013).

However, despite women’s relative gains, largely attributable to men’s greater job 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 gap

hinges in on gender differences in skills and attachment to the labor force, as controlling for these differences greatly diminishes the 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 2013). While we know that the gender wage gap *and* differences between men's and women's labor force characteristics 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 and the shape of the gender wage gap 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 earnings using quantile regressions that allow effects of labor market characteristics to vary across the distribution. Examining the overall relative distribution of earnings and skills (rather than a single or aggregated point) allows better understanding of gender inequality. 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

gender inequality is assessed? Finally, I decompose the counterfactual distributions into 1) gaps explained by labor force characteristics and 2) the coefficient returns to these characteristics. The resulting picture of “unexplained” inequality allows a glimpse of where gaps are due to unequal returns rather than compositional effects.

Although the gender wage gap shows signs of decline overall, there are several larger metropolitan areas where it increases throughout the wage distribution, and others where it remains static as the recession proceeds. Most metro areas have polarizing distributions, such that the gender wage gap increases or stagnates 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, and limits understanding of how they are related. Attention to the spatiality of relative wage profiles suggests that even places with advantages for highly-skilled women were not as beneficial for them as for comparable men. Further, the spatiality of the distribution (by which I mean the spatial variation in the magnitude of the gender wage gap and how it 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. Lastly, there is a spatiality of “unfair” inequality as well. While labor force differences between men and women sometimes explain a good deal, much of the gender wage gap between full-time workers is still explained by differences in returns to these characteristics. Even in places with declining gender wage gaps, there are often relative increases to men’s returns, especially toward the top of the wage distribution.

## **Explaining the Gender Wage Gap Across Time and Space**

Explanations of the gender wage gap generally focus on women's lower labor force attachment and working hours (especially as a result of childbearing or childcare), gendered differences in educational attainment or labor market experience, and imbalances between men's and women's industries and occupations (Blau and Khan 2007, Autour 2011, Shen 2014). Reductions in relevant labor market differences and employment conditions between men and women over time have thus been used to explain the diminishing gender wage gap, although many scholars argue that progress toward gender equality began to slow sometime in the 1990s (Tomaskovic et al 2006, Hegewisch et al 2010, England 2010, 2011). Occupational differences remain a key concern because 1) occupational segregation by gender, while declining, is still considerable and 2) there is considerable evidence that the gendering of occupations, rather than the gendering of skill or occupational choice, is what results in wage inequality (England, Allison and Wu 2007). Relatedly, recent research has documented that the "motherhood penalty" results not just from time out of the labor market, but also from employers' stereotyping of women's reduced productivity regardless of whether or not they have children (Correll, Benard, and Paik 2007).

Older industrial labor market structures including unionization, industrial concentration, and the prevalence of large firms, have also been associated with male earnings advantages (Kilbourne et al 1994, Kalleberg 2011). Although these conditions diminished with globalization, they continue to work against gender equity in their decline (Gauchat, Kelly and Wallace 2012). Confusingly, some of the same macro-level economic shifts generally associated with reduced gender inequality have produced relative as well as absolute benefits to male workers. Changes associated with post-Fordism and economic restructuring arguably explain 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 were 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). Thus, accounts of the reasons for gender earnings inequality and its decline play into more recent discussions of the gender wage gap and the role of occupational concentration under increasingly contingent terms of employment.

In trying to understand these relationships, McCall's research into the spatiality of globalization and economic restructuring followed geographic accounts of changing labor market conditions and ramifications for relational earnings inequality (Massey 1984, Peck 1989). She found that 1) in declining labor markets with high levels of labor casualization less-educated workers fared very poorly but women fared relatively worse, and that 2) in high-wage labor market educational gains benefitted women less than men. While regions that retained manufacturing employment benefitted less-educated men (increasing the gender wage gap), regions rich in service employment showed reduced gender wage inequality because less-educated men fared poorly (1998). In *Complex Inequality* (2001), McCall argued that local labor market configurations of inequality translated the effects of economic restructuring such that intersectional gender, racial, and class inequities could be either intensified or diminished, even as they persisted.

Subsequent related analyses have similarly utilized US metropolitan areas to explore variation in gender inequality and its causes. Ranking occupation-industry employment cells



across metro areas, Cohen and Huffman found gender wage inequality greatest where female-dominated jobs are ranked lower on the wage hierarchy (2003). Dinovitzer and Hagan (2013) found that labor markets with greater gender dissimilarity in employment depress the wages of women in law. And Gauchat, Kelly, and Wallace (2012) conclude that gendered occupational segregation *within* metropolitan areas matters more than globalization's overall effects in terms of explaining gender inequality. Thus, these studies empirically extend the recursive nature of McCall's analysis of how macro-level economic shifts (like economic restructuring) have varying implications for the gender wage gap, through further elaboration of how locally-configured gender inequality conditions individual and group outcomes. Their labor market-scale analyses also add evidence to earlier arguments (like those cited above) that women's occupational concentration is a way in which wage gaps are maintained, rather than simply a measure of differing skills or workplace attachment (Reskin, Tomaskovic-Dewey et al 2006, England 2010).

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 (construction and manufacturing) hardest hit by economic downturn (Sahin, Song, and Hobijn 2010). Accounts proliferate of how 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 the relatively-secure health care sector (Dill, Price-Glynn, and Rakovski 2016). Within this industry, as in the 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).

Although geographic accounts have been sparse, a recent analysis of women’s increasing creative class employment by Florida, Mellander and King (2014) suggests “... 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”. Examining 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, their analysis of ACS data relies on comparing women (and sometimes, creative class women) across states, rather than comparing women to men. Analyses from Europe are more critical of creative employment’s promise for women, suggesting that the inequalities of work in this field, especially as related to open-ended flexible hours and contact-driven careers, are particularly punitive for women and ethnic minorities (see, for example, Gill and Pratt 2008; Conor, Gill, and Taylor and their contributors 2015).

In this vein, it is important to emphasize that heteronormative ideas about women’s proclivities and abilities, economic roles and gendered household practices, and related state policies continue to shape gendered stereotypes and hiring; allocation across firms, industries, and occupations; and working conditions including remuneration. Paula England’s analysis of the stalled “gender revolution” reevaluates these patterns, concluding that progress toward greater equity has been stymied (2010; 2011). There is little doubt that structural differences in treatment by gender continue with the recession, increasing women’s vulnerability to decreasing employment or job quality. For these reasons, as well as diminishing public sector employment under austerity, MacLeavy (2011) argues that the recession disproportionately threatens female

jobs in the UK. Rubery (2015) adds that just as social welfare systems helped to configure gender inequality, austerity's workfare policies may push some women into the workforce in ways that reinforce or intensify gender inequality. These latter perspectives are virtually absent from current US discussion (perhaps as public sector employment is neither as feminized nor as beneficial, and certainly as the social safety net was less expansive), where emphasis on men's losses remains dominant. In part, this may be due to the dominance of arguments about skills-based technological change or manufacturing decline in a literature that emphasizes men's wages. It may also be due to the emphases on states in a federal system (with widely varying labor force regulations and dynamics) rather than a more European focus on the state and its role in shaping social inequality.

All of these conflicting accounts remind us that 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 relative shape and shift of men's and women's wage distributions. 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.<sup>1</sup> Since the 1970s, gender inequality has declined much more at the bottom of the wage distribution (due to women's increased participation and the "floors" provided by minimum wage legislation) than at the top, where smaller declines are more attributable to women's educational gains (Blau and

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<sup>1</sup> England's 2011 reply to McCall's 2010 suggestion that younger women increasingly move into the top decile of earnings: "... central tendency is not the only relevant metric for assessing progress", is critical. It also points out the need for counterfactual analysis since women in the top decile still show significant gaps with top decile men.

Kahn 2007, Kassenboehmer and Sinning 2014). Bernhardt, Morris and Hancock'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. 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 counterfactual distributions and geography under recession is new.

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 has been little explicit examination of gender wage inequality in geography. This is notable as sociologists turn 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 geographical inquiries of sociologists (McCall 2001, Lobao, Hooks and Tickamyer 2008). As mentioned above, a related body of work by UK and European geographers suggests important questions about shifting patterns of women's employment under austerity (MacLeavy 2011) and with the rise of creative, knowledge-industry employment (Gill and Pratt 2008, Conor, Gill, and Taylor 2015). Although this work has a different empirical and theoretical framing, it has relevance for the results of the current research. I am also mindful of the repeated calls of feminist geographers for more empirical investigation of the spatiality of structural inequality. (Valentine 2007, McLafferty and Preston 2010, McDowell 2015). 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 in the workforce.

### **Data and Modelling Approach**

Data come from 3-year pooled samples of the American Community Survey. Large annual samples 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. 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, and 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.<sup>2</sup> All positive wage income is logged, and regressed on continuous Mincerian variables of age, years of education, and

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<sup>2</sup> Studies of the gender wage gap customarily examine weekly or annual earnings, rather than an hourly pay rate, in order to get a broader picture of earnings inequality that may also include differences in pay structure (salaried versus non-salaried, access to overtime pay, etc) (see for example Bernhardt, Morris and Handcock 1995; Gould 2016). I have chosen, as do most of the authors cited here, to examine annual earnings gaps since I control for mostly full-time, full-year workers and because I am mostly interested in the variances between metropolitan areas across the full distribution of wages. Weekly wage gaps would be lower but should not (given sample controls) be systematically different.

experience (age-6-education).<sup>3</sup> Although I agree with many of the authors cited above that occupations are not exogenously chosen or rewarded, I also include 11 commonly-used occupational dummies<sup>4</sup> for purposes of decomposition. 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 99<sup>th</sup> percentile for each state and averages all values above this point. This represents a somewhat 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. 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. Integrating the entire conditional wage distribution over the full range of the covariates yields an estimated unconditional wage distribution. Here, this allows for the identification of the counterfactual function expressing women's wages if they were rewarded for their characteristics as men are, and the further decomposition of the

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<sup>3</sup> These data are not longitudinal and do not have information about the time workers may have spent out of the labor market, (except for the preceding year in which case the individual was excluded from the sample).

<sup>4</sup> These are Management, Business, and Finance; Other Professional; Services; Sales; Office Support; Farming, Forestry, and Fishing; Construction and Extraction; Installation, Maintenance and Repair; Production; Transportation and Materials Maintenance; and Military. These are general census occupational codes, and also follow Reskin (among others). I also separated Management, Business and Finance from other Professional due to the gendered structure of employment and salaries in this first sector.

unconditional quantile function into the effects of characteristics/covariates and returns/coefficient, such that

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

is the  $\theta$ th quantile of the counterfactual distribution for women's characteristics and men's prevailing wage distribution. Research on the gender wage gap often employs Oaxaca-Blinder-type decomposition techniques to account for the portion of the gender wage gap due women's generally lower levels of education and experience (covariates), versus the differing returns to these characteristics (coefficients). Unlike Oaxaca-Blinder type models, the formulation employed here allows the effects of the covariates to vary over the distribution. This is especially important in that the effects of workplace characteristics, especially education, have different effects on the gender wage gap amongst higher-earning and lower-earning workers. The decomposition is reported briefly, although the primary focus is on the geographic variance in counterfactual-estimated gender inequality and how it changes.

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<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile with 50 bootstraps in each case.<sup>5</sup> 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

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<sup>5</sup> 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<sup>th</sup> and 25<sup>th</sup> percentiles in 2005-7) and Fresno (at the 10<sup>th</sup> percentile in 2011-13) were not statistically significant at the .05 level. Detailed tabular results are available upon request from the author.

the top quarter, and those just entering the top decile of workers (due to top-coded rounding of income above the 99<sup>th</sup> 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<sup>th</sup> percentile is much higher in New York than in Janesville-Beloit, but 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.

## 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. Although the gender wage gap usually increases steeply across the wage distribution, there are significant variations in its magnitude and shape. One of the steepest shapes is in New York City, where the gender wage gap is 15% at the 10<sup>th</sup> quantile (10% post-recession) but 40% at the 90<sup>th</sup> quantile (38% post-recession). Austin and Houston look similar, and Research Triangle Raleigh's similarly steep gap *increases* with the recession. In these metros, low-earning women earn less than similar men but high-earning men earn *much* more than high-earning women. Contrastingly, women in Riverside consistently earn 20-25% less than men, and 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. Polarization (where the gap declines much more



at the bottom, or even increases at the top) is the most common shape shift. 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 (a) and Southern (b) regions, the gap is about 15-20% at the 10<sup>th</sup> quantile, rising steeply from the median to attain gaps of 30-40%. Some metros in the deep south and Florida look less steep mostly due to higher gaps at the bottom, while San Antonio is flatter due to reduced inequality at the top. Virginia Beach and New Orleans show consistent gaps in of 30-40%, and DC and Baltimore also have lower consistent gaps. Most gender wage gaps decline a few points with the recession (New Orleans declines substantially), but top earning men pull away from women in Raleigh and Jacksonville. Slight but significant increases in inequality are also seen in Oklahoma City (through the 75<sup>th</sup> quantile), Miami (at the top), and San Antonio (below the median). Polarization is the dominant shape shift in these metros, although some metros show increases throughout.

Excepting New York, Northeastern metro areas (c) generally show lower variation across the distribution, and Midwestern metros (d) are even more compressed. These are more traditionally-based economies that have often benefitted working-class men. Below-median gender wage gaps are generally in the 20s, rising into the 30s at the 90th quantile. They generally drop 5-10 percentage points with the recession (Detroit declines much more). Many Midwestern metro areas have steeper gender wage gaps *post*-recession, because below-median wage gaps drop significantly. However, declines are evident throughout all metros across the wage distribution, and no very significant increase is seen. (Pittsburgh stands out with above-median

increases, and Columbus has an increase at the bottom.) These metros show the decline in gender inequality discussed in the media and popular accounts, although the decline is minimal amongst top earners.

Excepting Salt Lake City, gender wage gaps in the West (e) are generally lower than anywhere else, especially among top earners. Los Angeles' steep gap is due to very small differences between low-paid men and women (the same is true of Phoenix, San Francisco, and Sacramento post-recession). Conversely, Riverside's gaps are in the low-20s overall, and Seattle's high and increasing inequality has a similarly flat shape. Few Western metros show significant overall declines post-recession. Most cities show some below-median declines but increases or stagnation in wage gaps at the top. High-inequality San Jose and Seattle see increases from the median. Las Vegas, Riverside and Los Angeles are the only metros where gender inequality drops significantly overall.

*Mapping the gender wage gap* >> **Figure 2 about here**<<

Figure 2 details the estimated counterfactual quantiles of the gender wage gap for all 100 metro areas a) just prior to the Great Recession (2004-2006), and b) post-recession (2010-2012). The geographic variability of the gender wage gap is evident here, as well as how assessment of inequality 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.

At the 10<sup>th</sup> quantile, the gender wage gap is very low (less than 10%) in Los Angeles and Sacramento.<sup>6</sup> Post-recession, a bevy of California metros and neighboring Phoenix, Tucson, and

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<sup>6</sup> It is also this low, but insignificant, in Durham, NC and Cape Coral/Fort Meyers, FL.

Las Vegas drop into this lowest category, as do Orlando and New York City. Seattle and Texas metros drop to relatively low levels. 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, women's relative gains may be little more than men's absolute losses. The recession attenuates a divide between relatively higher inequality in the north than in the south because of marked declines in moderately high inequality in the upper Midwest and Northeast. Most of the non-border West, the central heartland of the country, and the South are stagnant.

At the 25<sup>th</sup> quantile, only Los Angeles has a gap below 10%, joined by Sacramento, Fresno, and Vegas post-recession. New York City, DC, and a handful of metros scattered through the southwestern states and Florida have gaps below 20%. For the most part, the gender gap is moderate, and declines with the recession. A pre-recession array of high and very high inequality metros throughout the upper Midwest and the East is reduced to only Youngstown post-recession. California cities decline as well, although San Francisco and San Diego's moderate gaps remain. These are among low-paid (probably not undocumented) workers in high-wage global economies. Thus below the median the gender wage gap declines mostly in California (where it was already low) and more significantly in the Midwest and Northeast, with some declines along the Texas border.

From the median the lowest inequality category disappears, and only a few highly immigrant metros in California and Florida and along the Texas border have gender gaps below 20%. Moderately-high gender inequality drops in several Midwestern and Northeastern metros, a small corner of the Southwest and some of Florida, but remains otherwise stagnant, especially

across the Western half of the US. The 15 high inequality metros scattered across the country pre-recession are reduced to resiliently-high San Jose, Provo/Ogden, Colorado Springs, Baton Rouge, Palm Bay, Raleigh, Bridgeport, and Youngstown by recessions' end. In short, although the levels of gender wage inequality have increased from the bottom of the wage distribution, the geography of high and low gender wage gaps remains extremely similar.

At the 75<sup>th</sup> quantile, the lowest inequality metros are the familiar Fresno, Stockton and McAllen, TX, joined by Riverside, Las Vegas and Los Angeles post-recession. These metros have 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 affect the lower end of the wage distribution. However, most of the top 100 metros have differences above 30%. Declines are mostly in the upper Midwest and Southern California, but also in Orlando and Miami. Already-high gender wage gaps in the western half of the country look remarkably static, and Seattle's gap increases.

At the 90<sup>th</sup> quantile gender inequality is extremely high, with the exceptions of Fresno (low) and Seattle, DC, and some metros in California, Florida, New York, and along the Texas border (moderately-high). More than a dozen metros have gender gaps above 40%, although those in the north again diminish with the recession. Moderately-high gaps in San Diego and Oxnard, the upper Midwest and the Northeast decline. However, coastal Seattle, San Jose, and San Francisco, Orlando, and Daytona *increase* into the highest category. Otherwise gender inequality amongst these top-paid workers remains resilient.

The result overall is that much of the Northeast and Midwest look less unequal post-recession compared with the rest of the country, and lower levels of below-median inequality in California and Florida also decline. However, gender inequality increases at the top of the

distribution across 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 below-median gap 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 3 provides a more granular summary of change. For example: Seattle's gap decreases from 23.1-19.7% at the 10<sup>th</sup> quantile, a decrease of 14.7% (3.4 percentage points); and increases from 29.9-34.4% at the 90<sup>th</sup> quantile, an increase of 15.1% (4.5 percentage points). Thus, although these mapped changes seem small their magnitude is considerable. Figures 2 and 3 need to be examined together to distinguish changes from metros where inequality was high initially versus similar changes where inequality had been low.

This analysis shows again that recessionary declines were geographically uneven and occurred mostly at the bottom of the wage distribution. The most significant decreases are below the median in California (not including San Francisco and San Jose), the most heavily industrial Rustbelt metros of the Midwest and Northeast, and some Florida metros as well as New Orleans and Little Rock (both of which decline overall). Some of these are economies with historically strong advantages for male blue-collar workers, or largely agricultural immigrant workforces (in California), or had started to decline long before the recession. There are some *increases* in the gender wage gap even below the median, most notably in perennially-unequal Utah, El Paso, Oklahoma City, Columbus, Bridgeport, and Durham.

At the 75<sup>th</sup> quantile, there are few declines (mostly the upper Midwest and a few Western metros), and additional increases in Pittsburgh, Scranton, Lakeland, Jackson, Springfield, and the western US. At the top of the wage distribution there are more significant increases in 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 Modesto, Tucson and Colorado, as well as McAllen and always-high Utah); the western Midwest (Wichita, Springfield), Scranton, and the deep South. It should be mentioned, however, that California metros besides San Francisco/San Jose show declining gender inequality through the distribution, as do Boise, Las Vegas, and Albuquerque. There are more moderate but still significant increases in DC, Akron, and North Carolina; as well as much of the southwest. The few significant declines at the 90th quantile are overwhelmingly in the Rustbelt.

*Unfair inequality? Decomposing changes in the Gender wage gap* >> **Figure 4 about here** <<

The counterfactual wage distributions presented thus far control for gendered differences in age, education, labor force experience, and occupation in that these covariates are used to estimate the overall gap. However, decomposing the differences into the effects of characteristics versus those of coefficients allows for analysis of explained (compositional) inequality versus unexplained or “unfair” inequality. Not surprisingly, unexplained inequality is higher where overall inequality is, and increases similarly across the distribution. However, it is interesting to examine whether the assessment of the geography of inequality or its change differ when only “unfair” inequality is examined. Given space constraints, I only briefly summarize notable differences.

Figure 4 replicates Figure 2 for the portion of the gender wage gap *not* attributable to men's and women's different characteristics. For the most part these maps look similar, but levels of unexplained inequality look somewhat higher. This is because women's attributes can exceed men's even though their earnings do not. For the lowest-paid workers, unexplained inequality is higher in most California, Florida, and southwestern metros, as well as New York City and a few places in the southeast. This may indicate the latent importance of immigration as mentioned above, but it also points out that some of the least-unequal metros had very high *unexplained* inequality. Ogden and Portland, ME (at the 10<sup>th</sup>) and San Jose and Minneapolis (at the 25<sup>th</sup>) have gender wage gaps that are more explained by compositional effects. However, above the median unexplained inequality is higher from the Pacific Northwest through California, Arizona, Colorado, and border Texas, as well as central Florida and along the Northeast coast. Post-recession the patterns are generally similar if more consistent across the country: unexplained inequality looks geographically similar to overall inequality, and is mostly higher than expected. Thus, the decline in overall inequality across the Midwest and Northeast is largely attributable to compositional changes between male and female workers. These areas have higher levels of unexplained/"unfair" inequality post-recession. This is probably due to a combination of 1) drop-out of more skilled men or men in more beneficial occupations and 2) women's (at least relative) upskilling.

>> **Figure 5 about here** <<

Similarly, the metro areas where the *change* in unexplained inequality (Figure 5) is considerably lower than overall (Figure 3) are those where gendered compositional changes are important. Given the counterfactual modeling strategy employed, wherein covariate differences between full-time working men and women are used to construct the overall distribution, as well

as women's increasing similarity to men in terms of labor force characteristics; these places are rare. They are most apparent at the bottom of the wage distribution. At the 10<sup>th</sup> quantile, unexplained inequality declines more than overall inequality in a series of Southwestern metros comprised mostly of agricultural areas in California and border Texas, and including Provo, Boulder, and Albuquerque. The same is true of Albuquerque at the 25<sup>th</sup> quantile, where El Paso and Tucson also show declines in unexplained inequality even as the overall gender wage gap increases. Here, "unfair" inequality declines relative to overall inequality, and increases in the gender wage gap are explained by compositional differences between male and female workers. This geographic distribution strongly suggests that these changes are attributable to declining immigration and employment of lower-wage male workers. There are no cases of lower unexplained inequality (signaling greater compositional effects) above the 25<sup>th</sup> quantile, barring some slight, nonsignificant changes at Phoenix and San Antonio's 90<sup>th</sup> quantiles.

Conversely, places where changes in unexplained inequality exceed changes in overall inequality are common (Figure 5 shows more significant increases than in Figure 3). At the 10<sup>th</sup> quantile, this means that Portland, San Francisco, Colorado Springs, Omaha, and Nashville have increases in inequality even with women's relatively improved labor force characteristics (or men's relatively worse ones), and the same is true for San Francisco, Minneapolis, New York, DC, and a few southern metros at the 25<sup>th</sup> quantile. Above the median the increases in unfair inequality are extremely high in the Pacific Northwest and the Southeast, with San Jose/San Francisco and northern Ohio showing very strong increases at the 90<sup>th</sup> quantile. Thus, places where the gender wage gap is declining still show increasing returns to men when compared with similar women, and places where the gender wage gap increases significantly with the recession



also show extremely high increases in returns to men relative to characteristics. This is especially true at the top of the wage distribution.

## **Discussion**

Although there were some declines in gender inequality with the recession, this is far from the entire story. A handful of cities show increases throughout the wage distribution. 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 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, Tucson, and Seattle 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 remains strong (Moretti 2012), conditions that advantage men over women across the entire wage distribution. This transition has been overlooked as a possibility in a literature that emphasizes more complete shifts between industrial and post-industrial economies. Additionally, 18 metros (mostly in the West, Ohio/Pennsylvania, and Florida) show increases above the 75<sup>th</sup> or 90<sup>th</sup> percentile. The increases are particularly significant and visible in Seattle, San Jose, and San Francisco -- places with declining gender wage gaps amongst the lowest-earners -- meaning that increasing inequality at the top would be obscured in analysis of median wages. And much of the South shows essentially static gender wage inequality. 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 US metropolitan areas.

The maps thus show that the gender wage gap shifted in two important ways during the recession. First, the most significant changes overall are reductions in gender inequality in upper Midwestern metros extending to New York and Pennsylvania, as well as in some smaller agricultural California metros. These were more significant below the median, and much rarer above it. With quite significant above-median increases, gender inequality becomes much more about top earners with the recession. Second, the maps demonstrate a general spatial shift of gender inequality from Midwest/Northeast metros to West Coast metros. These two shifts are intertwined: the pre-recession distributional pattern was dominated by differences between lower-waged workers in the Midwest and Northeast, but was increasingly about higher-waged workers in Western metro areas post-recession. 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 1b) to areas where it is low at bottom and high at top (as in Figure 1c). Where declines in these second more polarized distributions occur, they decline more at the bottom of the wage distribution, and in most cases the gender wage gap is stagnant or increases. Further, these places have increases in “unfair” inequality both at the bottom of the distribution, where wage gaps are narrowing, and at the top of the wage distribution where wage gaps are stagnant or increasing.

The intersection of the distributional and spatial analysis provides 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 it 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 these only remain post-recession in the worst-hit Rustbelt metros, and in

solidly unequal Baton Rouge and Utah. 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 knowledge-economy cities of the West (San Francisco, San Jose, Seattle).

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. 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 configurations of inequality across 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 the lowest-earning men and women diminish even further with the recession. However, at higher earnings levels in these same cities, a very high gender wage gap may diminish only slightly, stagnate, or even increase while returns to men increase or remain very high. 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.<sup>7</sup> 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

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<sup>7</sup> 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.

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.

In contrast, the more traditionally-configured economies of the Midwest and upstate New York 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 90<sup>th</sup> quantile as well). The wage gap declines with women's increased similarity to men through both educational gains and through men's relatively greater recessionary losses (although men's *returns* remain high). 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. Redirecting focus from women's *disadvantages*, 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). Here, I find that "unexplained" male advantage generally increases with the Great Recession, rather than attenuating.

## **Conclusions**

As McDowell and her colleagues (2005) point out, most analysis of the transition to post-industrial economies has neglected the significance of gender. Consequently, 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 services 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. That said, it establishes the continuing dominance of older patterns of economic space, undergirded always by gendered state policies surrounding social reproduction, and resulting gendered employment and workforce outcomes. Pre-recession, especially among below-median workers, gender inequality was Rustbelt-dominant. These inequities diminish 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 traditional labor markets, and possibly selective immigration and return migration. The significance of these shifts for racial and ethnic wage inequality and its spatiality warrant further investigation, especially given rapidly changing configurations of inequalities of race, class, and gender within and between US labor markets (Cotter, Hermsen, and Vannerman 1999; McCall 2001; Goodwin-White 2014).

The increases in 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 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 to best approximate labor markets, 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.

Finally, wages are just one small picture of gender inequality, especially wages of full-time full-year workers with occupational controls. While this paper demonstrates the importance of counterfactual distributions and looking across contextually-unequal labor markets, it falls

short of explaining the mechanisms that condition these inequalities. Future research should consider factors that may have conditioned the geography of both the gendered supply of workers and how gendered rewards intersect with changing inequalities of race, class, and immigration.<sup>8</sup> Did women spend more time out of the labor force in some states than others, and why? Does occupational gendering matter differently in different places? What determines which workers suffer most? In Trump's America, there are increasing reasons to consider how austerity programs – from reductions in healthcare accessibility, food assistance, and anti-poverty programs to defunding STEM outreach to girls – intersect with labor market inequalities. The devolved nature of US federalism means that localities have a significant role to play in whether and where the gender revolution stalls or continues.

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<sup>8</sup> I am grateful to two anonymous reviewers for these points and others that improved this piece.

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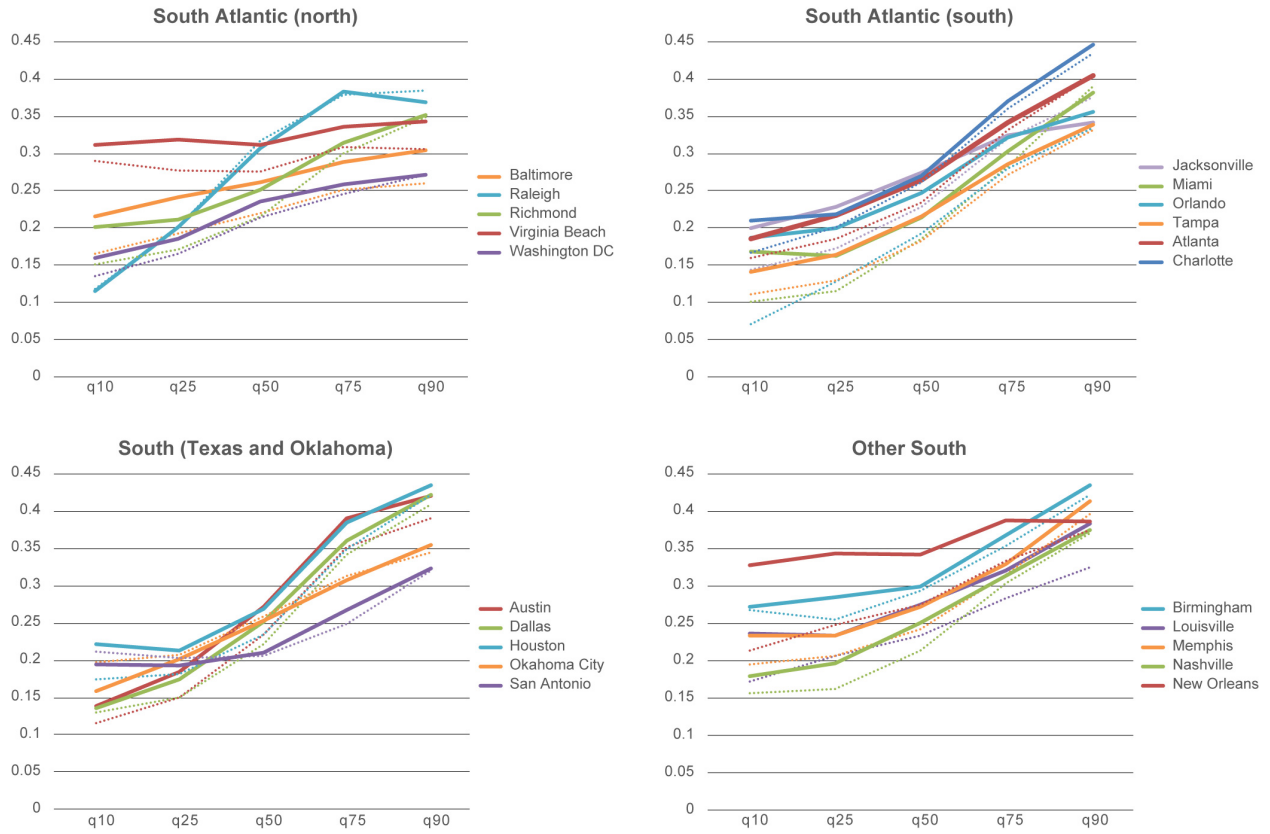
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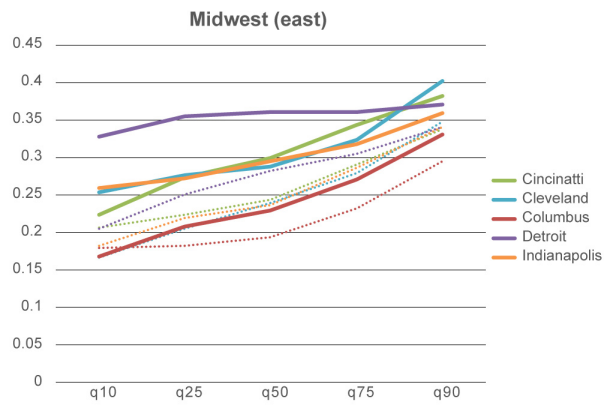
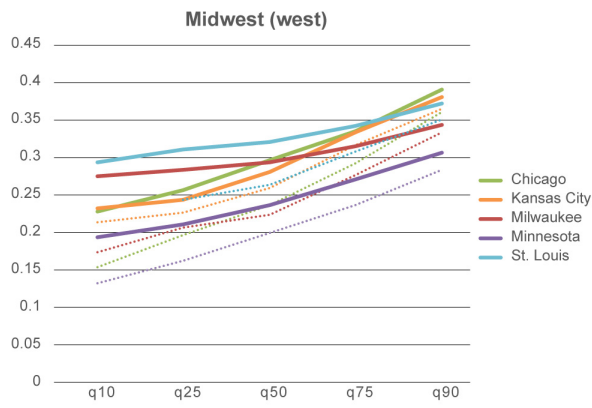
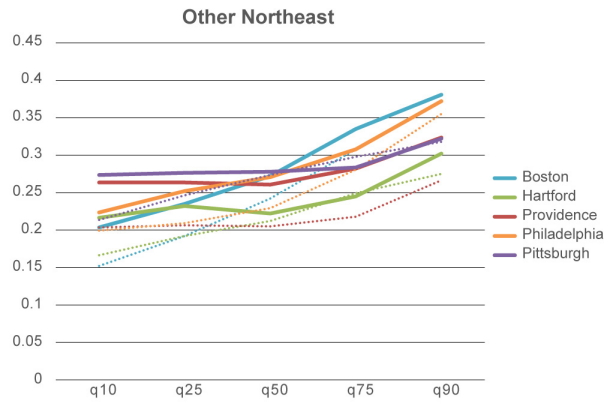
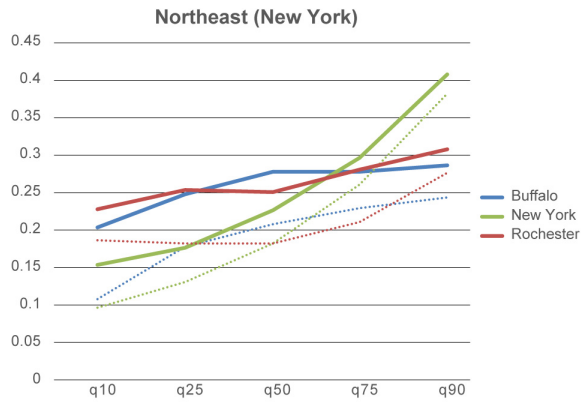
Figure 1

**Adjusted Gender Wage Gap: 2005-7 and 2011-13 for Top 50 Metro Areas**



(2005-7 are solid lines, 2010-12 are dotted lines)

## Adjusted Gender Wage Gap: 2005-7 and 2011-13 for Top 50 Metro Areas



(2005-7 are solid lines, 2010-12 are dotted lines)

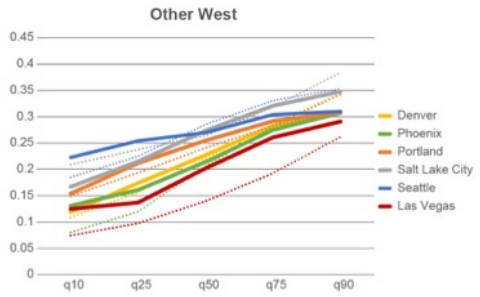
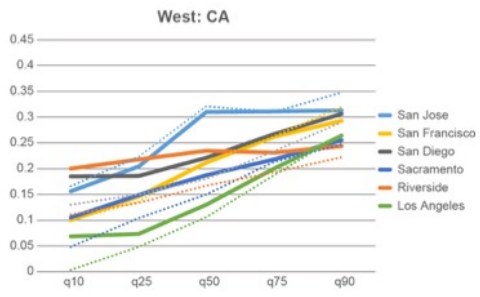
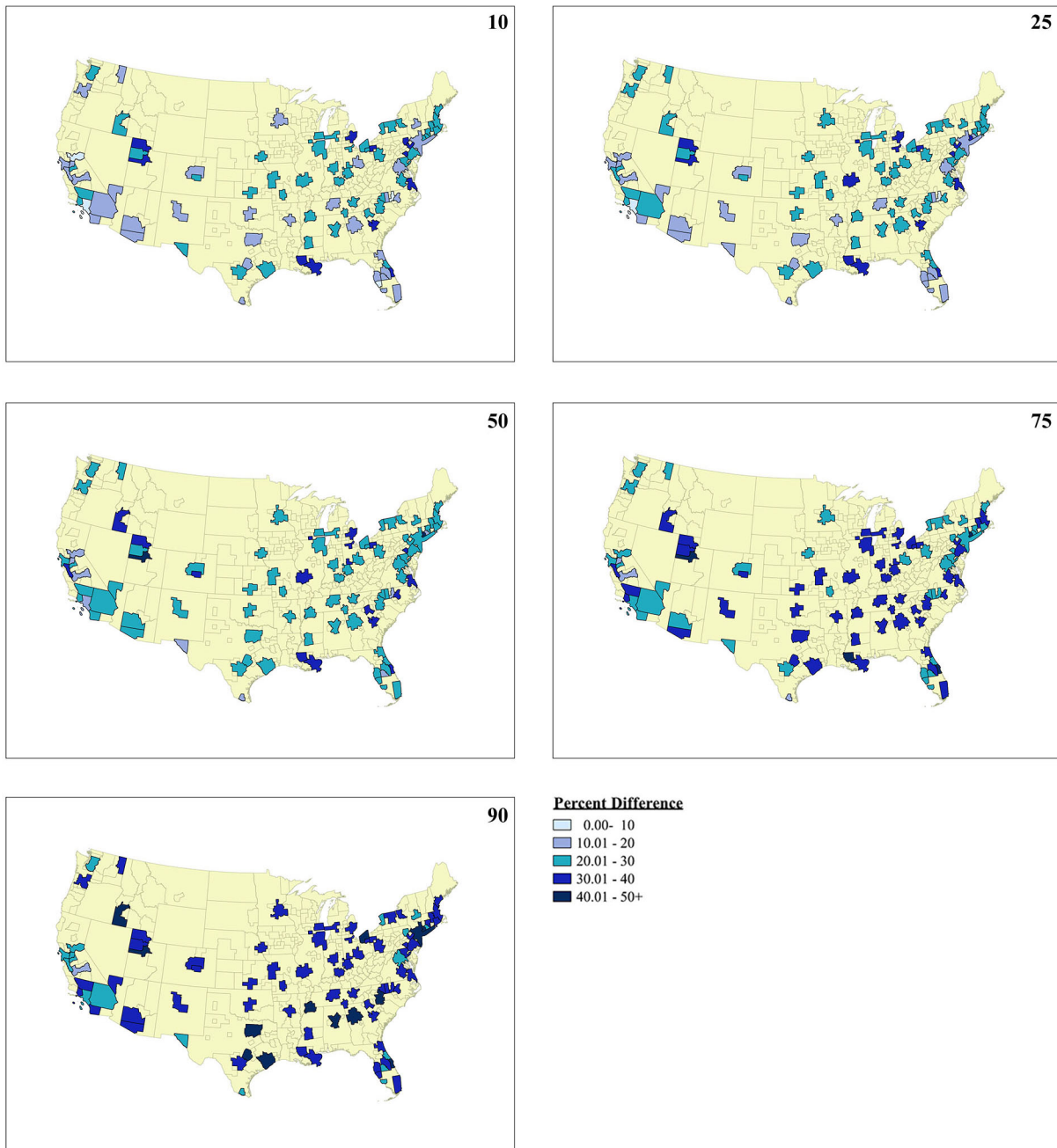


Figure 2

Adjusted Gender Wage Gap: 2005-7



### Adjusted Gender Wage Gap: 2011-13

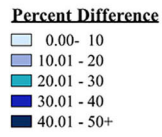
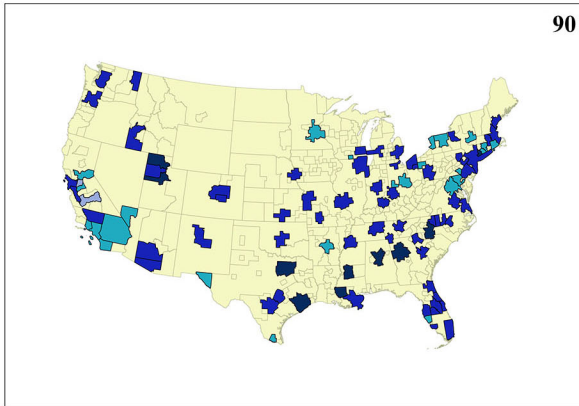
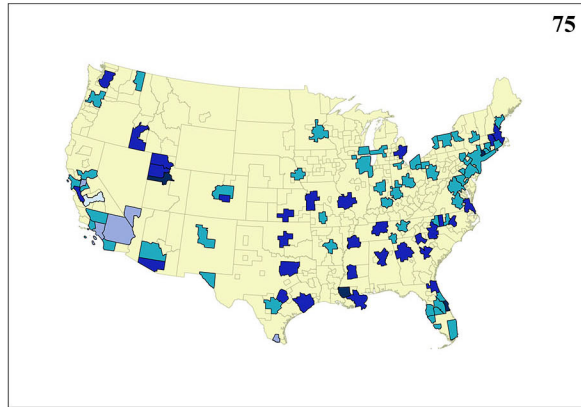
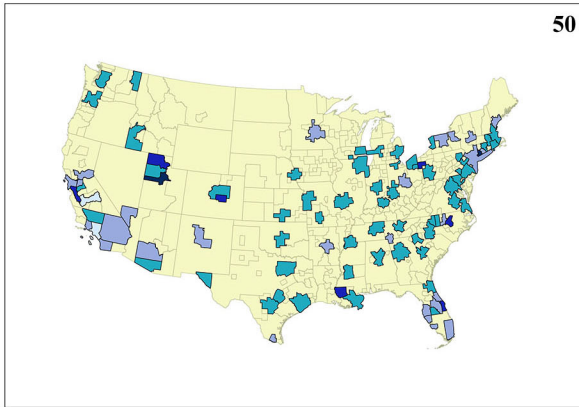
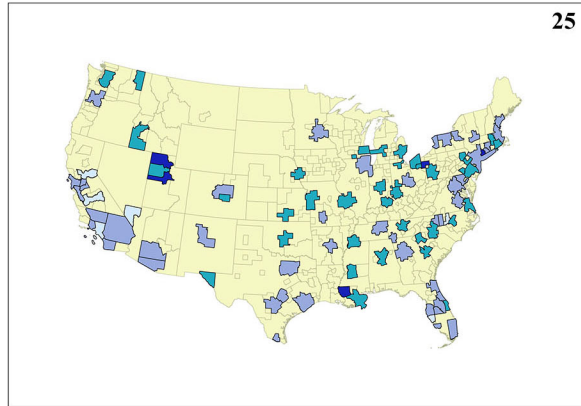
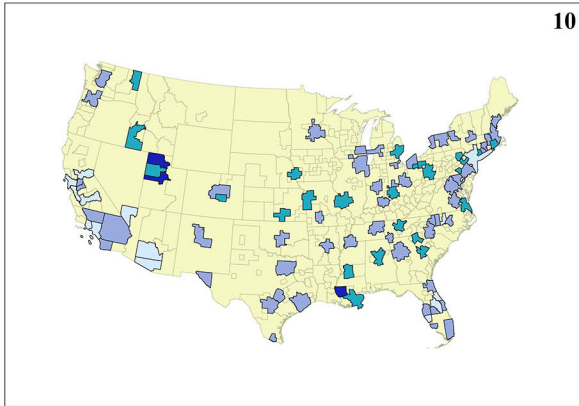


Figure 3

### Recessionary Changes in the Gender Wage Gap

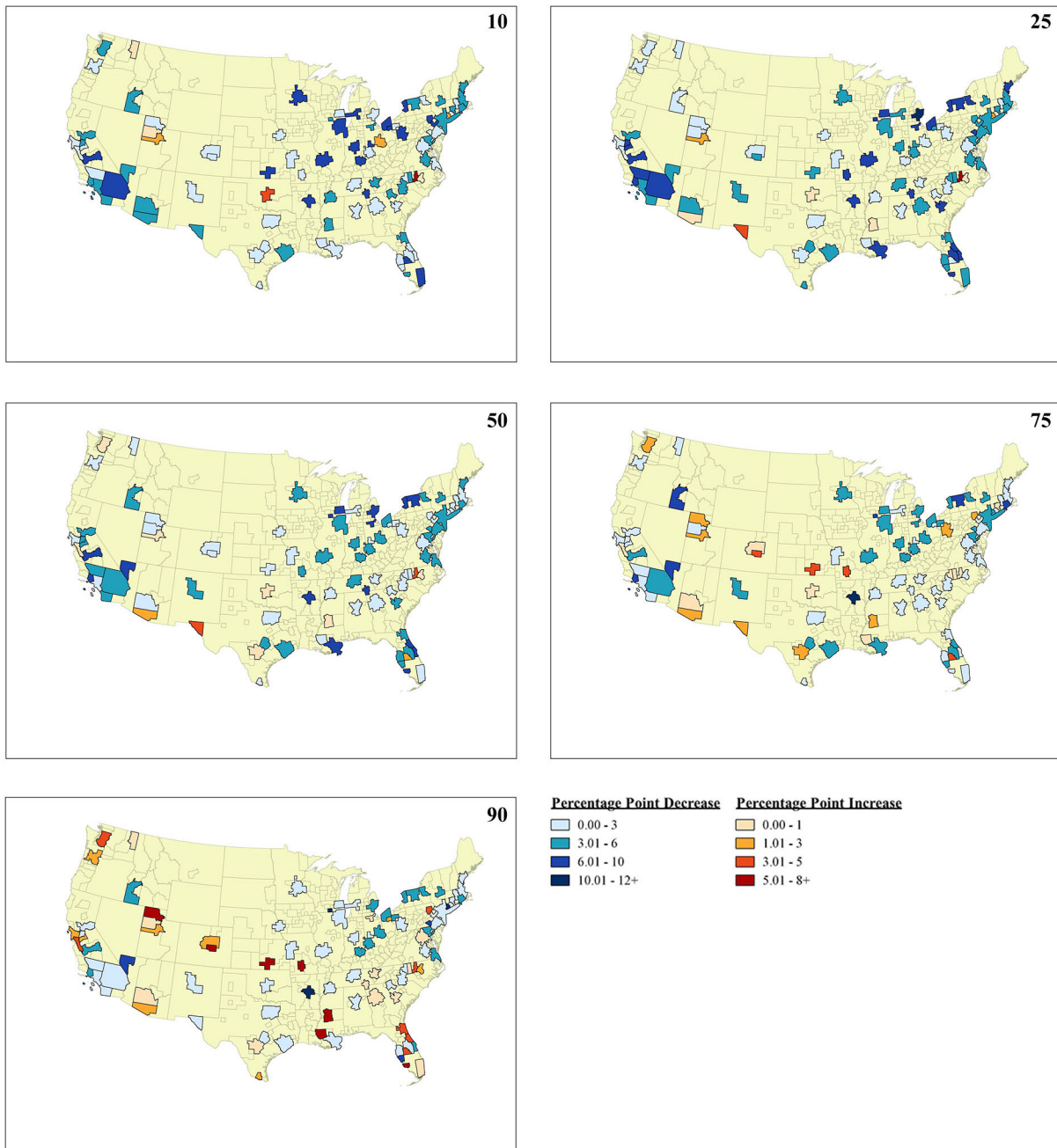
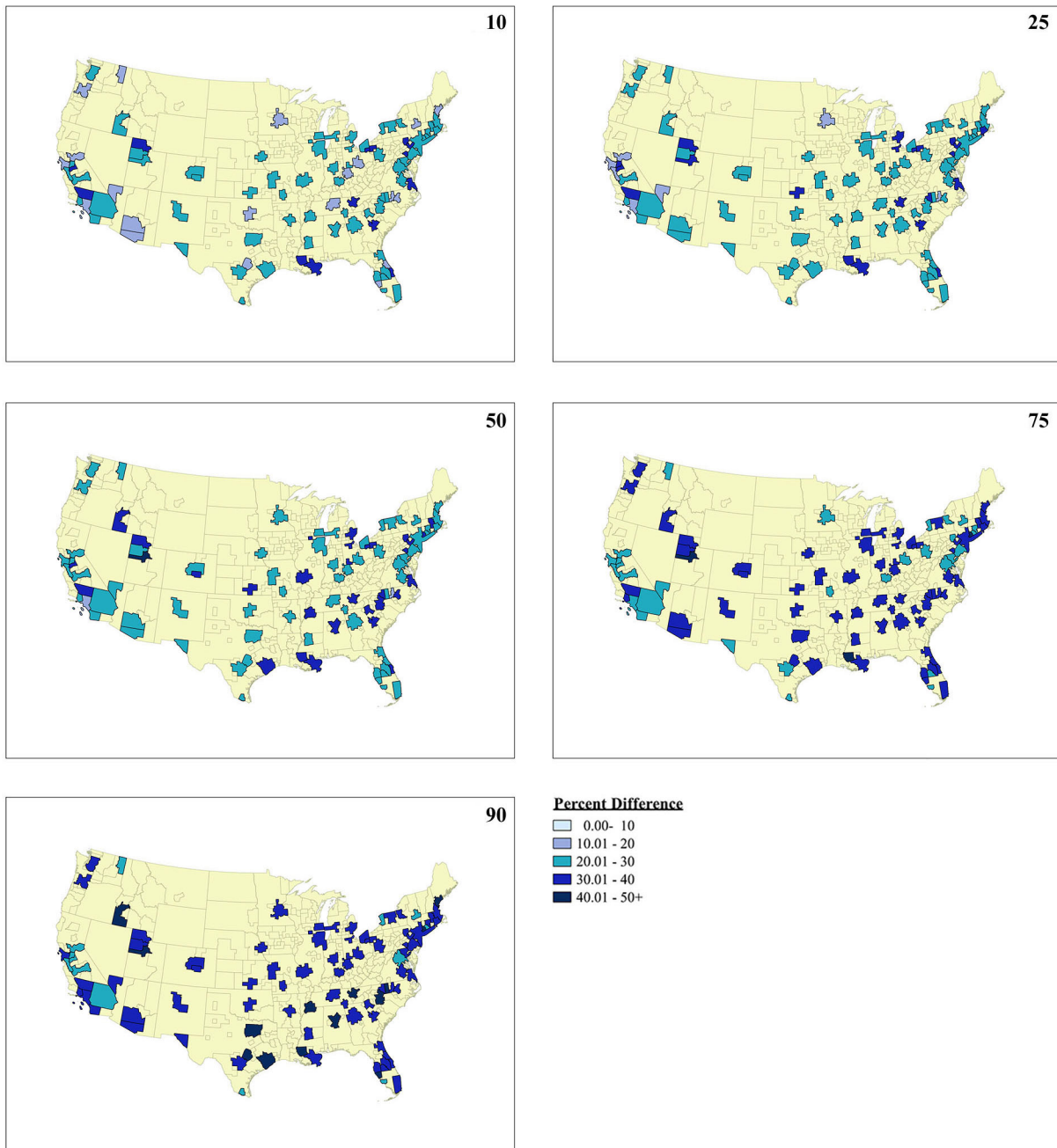
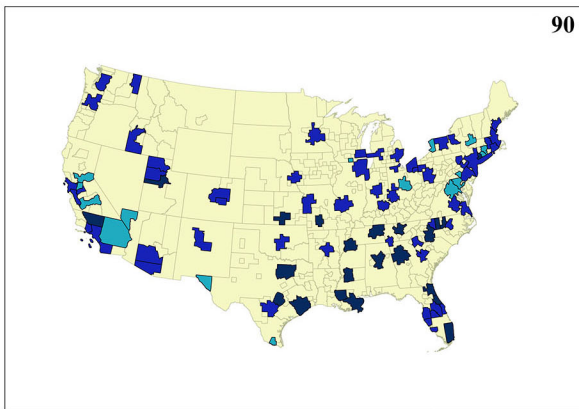
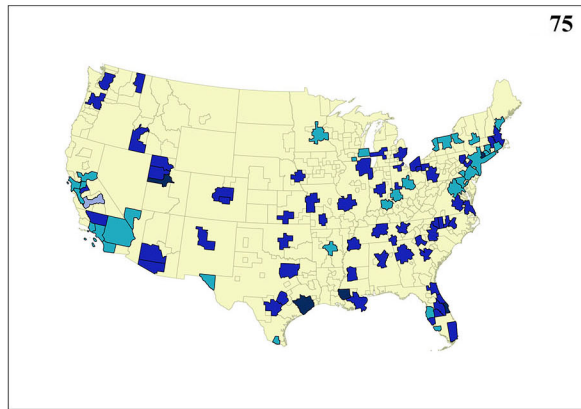
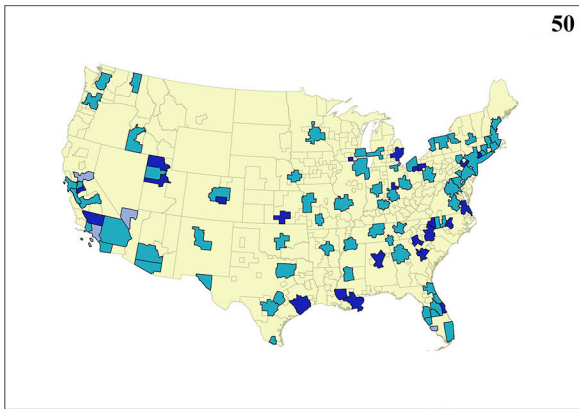
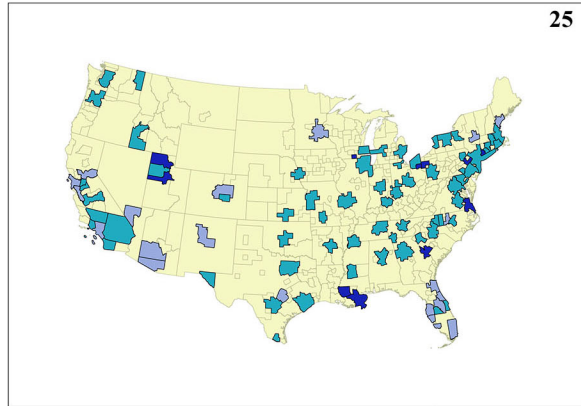
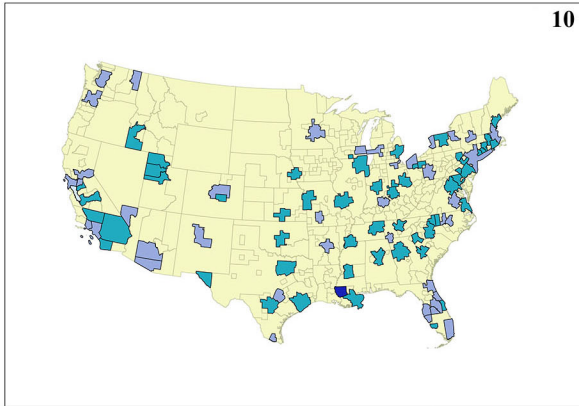


Figure 4

Unexplained Gender Inequality 2005-7



# Unexplained Gender Inequality 2011-13



**Percent Difference**

- 0.00 - 10
- 10.01 - 20
- 20.01 - 30
- 30.01 - 40
- 40.01 - 50+



Figure 5

### Recessionary Changes in Unexplained Inequality

