Gender Discrimination: What Factors Influence the Level of Gender Discrimination Facing U.S. Workers?

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Abstract:

This paper uses previous research conducted by the author which analyzes gender discrimination at the state level. Using state level discrimination coefficients, this paper looks to analyze why discrimination varies significantly across the United States. The empirical model is constructed using a panel data set over the past twenty years to develop a model that explains why variations in the level of gender discrimination faced by U.S. workers has persisted despite the fact that the level of gender discrimination has decreased over this period.

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1.0 INTRODUCTION

Gender discrimination and the gender pay gap is a topic of great discussion in economic literature. The vast majority of studies have found that on average, women make less than men, although the gap has narrowed over the past forty years (Blau and Kahn, 1994; Suh, 2010). The gender pay gap can be attributed to both explained and unexplained factors, with the latter being used as a proxy for gender discrimination. The standard approach in decomposing the gender pay gap is to regress wages by hours worked; industry, occupation, and sector of work; and human capital characteristics. Studies show that even when controlling for these explanatory variables, the majority of the gender pay gap still exists suggesting that the majority of the pay gap in the United States is still attributable to discrimination (Blau and Kahn, 2006).

Previous literature on this topic shows that the gender pay gap fell substantially over the 1980's and early 1990's, but has remained constant since (Blau and Kahn, 1994). The majority of the falling gender pay gap over the past twenty years is attributable to unexplained factors, or reductions in the level of discrimination (Suh, 2010). In addition, the productivity differences between men and women converged over the past thirty years, leading to a decrease in the explained portion of the gender pay gap as well. For example, the mean level of education for women is higher than that of men over the period 2005-2010; in the 1980's men possessed the advantage for this human capital characteristic.

The literature on this topic has mainly focused on quantifying the magnitude of the gender pay gap. There exists limited information on the fundamental causes of gender discrimination and was large variations in gender discrimination in the United States. In other words, the major lacking in the literature is what state level factors can explain variations in the level of gender discrimination faced by U.S. workers.

Previous studies on gender discrimination find that there exist wide variations in the level of gender discrimination faced by U.S. workers at the state level (Ryu, 2010; Ballance, 2012). Previous research completed by Ballance (2012) concludes that the level of

unexplained variations in the gender pay gap varies substantially across U.S. states. In other words, the level of gender discrimination faced by workers varies substantially across state lines. This suggests state level factors including demographic and labor market composition may explain variations in the level of gender discrimination in the United States.

This study takes a unique approach to explaining variations in gender discrimination across the United States. Whereas most research on the topic of gender discrimination is conducted with micro level data to assess the level of discrimination, this study uses state level macro data to explain variations in gender discrimination across U.S. states. To conduct this analysis, this paper uses discrimination coefficients compiled by Balance (2012) as the response variable. The study combines data on state legislative, population composition, and labor market characteristics to explain the variations in gender discrimination faced by U.S. workers across states.

The paper uses a panel data approach to eliminate the key source of omitted variable bias, the fact that within a state there exists unobserved heterogeneity that must be controlled for. In order to control for this bias, a fixed effects model is used in this paper to control for state and time period. The data for this model is derived from state level information and discrimination coefficients over the past 20 years. Discrimination coefficients were assembled using CPS micro level data, and the macro state level characteristics are mainly combined from the Census Bureau and BLS. Ballance (2012) measured unexplained variations in the gender pay gap over the periods 1990-1994, 1995-1999, 2000-2004, and 2005-2010. Therefore, this study combines state level characteristics for these four periods of times to assemble a dataset with a total of 196 observations.[1]

Understanding the key factors that cause variations in discrimination may be useful in determining why convergence in the gender pay gap has slowed since the mid-1990's. This study also has powerful policy implications in understanding what factors explain

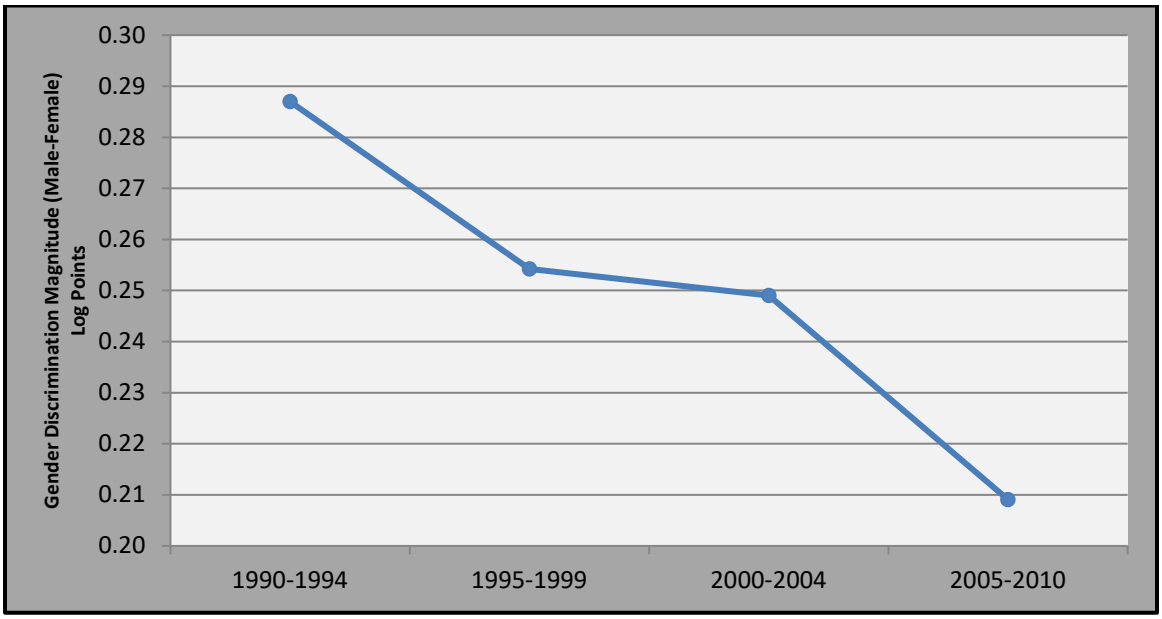
[1] Nebraska is the only state not included in this analysis. Nebraska does not have a partisan state legislature (one of the variables included in the model) and therefore was dropped from the analysis.

why such large variations in the level of gender discrimination exist in the United States. Although many of the characteristics have been discussed and studied individually, the model derived in this paper aims to provide a comprehensive discussion on many possible factors that may contribute to the level of gender discrimination.

The rest of this paper is organized as follows: Section 2 provides a trend analysis of gender discrimination over the past twenty years. Section 3 contains a literature review focusing on key explanatory variables previously used in the literature to explain gender discrimination. Section 4 outlines the empirical model. Data and estimation methodology are discussed in section 5. Finally, section 6 presents and discusses the empirical results. This is followed by a conclusion in section 7.

2.0 TRENDS IN GENDER DISCRIMINATION

Figure 1: Gender Discrimination, 1980-2010

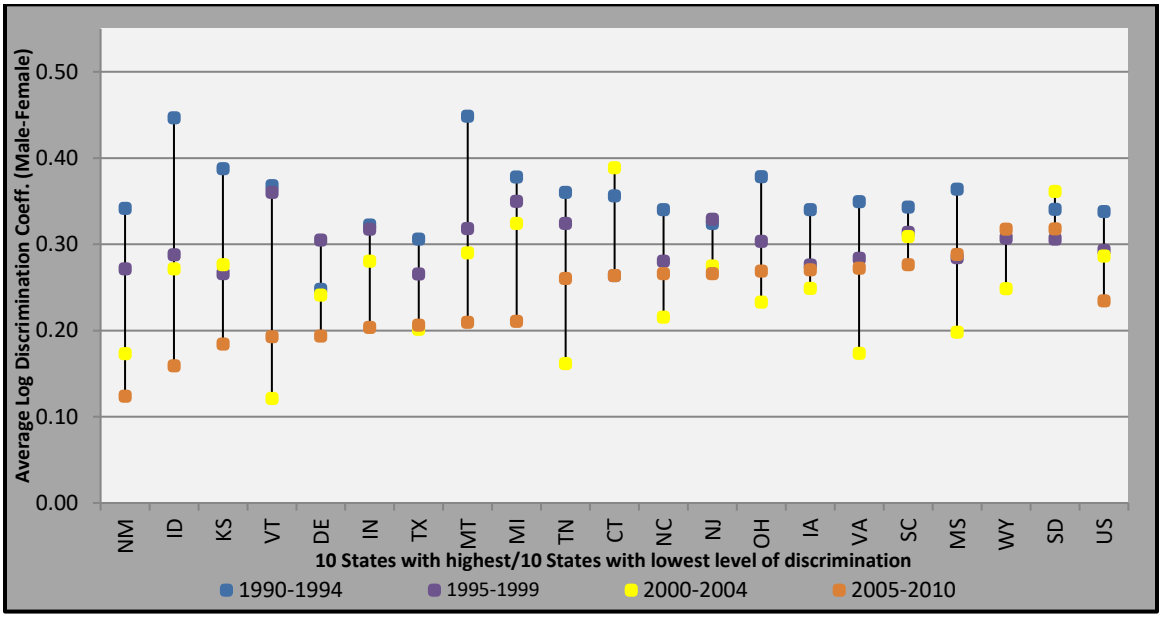


Source: Author's estimation using data from the Current Population Survey
Note: Data Presented in Log Points

Figure 1 displays the magnitude of gender discrimination across the United States over the period 1990-2010. The trend shows that gender discrimination decreased by nearly a third over the past twenty years. Over the period 1990-1994 the level of gender

discrimination in the United States was 0.287 log points, while over the period 2005-2010 the level of discrimination fell to 0.2091 log points (Ballance, 2012). Consistent with the previous literature, reductions in the level of gender discrimination face by U.S. workers seems to have slowed over the late 1990's and early 2000's, but the pace in reduction seems to have increased slightly over the period 2005-2010.

Figure 2: Wage Differential Trend: Selected States, 1980-2010



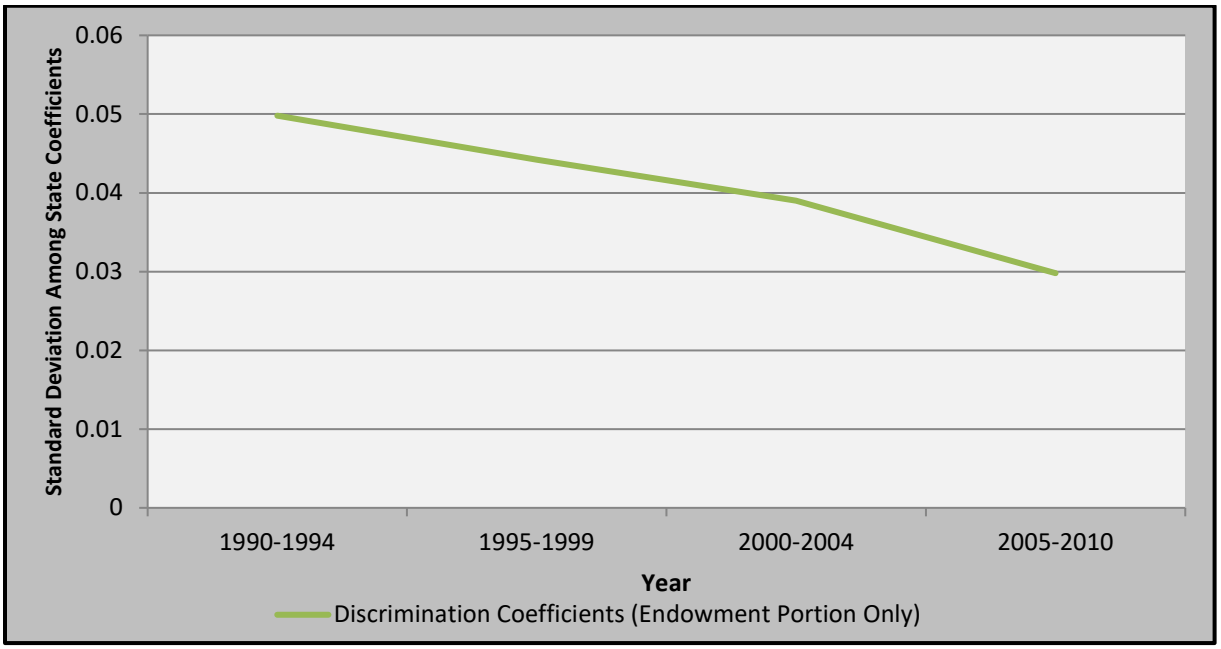
Source: Author's estimation using data from the Current Population Survey
Note: Data Presented in Log Points

Figure 2 displays the ten states with the highest level of gender discrimination and the ten states with the lowest level of gender discrimination over the period 1990-2010. This figure makes clear the fact that the level of gender discrimination varies greatly across state lines. Furthermore, while discrimination for all states decreased for nearly all states over the period 1990-2010, the magnitude of the reduction varies immensely as well. The states with the lowest level of gender discrimination over the period 2005-2010 was New Mexico, while South Dakota was the state that experienced the highest level of gender discrimination over the same period. It is interesting to note from the graph that the states with the lowest level of gender discrimination over the period 2005-2010 tended to, on average, experience larger reductions in discrimination over the past twenty years. This is to say that in many cases, the states that have the lowest level of gender

discrimination over the period 2005-2010 typically did not experience the lowest level of gender discrimination over the period 1990-1994. For example, New Mexico was ranked number twenty two for states facing the lowest level of gender discrimination over the period 1990-1994, but now ranks number one.

The standard deviation of the state discrimination coefficients appears to be decreasing over time, suggesting that convergence has occurred over the past twenty years. Over the period 1990-1994, the standard deviation amongst state discrimination coefficients was 0.0498, while it fell to 0.0298 over the period 2005-2010.

Figure 3: Standard Deviation of Gender Discrimination Coefficients



Source: Author's estimation using data from the Current Population Survey

These three trends demonstrate the necessity in determining what factors impact the level of gender discrimination faced by U.S. States. The fact that there still exist wide variations in state level discrimination makes it apparent that there must exist state-level factors which influence the level of gender discrimination faced by workers in those states.

3.0 LITERATURE REVIEW

Francois (1997) attempts to provide an explanation for the existence of gender discrimination in competitive labor markets. The author finds that women are typically discriminated against by employers because of perceived associations between family structure and quality of work. Francois (1997) attributes much of the falling gender pay gap to reduction indiscrimination by employers. The size of families is decreasing which lessens the need for women to take time off to care for children and marriage duration is decreasing as well. These changing characteristics imply that the perceived employer benefits of hiring a male worker over a female worker may be disappearing as the family structure begins to change. Francois (1997) also argues that married men would on average have a higher level of job productivity compared to single mean, while this trend does not hold for women.

Gornick and Jacobs (1998) uses data from the Luxembourg Income Study to assess the influence of government employment on the gender pay gap for seven difference countries, including the United States. High levels of public employment are associated with higher levels of female employment. The authors find that when not controlling for compositional differences, there is a pay advantage for public employees. However, once compositional difference is accounted for this pay advantage disappears; in fact it leads to a pay penalty. Gornick and Jacobs (1998) posit that the size of the public sector may explain the existence of cross-national variation. The authors challenge the claim that a large public sector is good for the female labor force because it provides more high jobs that tend to be higher paying. Furthermore, the authors suggest that further research is needed to study the effects of public employment on pay structures and gender equality.

Bratton and Haynie (1999) find that black and women representatives in state legislature tend to pursue distinct legislative policies that articulate the interests of black and women. Furthermore, their research finds that these two groups lend support to each other, with one group assisting with the creation of legislation to help the other. The study also finds that bills proposed by black legislators are less likely to be passed when compared to white legislators, although the trend does not necessarily hold for female legislators. This

study suggests that both the percentage of black state legislators and female state legislators may have an impact on gender discrimination as they would be more likely to pursue bills that favor gender pay equality.

Mandel and Semynov (2005) posit that labor market policies may have an impact on the level of discrimination faced by workers. While these policies including parental leave, reduced working hours, and absenteeism policies can increase labor force participation for women, they can also create an environment that encourages employer discrimination indirectly. The authors found that egalitarian wage systems decrease the gender earning gap in the twenty countries they studied. However, they found that family-friendly policies, such as maternity leave times, are not successful in reducing the gender pay gap. The study concludes that while most of these family friendly policies are designed to reduce gender earnings inequality, they encourage a lower work effort by women and encourage employer's discrimination.

Ryu (2010) posits that the decentralized nature of U.S. labor markets make national level policies ineffective in closing the gender pay gap. Ryu (2010) finds that states which promote federal equal employment initiatives have narrowed the gender pay gap in earnings across states. However, similar to Gornick and Jacobs (1998), Ryu (2010) finds that public social service employment has a negative effect on the gender pay gap. A larger public sector may provide more jobs for female employees, but the jobs do not necessarily provide a higher wage for female employees when compared to other positions. Ryu (2010) also finds that progressive institutional environments have an effect on gender pay equality. This suggests that partisanship of state government may have an impact on the level of gender discrimination faced by workers.

Weinberger and Kuhn (2010) conduct analysis on the gender pay gap over the period 1959-1999 to determine whether the decline in the gender pay gap is attributable to wage growth after labor market entry or relative earnings at the time of entry. Instead of using a panel dataset, the authors follow cohorts of individual age groups over the forty year period. Weinberger and Kuhn (2010) find that approximately one-third of the narrowing

gap is attributable to wage growth after market entry, while the majority is attributable to factors present at the time of labor market entry. This is consistent with much of the literature including Suh (2010) which concludes discrimination, rather than explained factors like experience, explain the majority of the closing gender pay gap. The authors also conclude the female/male wage gap is narrower during initial entrance into the workforce, widens around the time most women have children (25-35 years old), and then narrows again until retirement. Weinberger and Kuhn (2010) also find that the female/male earnings ratio slopes for each successive age cohort were steeper, representing an overall closing of the gender pay gap.

Flabbi (2010) argues that the traditional measures of productivity do not accurately depict actual productivity and uses a search model of the labor market with matching, bargaining, and employer's taste discrimination to determine what portion of the gap is attributable to unobserved productivity and how much is attributed to prejudice by employers. Flabbi (2010) finds that productivity is 6.5% lower for females than males however, 50% of employers are prejudiced which leads to wage discrimination. The author concludes that two-thirds of the gender pay gap is still attributable to discrimination, while the other third is attributable to the productivity difference. Flabbi (2010) further discusses that wage discrimination is present at unprejudiced employers as well because women's outside options are restricted due to prejudiced employers. The major limitation of this study is the fact that analysis is only completed for one year, which prevents the ability to analyze how these differences in productivity have changed over time. These differences in productivity are found to be higher in more physical occupations such as manufacturing. This suggests that controls for the manufacturing sector may explain some of the variations in gender discrimination.

This paper aims to improve on the literature by combining many of the explanatory variables discussed in the previous literature as well as introduce additional controls such as partisanship of state legislature and demographic/population controls to explain variations in the level of discrimination.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

This study uses data from a variety of different sources to compile state level information over the period 1990-2010. The main sources for this data are the Bureau of Labor Statistics and the Census Bureau. Detailed information on the source and description of each variable used can be found in Appendix A. A Table of Summary Statistics is shown below.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
IMMIG	196	0.0656	0.0550	0.008	0.2724
UNION	196	14.8	6.2	3.3	31.5
TECH	195	0.0677	0.0261	0.0145	0.1348
WOMEN	196	20.6	7.7	2.1	40.8
HISP	196	3.8652	10.3171	0.0053	112.9
DEM	196	0.5378	0.1546	0.1143	0.8963
BLACK	196	0.0939	0.0929	0	0.4209524
MANU	196	0.1478	0.0609	0.0193	0.2770
MARRIED	196	0.5006	0.1162	0.3773	0.7895
PRIVATE	196	0.8388	0.0353	0.6943	0.8982
DISC	196	0.2826	0.0633	0.1028	0.4893

4.2 Empirical Model

The empirical model for this study is show below

$$DISC_{it} = B_0 + B_1 IMMIG_{it} + B_2 UNION_{it} + B_3 TECH_{it} + B_4 WOMEN_{it} + B_5 HISP_{it} + B_6 DEM_{it} + B_6 BLACK_{it} + B_7 MANU_{it} + B_8 MARRIED_{it} + B_9 PRIVATE_{it} + \alpha + u_{it} \quad . \tag{1}$$

$DISC_{it}$ is the dependent variable for this model, as described in the introduction of this paper. $DISC_{it}$ represents the level of discrimination faced by a given state *i* at time *t*. This variable was compiled from a previous study conducted by the author examining gender discrimination at a state level. The data is compiled from point estimates of the mean level of gender discrimination for individual states over the four time periods analyzed in this study.

Independent variables consist of seven variables obtained from various sources. Appendix A and B provide data source, acronyms, descriptions, expected signs, and justifications for using the variables. First, $IMMIG_{it}$ (state i at year t) represents the proportion of immigrants, both legal and illegal, as a percentage of the total population in a given state. $UNION_{it}$ represents the proportion of individuals in the state who have union coverage as a percentage of the total working population. Third, $TECH_{it}$ and $MANU_{it}$ represent the proportion of jobs in a given state that are in the high tech industry and manufacturing industry respectively. $WOMEN_{it}$ represents the percentage of the state legislature comprised of female politicians. $HISP_{it}$ and $BLACK_{it}$ represents the percentage of Hispanics and Blacks respectively as a proportion of the total population in a given state. DEM_{it} represents the proportion of the state legislature comprised of democrats. $MARRIED_{it}$ represents the proportion of the state population that is married. Finally, $PRIVATE_{it}$ represents the proportion of all jobs in the private sector for a given state.

5.0 EMPIRICAL RESULTS

In order to determine whether a fixed effects or random effects model should be used in this paper, the Hausman Test was conducted. The null hypothesis for this test was that the unique errors (u_i) are correlated with the regressors and the alternate hypothesis that they are not. The results of this test are shown below.

Table 2: Regression results Gender Discrimination

	fixed	random	difference	S.E.
private	0.0298	0.0261	0.0037	0.2543
married	0.0203	0.0741	-0.0538	0.0265
black	0.0469	-0.0384	0.0853	0.2220
dem	0.1386	0.0076	0.1310	0.0604
hisp	0.0002	0.0005	-0.0004	0.0002
women	-0.0043	-0.0027	-0.0016	0.0011
tech	-0.5352	0.2306	-0.7658	0.6398
union	0.0091	0.0034	0.0056	0.0025
immig	-0.5725	-0.3763	-0.1963	0.3871
Test: Ho: difference in coefficients not systematic chi2(8)=(b-B)'[(V_b-V_B)^(-1)](b-B)=60.5 Prob>chi2 = 0.0000				

The resulting chi-square statistic was equal to 0, signifying that a fixed effects model is the appropriate choice. Therefore, the empirical results are reported using a fixed effects model.

The empirical estimation results are presented in Table 2 along with the expected sign for each independent variable. The R^2 statistic for this model is 0.3165, signifying that 31.65% of the variations in discrimination can be explained by the explanatory variables controlled for in the model. This is a fairly good model considering the fact that little empirical research has been previously conducted to analyze the causes of variations in gender discrimination across states.

Table 2: Regression results Gender Discrimination

DISC	COEFF.	STD. ERROR	SIGNIFICANCE
CONSTANT	0.2805	0.2638	
IMMIG	-0.1518	0.4181	
UNION	0.0072	0.0027	***
TECH	-0.9039	0.6624	
WOMEN	-0.0042	0.0013	***
HISP	0.0001	0.0005	
DEM	0.1400	0.0653	**
BLACK	0.1312	0.2253	
MANU	0.5761	0.2135	***
MARRIED	-0.0216	0.0468	
PRIVATE	-0.1303	0.2811	
R^2	0.2004		
F-statistics	14.47		
Number of obs.	196		

Note: *** , **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

Only four out of the ten variables controlled for in this model were significant: proportion of the employees under union coverage, proportion of women in state legislature, proportion of state legislature occupied by democrat candidates and the proportion of manufacturing jobs in a given state.

The proportion of workers covered by unions as a percentage of the total working population is significant at the 1 percent level. The interpretation of this coefficient is that a 1% increase in union membership is expected to increase gender discrimination by 0.000072 log points. The expected sign on union coverage is opposite of what was observed, signifying that further analysis may be needed. However, the direction of this coefficient could signify that union participation may lead to more gender discrimination. Perhaps firms will chose not to hire female employees if union participation is strong

because they discriminate based on perceived productivity differences between men and women. As an example, the auto industry, a highly unionized industry in the U.S., may be less likely to hire female employees or hire them into positions that are less labor intensive (and as a result pay less) because of prejudices that women are weaker than men. Even though union is designed to promote equal pay for the same work, if women are only offered lower paid positions in the same industry.

Percentage of state legislature occupied by democrats was also found to be an explanatory variable that was significant at the 5 percent level. A one percent increase in the proportion of democrats in state legislature is expected to increase discrimination by .001400 log points. The sign of this coefficient is also opposite of what we expected, however this result may be consistent with the discussion by Mandel and Semynov (2005). If we assume that democrat legislators are more likely to promote liberal policies designed to reduce discrimination, it may be that these policies lead to more discrimination by firms.

Women in state legislature is also an explanatory variable that was significant at the one percent level. The interpretation of this variable signifies that a 1% increase in the proportion of female state legislators in a state is expected to decrease discrimination by .000042 log points. The direction of this coefficient is consistent with research conducted by Bratton and Haynie (1999), which concludes female legislators tend to support more legislation that promotes equal pay for men and women.

The forth significant explanatory variable is the proportion of manufacturing jobs as a percentage of total jobs. The magnitude of this coefficient is the largest of all explanatory variables used. The interpretation of this variable signifies that a 1% increase in the proportion of manufacturing jobs as a percentage of total jobs is expected to increase gender discrimination by .005761 log points. The direction of this relationship is expected considering manufacturing tends to be a male dominated and labor intensive sector. It can be assumed that discrimination would be more prevalent in

this sector as there is a perceived difference in physical strength between men and women.

5.0 CONCLUSION

Utilizing the framework provided in this paper provides some useful insight into why there exist large variations in the level of gender discrimination over the past twenty years. Although, this variation seems to be decreasing over time, this paper helps conclude that there are many state level factors which can explain why these variations exist and why they may persist into the future.

Important finding in this study certainly warrant further and more comprehensive analysis. First, the policy implication of union coverage increasing discrimination faced by workers should be studied more to be sure the relationship holds. If this is true, unionization is actually counterproductive to one of the fundamental goals it is trying to achieve, equal pay for men and women. As discussed in the results section, it may be that firms tend to discriminate against more in hiring decisions if they are unionized based on prejudices of productivity differences. Second, the fact that the percentage of democrats in state legislature had a positive impact on discrimination also warrants further analysis. It could be that in these states with a larger proportion democrat legislators tend to push through legislation (e.g. maternity leave legislation) that encourages firms to discriminate more against women.

Other important findings were expected and consistent with previous literature. The results showed that a large manufacturing sector increases the level of discrimination faced by workers in the state. This is important information that can be used by policy makers to introduce legislation or incentives that promotes equal pay and job opportunities in this sector to reduce discrimination. Lastly, a woman in state legislature was shown to reduce discrimination which supports the fact that a diverse legislative body works to reduce discrimination. This may explain why gender discrimination decreased rapidly in the 1980's as more women began filling state legislature seats.

The model used in this paper provides an adequate framework for analyzing the causes of gender discrimination, although there exists many additional factors not controlled for in this model that may explain gender discrimination. Moreover, this model only explained 20 percent of the variation in discrimination, which means there may exist many additional factors which explain variations in discrimination. Many of these factors, such as state level family leave legislation, were not included in this analysis because is no variation in the variables over time. Furthermore, measures of income inequality proved difficult to find, but may help to explain variations in the United States. More research is needed to determine other factors which may influence the level of gender discrimination faced by U.S. workers, thereby making this research more comprehensive.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
DISC	Magnitude of Gender Discrimination for a given state.	Author's estimation using Current Population Survey data
IMMIG	Proportion of immigrants (legal and legal) as a percentage of total state population.	Census Bureau
UNION	Proportion of workers covered by unions as a percentage of total workers	Unionstats.com
TECH	Proportion of high tech jobs as a percentage of total jobs	Bureau of Labor Statistics/ Census of Employment and Wages
WOMEN	Proportion of women in state legislature	Rutgers
HISP	Number Hispanics as a proportion of total population.	Census Bureau
DEM	Percentage of state legislature held by democrat candidates	US Bureau of Economic Analysis
BLACK	Number of Blacks as a proportion of total populations.	Current Population Survey
MANU	Number of manufacturing jobs as a proportion of total jobs	Current Population Survey
MARRIED	Proportion of married individuals	Current Population Survey
PRIVATE	Number of private jobs as a proportion of total jobs	Current Population Survey

Appendix B- Variables and Expected Signs

Acronym	Expected Sign	Rationale
IMMIG	(-)	A more diverse population is expected to have lower gender discrimination
UNION	(-)	Increased union coverage should lead to equal pay for men and women
TECH	(+/-)	High tech jobs tend to be more male dominated, but it is unclear what effect a larger proportion of these jobs would have on discrimination
WOMEN	(-)	Women would be more likely to push for equal pay and family leave legislation as well as legislation that promotes gender equality
HISP	(-)	A more diverse population is expected to have lower gender discrimination
DEM	(-)	Democrats tend to pursure more liberal policies which may aid in decreasing the level of gender discrimination faced by workers
BLACK	(-)	A more diverse population is expected to have lower gender discrimination
MANU	(+)	Manufacturing tends to be a physical industry and perceived female physical weakness would suggest increases in discrimination
MARRIED	(+)	A larger proportion of married individuals may suggest that more women stay home and the culture of that state may tend to discriminate against women more.
PRIVATE	(+)	Private industry would be more likely to discriminate when compared to public industry because the government is held more accountable for equal pay legislation.

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