A Study of the Disparity in Wages and Benefits Between Men and Women in Wyoming: Update 2018

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"Your Source for Wyoming Labor Market Information"

Who We Are

Research & Planning (R&P) functions as an exclusively statistical entity within the Wyoming Department of Workforce Services. R&P collects, analyzes, and publishes timely and accurate labor market information (LMI) meeting established statistical standards. We work to make the labor market more efficient by providing the public and the public's representatives with the information needed for evidence-based, informed decision making.

Table of Contents

Executive Summary

In 2017, the Wyoming joint labor, health, and social services interim and the joint minerals, business, and economic development interim committees tasked the Wyoming Department of Workforce Services with completing a study on the state's gender wage gap. Presented in this executive summary are some key findings of each chapter within the report. When ranking the states based on the difference in pay between men and women, Wyoming is often one of the states with the greatest disparity. According to studies conducted using Census data, in 2015 Wyoming ranked 51st in the nation; among individuals working full-time, year-round, women earned just $0.64 for every dollar earned by men.

In 2003, the University of Wyoming completed several studies regarding wage disparity among genders and found that time spent at work, education differences, employment in different industries, and family factors were the main reasons for the wage gap. Many of the results from the 2003 studies were replicated in this report. Research & Planning maintains several large databases, including the Wyoming wage records database, which includes records of wages paid to each employee every quarter. These data are collected by all states, and some states simultaneously collect data on the occupation each individual works. The administrative databases maintained by R&P, combined with the knowledge and skills of the staff, put R&P in a unique position to conduct a study like the one presented in this report.

House Bill 0209 (2017) provided specific language that directed R&P's efforts in this report. The following key findings address the requirements of House Bill 0209, along with directions of where these findings can be found in the publication.

Key Findings

Workforce, Data, and Limitations

- Wyoming's gender wage gap varies depending on the cross-section of the workforce observed, the data source used, and the limitations placed upon the data. The wage gap narrows or widens when considering different factors, such as industry of employment, hours worked, education, tenure, having children, or growing older.
- Among full-time, year-round workers in Wyoming, women earned $0.68 for every dollar paid to men in 2016, according to estimates from the U.S. Census Bureau (see page 8). Wyoming's gender wage gap was second widest in the nation, ahead of only Louisiana.
- In contrast, using wage records data and including only individuals with at least

(Findings continued on page 5)

(Findings continued from page 4)

two consecutive quarters of employment, women earned $0.74 on the dollar compared to men (see page 17).

(i)(A) Data and Analysis According to County

- Wyoming's gender wage gap varies by county of employment. In Wyoming's two most populated counties, Laramie and Natrona, women were paid $0.80 and $0.82 on the dollar, respectively. Counties in which mining made up a substantial proportion of all jobs had some of the largest wage gaps, including Sweetwater ($0.59 on the dollar), Sublette ($0.62), and Campbell ($0.66) counties. Niobrara ($0.99 on the dollar) and Goshen ($0.90), two of Wyoming's least populated counties, had two of the narrowest gaps. *... see page 18 and Appendix Table 2.1*

(i)(B) Data and Analysis According to Occupation

- Data on occupations are limited. Because occupation data are not collected with wage records, R&P relied on data from the Department of Education, Wyoming state licensing boards, state auditor's file, and the New Hires Job Skills Survey.

- The gender wage gap was narrower in many occupations in the educational services industry, which employs a large number of women in occupations requiring a postsecondary education. Among teachers, the wage disparity varied from women earning $0.96 on a man's dollar for middle school teachers to $1.14 on a man's dollar for kindergarten teachers. *... see page 24*

- With the data available, R&P was able to perform an analysis by occupation on 30,536 men and 56,185 women working in Wyoming between 2005 and 2017. Of the 228 occupations analyzed, 81 occupations had statistically significant wage differences, 76 in which men were paid more than women and five in which women were paid more than men. The remaining 147 occupations showed no statistically significant difference in wages between men and women. *... see page 36*

(i)(C) Comparative State Data with Other State and Federal Information

- Among full-time, year-round workers, women in the United States were paid approximately $0.80 on the dollar paid to men in 2016. However, during that same year, women in Wyoming were paid $0.68 for every $1 paid to men, ranking the state 51st in terms of gender wage gap. *... see page 40*

(Findings continued on page 6)

(Findings continued from page 5)

- In Wyoming, women made up 92.3% of persons working in healthcare support occupations, compared to 85.7% nationally and 78.0% in the Salt Lake City Metropolitan Statistical Area. Many of these occupations had relatively low hourly wages, particularly nursing assistants: according to Occupational Employment Statistics for Wyoming, the average hourly wage in 2016 was $15.41. The large proportion of women working in healthcare support occupations was the largest difference between men and women in all of the selected regions and occupations. *... see page 46*

- Women also made up a larger proportion of persons working in sales & related occupations (47.2%) and office & administrative support occupations (77.7%) than in any other region. On the other hand, women made up just 10.2% of persons working in production occupations, the smallest proportion in the region. *... see page 47*

(ii) The Causes of Any Wage and Benefit Disparities

- A decomposition analysis identified industry of employment and the number of hours worked as the two greatest contributers to Wyoming's gender wage gap. According to the analysis, industry made up $0.12 of the $0.28 gender wage gap, while hours worked accounted for $0.09. Overall, R&P economists were able to identify the causes for $0.15 of the gender wage gap. The remaining $0.13 could not be explained with the data available to R&P. *... see page 60*

(iii) The Impacts of Any Wage and Benefit Disparities on Wyoming's Economy

- R&P economists created a scenario in which the hourly wage of women was increased to the hourly wage of men while leaving the total number of hours worked unchanged. The analysis indicated an infusion of $153 million in labor income and an induced effect of an additional 604 jobs, approximately $22.2 million in additional labor income, and over $80 million in output to the Wyoming economy, measured in 2016 dollars. It should be noted, however, that this scenario is not entirely realistic, in that profits would decrease with the increased labor costs, which could cause a lowering of primary output. *... see page 76*

(iv) Possible Solutions and Workforce Development Programs to Reduce or Eliminate Any Wage and Benefit Disparities

- See Possible Solutions and Actions Other States Have Taken, page 7

(iv) Benefits and Costs of Eliminating or Reducing Any Wage and Benefit Disparities

- See section iii.

Possible Solutions and Actions Other States Have Taken

Possible Solutions - Legislation

- Prohibit employers from requiring applicants to share salary history – asking past salary perpetuates pay gaps
- Prohibit retaliation against employees that discuss salary with coworkers
- Raise the minimum wage and raise or eliminate the tipped minimum wage – approximately 2/3 of minimum wage and tipped workers are women
- Address pay equity for public employees, require companies with government contracts to address pay equity in some way (Oregon requires government contractors to complete a training, New Jersey requires them to submit a comparison of pay by gender within job classes)
- Require employers to demonstrate that wage differentials are based on factors other than gender

Possible Solutions - Training

- Teach women negotiating skills – women may be less likely to negotiate and generally ask for lower starting salaries than men
- Offer pay equity training/certification for businesses, HR professionals

Possible Solutions – Voluntary Employer Changes

- Transparency about wages in hiring process – share pay range for position with applicants
- Share how pay is calculated with employees – let employees know how factors like education, tenure, performance, etc. will affect their pay

Actions other states have taken since 2015

- Increased penalties for violation of equal pay laws – Connecticut, New Jersey, New York, Oregon, Puerto Rico, Utah
- Prohibit retaliation for discussing salary with coworkers – California, Colorado, Connecticut, Delaware, Maryland, Massachusetts, Nevada, New Jersey, New York, Oregon, Puerto Rico, Washington
- Employers cannot require applicants to share pay history – California, Delaware, Massachusetts, Oregon, Puerto Rico, Vermont
- Employers cannot limit career advancement opportunities based on gender – Maryland, Washington
- Reduced exemptions from equal pay laws for small businesses – Illinois, Nebraska

Chapter 1

Introduction

by: Elyse Gagné, Office Support Specialist, and Lynae Mohondro, Senior Research Analyst

It is widely recognized that overall, women earn lower wages than men. In 2016, among full-time, year-round workers, women in the United States earned $0.80 on a man's dollar (U.S. Census Bureau, 2018[1]). When ranking the states based on the difference in pay between men and women, Wyoming is often one of the states with the greatest disparity. According to studies conducted using Census data, in 2016, Wyoming ranked 51st in the nation among full-time workers, ahead of only Louisiana; women earned just $0.68 for every dollar earned by men (see Table 4.1, page 41).

Data from the American Community Survey (ACS) show that among persons working full-time and year-round in Wyoming, women earned between $0.60 and $0.68 for every dollar earned by men from 2005 to 2016 (see Table 1.1). It should be noted that the ACS data presented in Table 1.1 are based on five-year averages from relatively small sample sizes. As a result, ACS data often do not capture the effects of economic growth or downturns.

The gender wage disparity is often attributed to differences in occupations, industries, hours worked, experience, and gender discrimination. The 2003 study funded by the Wyoming State Legislature to tackle the gender wage gap in the state, *A Study of the Disparity in Wages and Benefits Between Men and Women in Wyoming*, estimated that discrimination explains between 2% and 12% of the wage gap (Alexander, Connolly, Greller, & Jackson, 2003).

Because Wyoming continues to rank as a state with one of the widest wage gaps, in 2017 the Wyoming State Legislature passed House Bill 0209 to require an update to *A Study of the Disparity in Wages and Benefits Between Men and Women in Wyoming* from 2003 and identify where and why the disparities in earnings exist. This publication discusses some of

Table 1.1: Median Annual Wages* in Wyoming by Gender and Wages Paid to Women Per $1 Paid to Men (Cents on the Dollar) for Full-Time, Year-Round Workers in Wyoming, 2005-2016

Year	Male	Female	Cents on the Dollar
2005	$42,463	$25,620	$0.60
2006	$41,993	$27,933	$0.67
2007	$44,947	$28,580	$0.64
2008	$47,533	$30,481	$0.64
2009	$48,198	$30,478	$0.63
2010	$49,649	$31,237	$0.63
2011	$51,634	$32,948	$0.64
2012	$52,958	$33,785	$0.64
2013	$53,454	$34,637	$0.65
2014	$54,017	$35,832	$0.66
2015	$54,212	$35,897	$0.66
2016	$53,881	$36,574	$0.68

*Median annual wages are inflation-adjusted for each year.
Source: U.S. Census Bureau, American Community Survey. Five-year estimates were used for 2010-2016, three-year estimates were used for 2007-2009, and one-year estimates were used for 2005-2006.
Prepared by M. Moore, Research & Planning, WY DWS, 8/30/18.

1 Results of the American Community Survey are released annually as one-year estimates, which are created using 12 months of data, or five-year estimates, which are created using 60 months of data. Although the one-year estimates are more current, the five-year estimates contain more responses, which make the more reliable, more precise, and better for analyzing smaller populations. As such, R&P generally relies on five-year estimates for research purposes when available.

the laws prohibiting gender discrimination in the workplace, reasons for the wide wage gap between men and women in Wyoming, and possible solutions to reduce the gap in the state.

Anti-Discrimination Laws

Since 1963, several laws have been passed to protect women and minorities from discrimination in the workplace. President John F. Kennedy passed the first law, The Equal Pay Act, prohibiting employers from paying female employees lower salaries because they are women (National Equal Pay Task Force, 2013). This law amended the Fair Labor Standards Act of 1938 to require that men and women be paid equally for equal work; any difference in pay among employees must be due to seniority, merit, quantity or quality of production, or anything else other than sex (Equal Pay Act, 1963).

One year after the Equal Pay Act passed, the Civil Rights Act of 1964 became law. Title VII of the Civil Rights Act of 1964 made it unlawful for employers to hire or dismiss from employment, deprive employees of opportunities, or negatively affect the employment status of employees based on race, color, religion, sex, or national origin. Additionally, differences in compensation, terms, conditions, or privileges of employment could not exist based on race, color, religion, sex, or national origin (Title VII of the Civil Rights Act, 1964).

In 1965, President Lyndon B. Johnson issued Executive Order 11246, which bars contractors of the federal government from discriminating based on race, color, religion, or national origin. Under the executive order, employees cannot be hired, promoted, demoted, transferred, recruited, dismissed, paid, or selected for training based on race, color, religion, or national origin. Also, federal contractors must disclose that all qualified applicants for a solicited position will be considered regardless of race, color, religion, or national origin.

In 1967, the Executive Order 11375 amended Executive Order 11246 to include sex as an employee trait against which a federal contractor could not base decisions regarding employment status, recruitment, compensation, or training (Executive Order 11246, 1965).

Laws passed in later years have added additional protections against discrimination in the workplace for women and minorities. The Education Amendments of 1972 prohibits sex-based discrimination in federally funded education programs (Title IX of the Education Amendments, 1972), while the Pregnancy Discrimination Act of 1978 prohibits discrimination on the "basis of pregnancy, child birth, or related medical conditions" and requires the same treatment and benefits for pregnant women as for individuals who are not pregnant but have similar ability to perform their work (The Pregnancy Discrimination Act, 1978).

Possible Solutions

The 2003 study on the disparity in wages between men and women provided a list of ideas to tackle the issue of the wage gap in Wyoming. The idea to "increase the average wages of Wyoming teachers and

nurses to at least the national minimum" has already been achieved. Monitoring School District Human Resource Cost Pressures (Gallagher et al., 2013) found that teacher salaries in Wyoming were higher than in surrounding states and nationally. Nurses in Wyoming still earn below the national average of $72,180, however nurses' salaries have increased over recent years (Bureau of Labor Statistics, 2016). Additionally, the Wyoming Legislature developed Economically Needed Diversity Options for Wyoming (ENDOW), a program spanning over 20 years to expand Wyoming's economy. The goal of this initiative is to diversify Wyoming's economy to rely less on oil, gas, and coal (ENDOW, 2017). The following section discusses other suggested solutions that Wyoming could strive toward to reduce the gender wage gap.

Encourage young women to pursue math and science in elementary and high schools, and continue that education in college.

Encouraging increased female participation in science, technology, engineering, and mathematics (STEM) education has been identified as a potential way to narrow the wage gap. In the U.S., employment in STEM occupations is growing above average, and 93 out of 100 STEM occupations have a higher average wage than the national average (Fayer, Lacey, & Watson, 2017). Increasing the number women in STEM occupations could have a noticeable impact on women's earnings.

Women continue to be underrepresented in STEM fields, even as the courses of study for boys and girls in secondary school have become increasingly similar, and gender differences in mathematics test scores have narrowed (Blau & Kahn, 2016). University departments in STEM disciplines also often have large gender disparities among faculty, which can affect whether female students choose to take additional courses in that field or choose it for their major (Bettinger & Long, 2005). Data from the ACS indicate that, as of 2014, 47% of men in Wyoming who earned bachelor's degrees majored in science and engineering, while only 24% of women who earned bachelor's degrees chose those majors (Connolly, 2016). However, STEM majors seem to be growing in popularity among Wyoming women. When those same data are grouped by age, nearly 30% of women ages 25-39 who earned bachelor's degrees majored in science and engineering (U.S. Census Bureau, 2014).

Technology jobs, particularly computer occupations, are among the fastest growing (Fayer, Lacey, & Watson, 2017) and could be an attractive option for women because of the flexibility many of these occupations offer. Many studies have attributed a portion of the gender wage gap to the loss of work experience for women when they reduce hours or take time away from work after the birth of a child (Budig, 2014). Women with degrees in technology have a slightly greater labor force participation rate than other women, in part because having young children has less of an impact on the participation rate of women with technology degrees (Goldin, 2014).

Encourage women to pursue "non-traditional" careers, and thus change the occupation matrix.

Gender differences in occupations have often been cited as an important contributing factor to the wage gap. Blau

and Kahn (2016) found that "occupation is the largest single factor accounting for the gender pay gap," and that within many occupations, men and women are employed at different levels of the hierarchy.

In the 2003 study of wage disparity from the University of Wyoming, the authors examined the effect of increasing the proportion of women in careers that are traditionally male-dominated and concluded that encouraging more women to pursue these careers would help narrow the pay gap. However, the authors make the assumption that the additional women recruited to these careers would be paid either the national or the Wyoming average wage men were paid for that occupation, instead of the Wyoming average wage for women in that occupation. The authors attribute the subsequent narrowing of the wage gap to the increased proportion of women, but a portion of the gap reduction was due to increasing the women's pay.

Goldin (2014) asserts that reducing differences in earnings within an occupation has a greater impact on the wage gap than changing the proportion of men and women in each occupation. The importance of factors like firm choice and job title have also been identified, as women have been found to be more concentrated at firms that pay lower wages for a given occupation and in jobs with lower paying titles (Cardoso, 2012). In the past, relative wages for an occupation have fallen as more women entered the occupation (Weinberger, 2001), suggesting that increasing the proportion of women in traditionally male-dominated careers without also reducing differences in earnings may not be an effective method of narrowing the wage gap.

Raise the minimum wage, and raise or eliminate the tipped minimum wage.

Increasing the minimum wage could also help narrow the wage gap. In the United States, 64% of workers with earnings at or below the federal minimum wage (Bureau of Labor Statistics, 2017) and two-thirds of tipped workers (Allegretto & Cooper, 2014) are women. Raising the minimum wage and raising or eliminating the tipped minimum wage would disproportionately affect women, because of their greater representation among minimum wage workers.

Of the 45 states with minimum wage laws, only Wyoming and Georgia have rates ($5.15 per hour) lower than the federal minimum, while 29 states and Washington D.C. have rates higher than the federal minimum (Department of Labor, 2017). A bill was introduced during Wyoming's 2017 legislative session to raise the state's minimum wage from $5.15 to $9.50 per hour and raise the base pay for tipped employees from $2.13 to $5.50 per hour. The amended bill failed a Committee of the Whole vote, 20-40 (H.B. 0140 Digest, 2017).

Increasing the minimum wage can have complex effects, as the increased earnings for some workers may be accompanied by reduced hours or job losses for others. The Congressional Budget Office (CBO) analyzed proposals to increase the federal minimum wage to either $9.00 or $10.10, and found that each option would result in an overall net increase in real income ($1 billion or $2 billion, respectively), a loss of employment (about 100,000 or 500,000 workers, respectively) and a reduction in the number of people (300,000 or 900,000, respectively) below the poverty threshold (CBO, 2014). Studies of a recent

minimum wage increase in Seattle found that in the food service industry, average weekly wages increased and there was no significant impact on employment (Reich, Allegretto, & Godoey, 2017). When looking at the city as a whole, however, there was a reduction of employment and hours worked in other low-wage jobs after the second phase of the minimum wage increase was implemented, when the minimum wage was increased from $11 to $13 (Jardim et al., 2017).

An increase in the minimum wage would likely help increase women's earnings relative to men's, but would need to be carefully measured to balance the gains in income with the potential loss of employment or hours worked.

Increase the proportion of women who work full-time.

The number of hours worked by individuals influences the size of the gender wage gap. In 2016, among individuals ages 16-64 who worked in the last 12 months in Wyoming, 86.0% of men usually worked 35 or more hours per week, compared to 69.2% of women (see Table 1.2). Of the men who worked in the past 12 months, 61.5% worked full-time, year-round, compared to 43.8% of women. Men worked an average of 44.0 hours per week in 2016, compared to 36.0 hours per week for women.

Research shows that the difference between men's and women's earnings is greater when men hold higher paying jobs, where more children reside, and where more women work in part-time positions (Alexander et al., 2003). As a result of decisions based on family formation and child care, women might cut their hours to work in part-time positions rather than full-time jobs.

Women might cut hours after starting a family for different reasons, including the cost of childcare, little or no job flexibility, or the desire to spend time with their children (Schank & Wallace, 2016). After starting a family, more women cut hours or take time away from work than men. In 2013, a PEW Research Center survey found that 34% of women cut their hours to care for children compared to 23% of men, and 33% of women took a significant amount of time off from work to care for family compared to 21% of men. Additionally, 22% of women have quit their

Table 1.2: **Working Status of Individuals Ages 16-64 in Wyoming, 2016**

	Men		Women		Total	
	N	%	N	%	N	%
Population Ages 16-64	195,740	100.0	182,751	100.0	378,491	100.0
Worked in Past 12 Months	170,477	87.1	143,393	78.5	313,870	82.9
Usually Worked 35 or More Hours Per Week	146,575	86.0	99,286	69.2	245,861	78.3
Usually Worked Fewer than 35 Hours Per Week	23,902	14.0	44,107	30.8	68,009	21.7
Did Not Work in Past 12 Months	25,263	12.9	39,358	21.5	64,621	17.1
Worked Full-Time, Year-Round	120,389	61.5	80,088	43.8	200,477	53.0
Mean Usual Hours Worked Per Week	44.0		36.0		40.3	
Median Age of Workers	39.2		39.7		39.4	

Source: U.S. Census Bureau, 2016 American Community Survey 5-Year Estimates.
Prepared by M. Moore, Research & Planning, WY DWS, 8/30/18.

jobs to care for family, compared to 9% of men (Pew Research Center, 2013).

Correll, Benard, and Paik (2007) and Kricheli-Katz (2012) suggested that taking time away from work to care for family results in what is known as the *motherhood penalty*. Employers are less likely to hire women with children and make lower salary offers when they do hire mothers. In other words, the motherhood penalty is not only the wages a woman loses due to time away from work, it is also increased difficulty finding a job or getting a promotion. Additionally, Killewald (2013) suggested that men tend to receive a *fatherhood bonus* and earn higher wages after they have children. Killewald noted that a father may earn higher wages because his status as a provider causes him to change his work behavior or because employers perceive him as being more committed to his job.

Increasing the proportion of women who work full-time instead of part-time has been a suggested solution to the gender wage gap. In 2003, between $112,199,736 and $160,819,622 would have been put back into the economy if half of the women who worked part-time moved into full-time positions. Respondents of a 2003 survey discussed subsidized childcare as a way of confronting the wage gap, allowing for women to work more hours in the workforce rather than in the home (Alexander et al., 2003). However, in 2012 another survey found that 47% of mothers with children under age 18 would prefer to work part-time over full-time or not at all (Wang, 2013).

Since 1965, the roles of mothers and fathers have shifted. Fathers used to spend the majority of their time doing paid work while in 2011, the time spent on paid work decreased and the time spent on childcare and housework increased. Inversely, in 1965 mothers spent most of their time on childcare and housework and few hours on paid work. In 2011, mothers spent about 60% of their time on childcare and housework and 40% on paid work (Parker & Wang, 2013). In recent years, the percentage of women participating in the workforce has decreased while the percentage of individuals working part time for noneconomic reasons[2] has increased. This suggests that men increasingly choose to work in part-time positions to balance other aspects of their life (Lim, 2015), which possibly provides more opportunity for women to work more outside the home and earn higher wages.

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Chapter 2

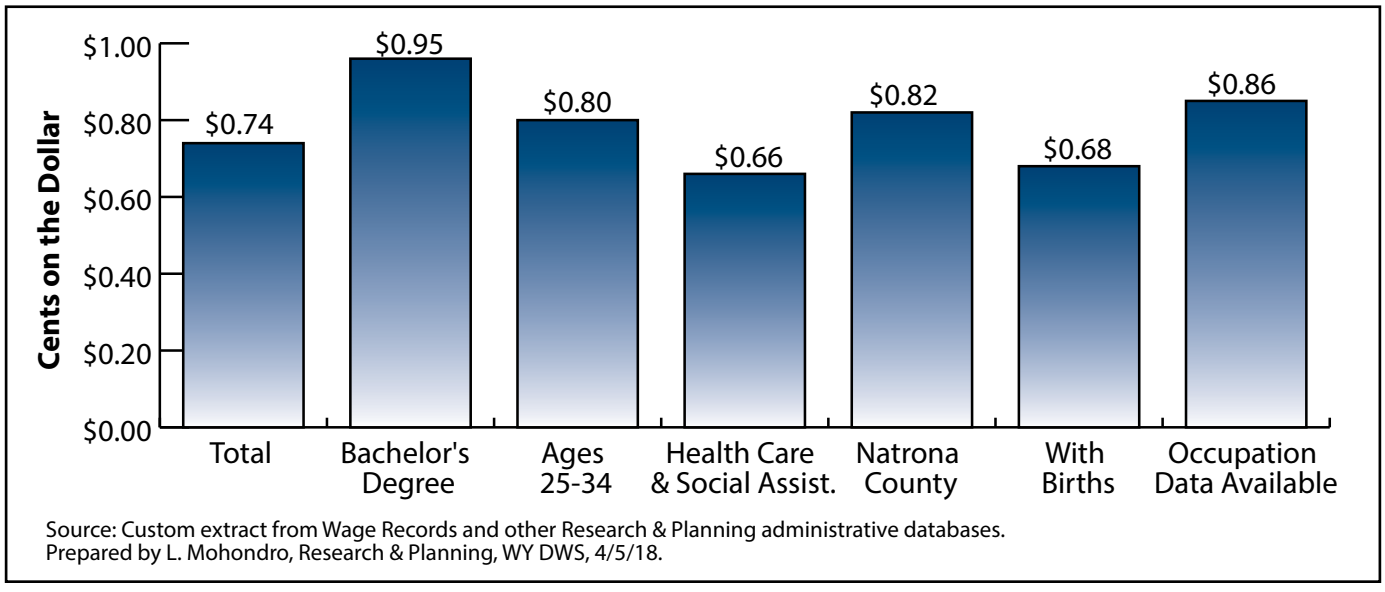
Factors that Influence the Gender Wage Gap

by: Elyse Gagné, Office Support Specialist, and Lynae Mohondro, Senior Research Analyst

Overall, women in Wyoming earned $0.74 on the dollar compared to men in 2016.

The Research & Planning (R&P) section of the Wyoming Department of Workforce Services collects wage records based on employers' quarterly wage and employment reports to the Unemployment Insurance (UI) tax section of the Wyoming Department of Workforce Services. Using these data, R&P calculated the gender wage gap using hourly wages for persons working in Wyoming at any time in 2016. For this chapter, R&P considered only individuals with at least two consecutive quarters of employment. This allowed R&P to eliminate low wages of non-continuous workers who may have changed employers in the middle of a quarter. These criteria resulted in 86,162 men and 80,198 women available for this analysis.

Figure 2.1 serves as an introduction to how some of the variables and life situations



Source: Custom extract from Wage Records and other Research & Planning administrative databases.
Prepared by L. Mohondro, Research & Planning, WY DWS, 4/5/18.

Figure 2.1: **Cents Women Earn on a Man's Dollar For Selected Characteristics, 2016**

discussed in this publication affect the gender wage gap. As discussed throughout this publication, Wyoming's gender wage gap varies depending on the cross-section of the workforce observed, the data source used, and the limitations placed upon the data. The wage gap narrows or widens when considering different factors, such as education, tenure, having children, or growing older. Overall, women earned $0.74 on the dollar earned by men in 2016. However, when comparing only individuals with bachelor's degrees, women earned $0.95 on the dollar. In Chapter 3 of this publication, Knapp limited her research to only individuals for whom occupational data were available, and found that women earned $0.86 on the dollar (see page 32).

This chapter discusses how several of those factors can influence the gender wage gap. The tables and figures in this chapter present this information in terms of the cents earned by women for each dollar earned by men. The actual wages used to calculate these numbers are available at http://doe.state.wy.us/LMI/WYWageGap2018.htm.

The data presented in the graphics in this chapter were taken from Appendix Table 2.1 online.

Table 2.1: **Average Hourly Wage for Persons Working in Wyoming by Gender and County of Employment, 2016**

County	Women	Men	Cents on the Dollar (W/M)
Total	**$20.89**	**$28.10**	**$0.74**
Albany	$20.26	$25.53	$0.79
Big Horn	$19.24	$25.26	$0.76
Campbell	$20.33	$31.02	$0.66
Carbon	$19.33	$27.32	$0.71
Converse	$19.22	$28.49	$0.67
Crook	$20.35	$26.39	$0.77
Fremont	$19.63	$25.16	$0.78
Goshen	$20.86	$23.30	$0.90
Hot Springs	$19.45	$25.20	$0.77
Johnson	$18.15	$23.87	$0.76
Laramie	$20.90	$26.05	$0.80
Lincoln	$18.29	$30.23	$0.61
Natrona	$23.46	$28.63	$0.82
Niobrara	$20.90	$21.13	$0.99
Park	$20.24	$25.95	$0.78
Platte	$21.21	$30.08	$0.71
Sheridan	$19.48	$23.93	$0.81
Sublette	$21.23	$33.97	$0.62
Sweetwater	$20.56	$34.61	$0.59
Teton	$24.82	$26.63	$0.93
Uinta	$18.18	$27.41	$0.66
Washakie	$19.80	$26.49	$0.75
Weston	$17.40	$25.79	$0.67

Source: Custom extract from Wage Records and other Research & Planning databases.

Prepared by E. Gagne, Research & Planning, WY DWS, 8/13/18.

County of Employment

Wyoming's gender wage gap varies by county of employment. Table 2.1 shows the average hourly wage for persons working in Wyoming by county of employment. In Wyoming's two most populated counties, Laramie and Natrona, women were paid $0.80 and $0.82 on the dollar, respectively. Counties in which mining made up a substantial proportion of all jobs had some of the largest wage gaps, including Sweetwater ($0.59 on the dollar), Sublette ($0.62), and Campbell ($0.66) counties. Teton County had the narrowest gender wage gap, where women were paid $0.93 per men's dollar. Conversely, the widest gap was found in Lincoln County, where women were paid $0.61 per each dollar paid to men.

Industry of Employment

At the industry level (see Table 2.2, page 18), the widest gaps were found in financial

activities ($0.65) and health care & social assistance ($0.66). In health care & social assistance, the wage gap is due in large part to the large number of women working in relatively lower paying jobs, such as nursing assistants. The wage gap was narrowest in leisure & hospitality ($0.88 on the dollar), which had the lowest average hourly wages among all industries, and educational services ($0.88), which had a large percentage of jobs requiring a bachelor's degree or higher.

Figures 2.2 and 2.3 (see page 20) illustrate how large numbers of men or women working in a particular industry can influence the overall wage gap. As shown in Figure 2.2, the industries that employed the largest number of men in 2016 also had some of the highest wages. Mining, for example, had the highest hourly wage for men in 2016 ($37.74) and employed the second largest number of men (10,912, or 12.7%).

In contrast, as shown in Figure 2.3, mining also had the highest hourly wage for women ($31.06) but employed only 1,401 women, or 1.7% of all women working in Wyoming in 2016. Nearly one in four women working in Wyoming in 2016 worked in health care & social assistance (22.2%, or 18,000), with an average hourly wage of $22.24.

Age

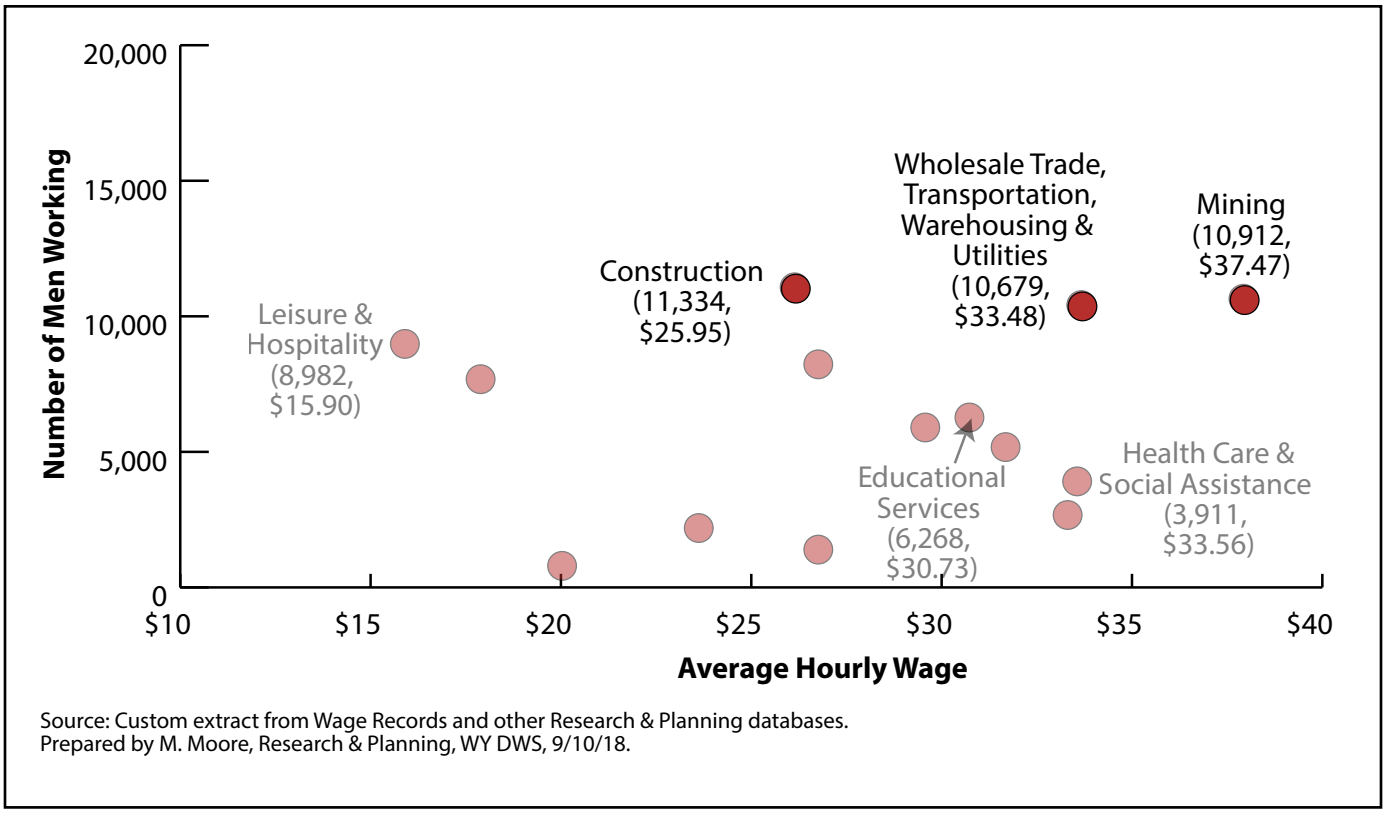
Younger individuals tend to earn lower wages when they enter the workforce,

(Text continued on page 21)

Table 2.2: **Total Number of Persons Working and Average Hourly Wage for Persons Working in Wyoming by Gender and Industry, 2016**

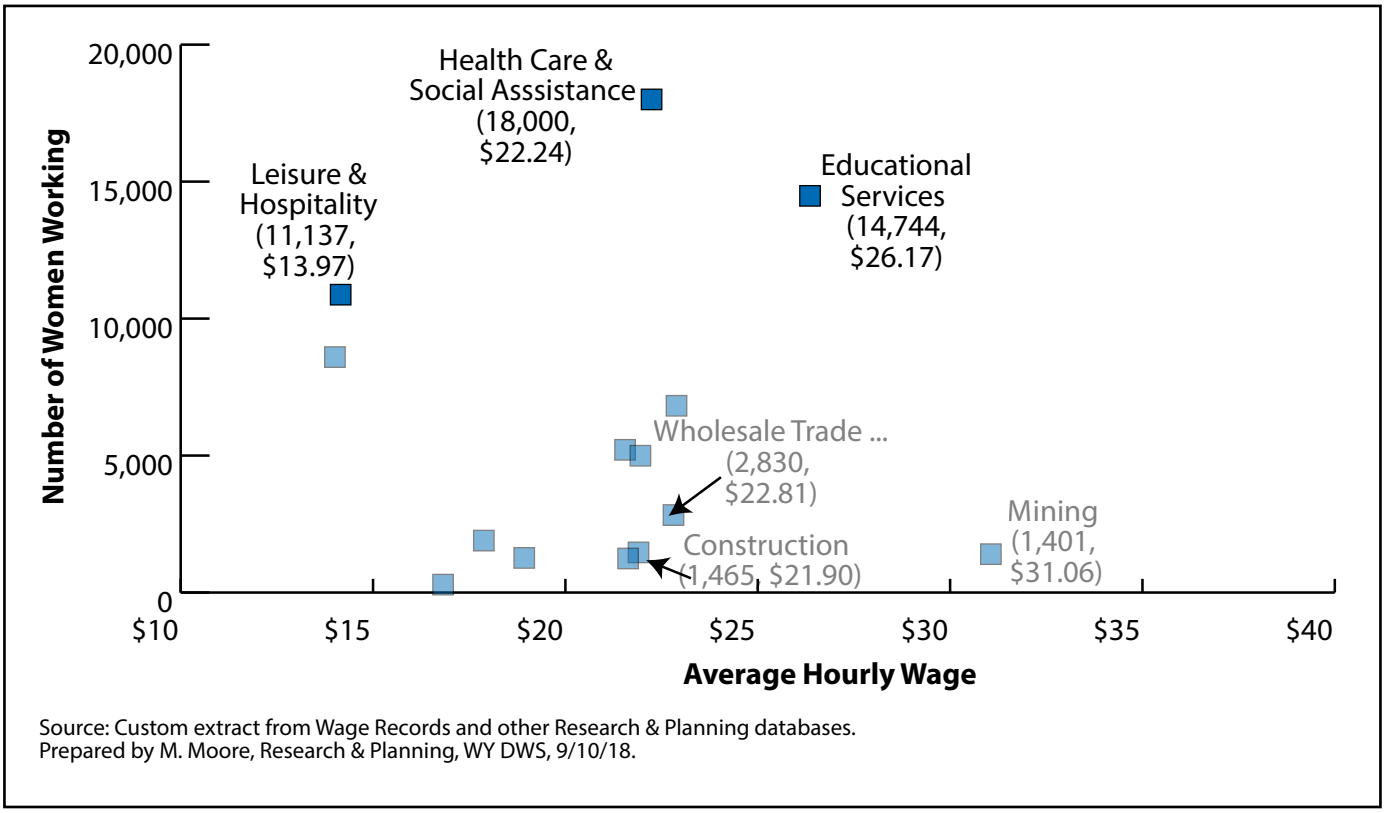
NAICS[a] Code	Industry	Number of Persons Working			Average Hourly Wage		
		Women	Men	Total	Women	Men	Difference
0	**Total, All Industries**	**80,198**	**86,162**	**166,360**	**$20.89**	**$28.10**	**$0.74**
11	Agriculture, Forestry, Fishing, & Hunting	289	2,795	3,084	$16.82	$20.03	$0.84
21	Mining	1,401	10,912	12,313	$31.06	$37.74	$0.82
23	Construction	1,465	11,334	12,799	$21.90	$25.95	$0.84
31-33	Manufacturing	1,243	5,176	6,419	$21.63	$31.68	$0.68
42, 48-49, 22	Wholesale Trade, Trans., Warehousing, & Utilities	2,830	10,679	13,509	$22.81	$33.48	$0.68
44-45	Retail Trade	8,596	7,680	16,276	$14.01	$17.89	$0.78
51	Information	1,263	1,394	2,657	$18.93	$26.76	$0.71
52-53	Financial Activities	5,210	2,670	7,880	$21.55	$33.31	$0.65
54-56	Professional & Business Services	4,994	5,899	10,893	$21.95	$29.57	$0.74
61	Educational Services	14,744	6,268	21,012	$26.17	$30.73	$0.85
62	Health Care & Social Assistance	18,000	3,911	21,911	$22.24	$33.56	$0.66
71-72	Leisure & Hospitality	11,137	8,982	20,119	$13.97	$15.90	$0.88
81	Other Services	1,896	2,190	4,086	$17.88	$23.62	$0.76
92	Public Administration	7,082	8,229	15,311	$22.70	$26.76	$0.85
	Unclassified	48	43	91	$16.46	$27.76	$0.59

[a]North American Industry Classification System.
Prepared by E. Gagne, Research & Planning, WY DWS, 8/13/18.
Source: Custom extract from Wage Records and other Research & Planning administrative databases.



Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by M. Moore, Research & Planning, WY DWS, 9/10/18.

Figure 2.2: **Total Number of Men Working in Wyoming by Industry and Average Hourly Wage, 2016**



Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by M. Moore, Research & Planning, WY DWS, 9/10/18.

Figure 2.3: **Total Number of Women Working in Wyoming by Industry and Average Hourly Wage, 2016**

(Text continued from page 19)

regardless of gender. As shown in Table 2.3, the gender wage gap in Wyoming in 2016 widened with age. Women in the youngest age group (0-19) earned the most relative to men, $0.96 on the dollar. The wage women earned relative to men continued to decrease with age, and women nearing or at retiring age (55 and older) earned $0.70 on the dollar. Compared to older age groups, younger women may earn more relative to men due to the lower wages earned when teenagers begin working, or when young adults obtain employment upon leaving school.

The motherhood penalty discussed in this publication may also contribute to the increasing wage gap with increasing age. In 2016, the wage gap widened to $0.80 on the dollar for women ages 25-34, the ages when the greatest number of women have their first child (Martin, et al., 2018).

Table 2.3: **Average Hourly Wage for Persons Working in Wyoming by Gender and Age, 2016**

Age	Women	Men	Cents on the Dollar (W/M)
Total	**$20.89**	**$28.10**	**$0.74**
0-19	$10.15	$10.55	$0.96
20-24	$13.91	$16.20	$0.86
25-34	$19.52	$24.28	$0.80
35-44	$22.77	$31.08	$0.73
45-54	$23.88	$32.85	$0.73
55-64	$23.63	$33.42	$0.71
65+	$20.29	$28.63	$0.71

Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by E. Gagne, Research & Planning, WY DWS, 9/4/18.

Education

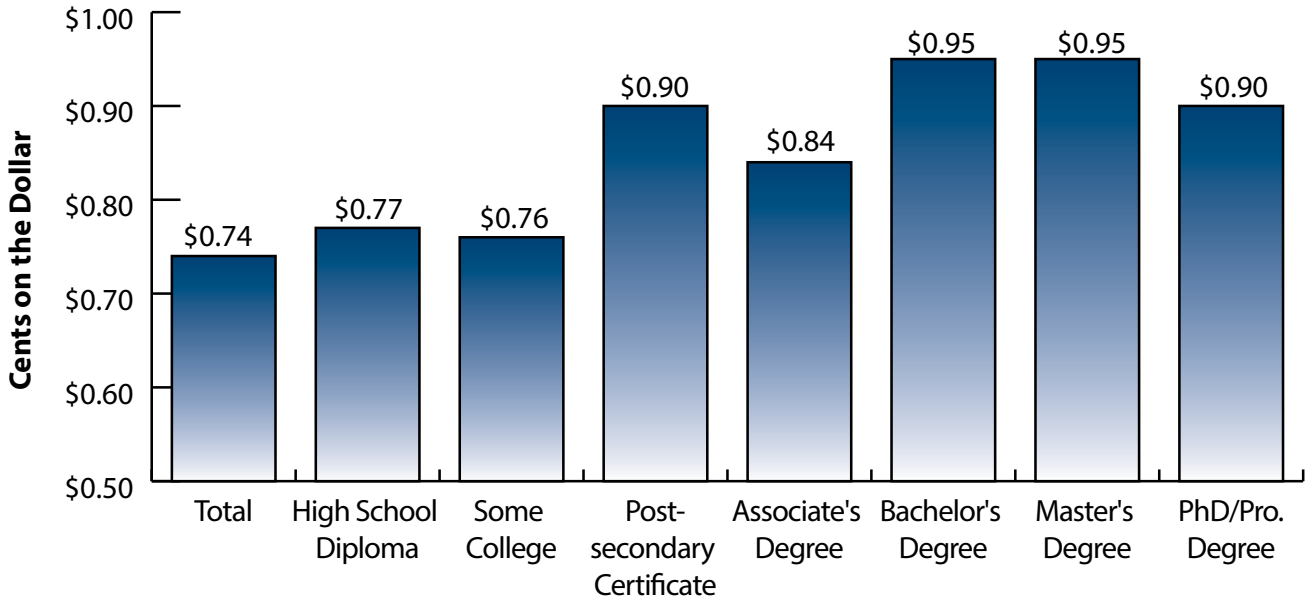
In 2016, women with a bachelor's degree outnumbered men with a bachelor's degree in the United States by more than two million individuals (NCES, 2016). Even though increased educational attainment leads to higher wages and more women obtain a postsecondary degree than men, the gender wage gap persists.

Data from R&P on educational attainment include degrees earned from Wyoming community colleges and University of Wyoming only. Thus, if an individual working in Wyoming earned a bachelor's degree in Colorado, the record will not show that person as having obtained a bachelor's degree. In general, the wage gap was narrower between women and men with degrees beyond high school than for individuals with a high school diploma. As shown in Figure 2.4 (see page 22), for individuals with a high school diploma, women earned $0.77 on the dollar. Among individuals with a postsecondary certificate and those with a doctorate or professional degree, women earned $0.90 on the dollar. For those with a bachelor's degree or master's degree, women earned $0.95 on the dollar. Among those with an associate's degree, women earned $0.84 on the dollar.

Educational attainment doesn't prevent the trend of the gender wage gap widening with age. As shown in Table 2.4 (see page 22), women with an associate's degree ages 20-24 earned $0.90 on the dollar compared to men, which then decreased to $0.83 on the dollar for those ages 25-34 and $0.81 on the dollar for those ages 35-44. Similarly, among individuals with a bachelor's degree, women ages 20-24 earned $1.10 for every $1 earned by men, which then fell to $0.94 on the dollar for those ages 25-34 and $0.97 on the dollar for those ages 35-44. These trends are similar to those presented in Table 2.3.

In one recent study, the first piece of advice for women to attain the same earnings as men was for women to earn an additional degree (Carnevale, Smith, & Gulish, 2018). This was true in Wyoming, where overall in 2016, women with an associate's degree earned $1.26 for every dollar earned by men with a high school diploma, and women with a bachelor's degree earned $1.01 for every dollar earned by men with an associate's degree (see Figure 2.5, page 23). Even with one more degree than men, women still earned less in some industries, such as manufacturing and wholesale trade, transportation, utilities, & warehousing.

Women's earnings in an industry are also affected by their educational attainment. Figure 2.6 (see page 24) shows the gender wage gap for persons with a high school diploma and persons with a bachelor's degree by industry. In many industries, the wage gap narrows for individuals with a bachelor's degree; this narrowing of the wage gap is especially prevalent in manufacturing, other services, construction, and public administration.



Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by M. Moore, Research & Planning, WY DWS, 9/24/18.

Figure 2.4: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming by Level of Education, 2016**

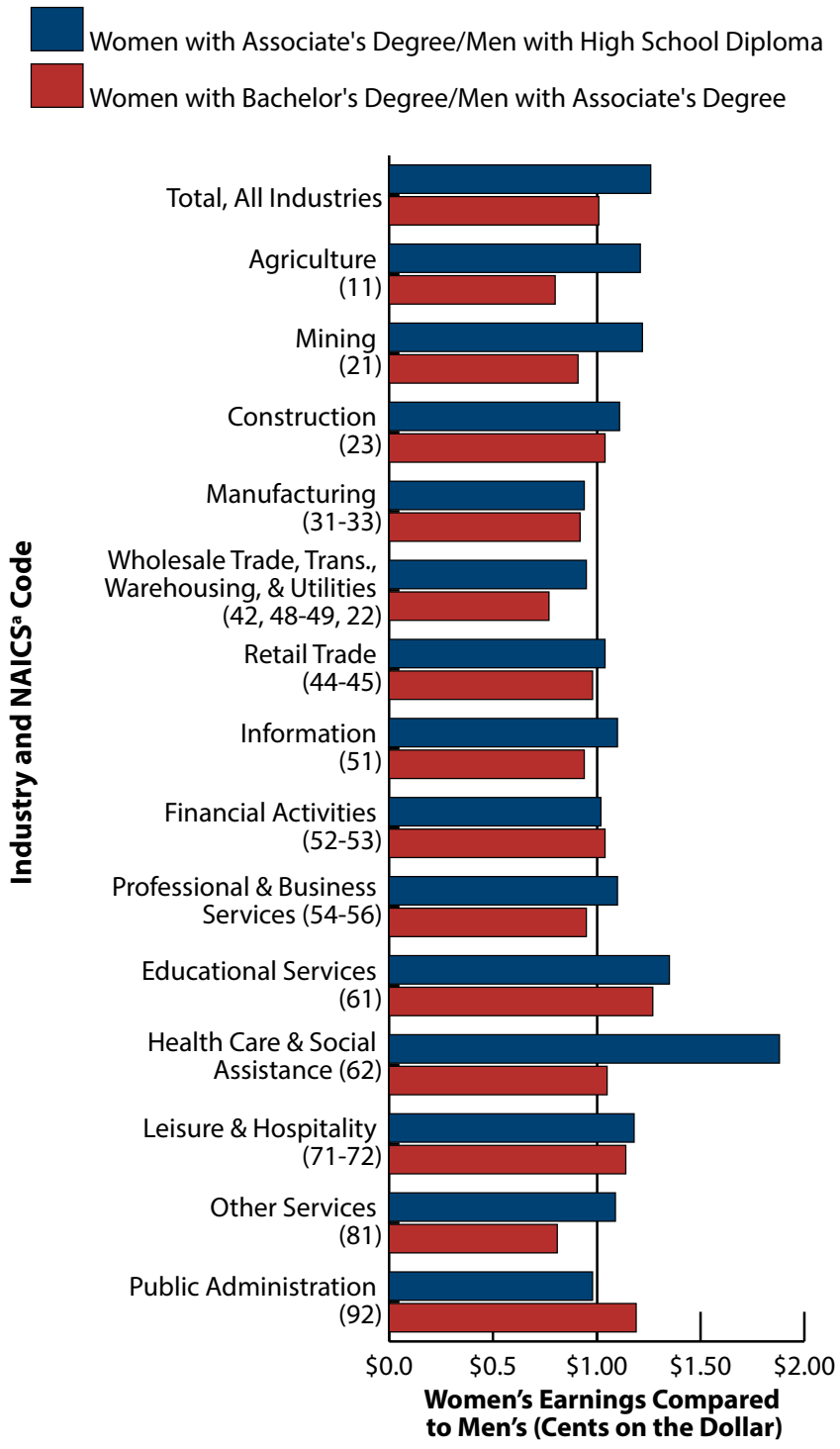
Table 2.4: **Average Hourly Wage for Persons Working in Wyoming by Gender, Age, and Selected Education, 2016**

	Associate's Degree			Bachelor's Degree		
Age	Women	Men	Cents on the Dollar (W/M)	Women	Men	Cents on the Dollar (W/M)
Total	**$20.36**	**$24.10**	**$0.84**	**$24.38**	**$25.58**	**$0.95**
20-24	$15.77	$17.50	$0.90	$19.58	$17.84	$1.10
25-34	$20.60	$24.75	$0.83	$24.55	$26.14	$0.94
35-44	$22.72	$28.00	$0.81	$27.45	$28.22	$0.97

Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by E. Gagne, Research & Planning, WY DWS, 9/4/18.

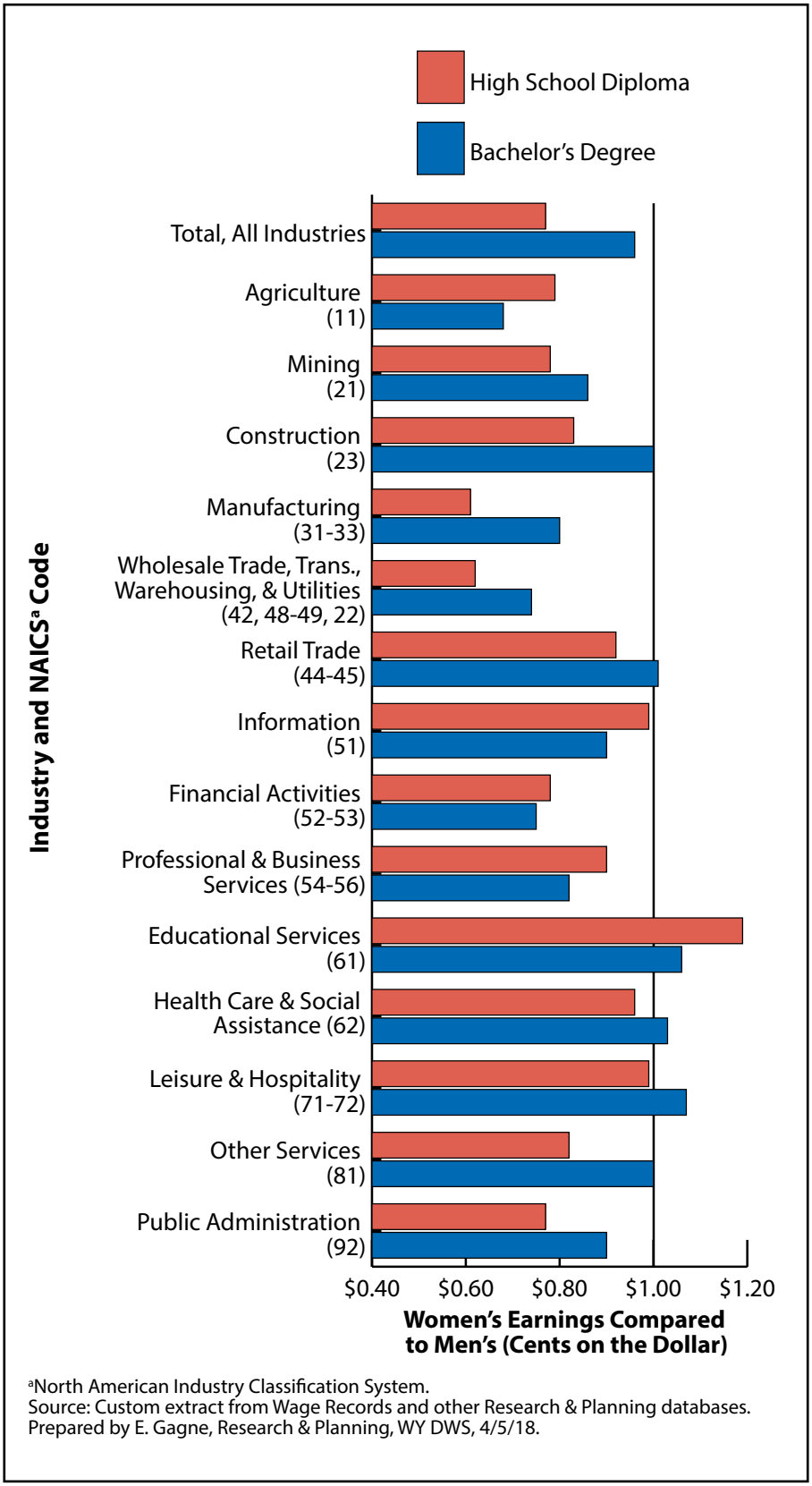
In other industries, increased educational attainment did not correspond with a reduced gender wage gap. In the financial activities industry, for example, educational attainment had little impact on the wage gap until women reached an educational level beyond a bachelor's degree. This may be a result of the occupational mix in the financial activities industry, as women with a bachelor's degree or less may be concentrated in lower paying clerical occupations while women with an advanced degree may be more likely to hold higher paying managerial positions.

Analysis of the wage gap by occupation in the financial activities industry was not performed because occupation data are not collected as a part of unemployment insurance wage records. R&P's occupation data are limited to information obtained from the Wyoming Department of Education, the Wyoming State Auditor's Office, state licensing boards, and the New Hires Job Skills Survey. Collecting data on occupations and hours worked with wage records would allow R&P to perform a more thorough



[a]North American Industry Classification System.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by E. Gagne, Research & Planning, WY DWS, 4/5/18.

Figure 2.5: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming for Women with an Additional Degree by Industry and NAICS[a] Code, 2016**



[a]North American Industry Classification System.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by E. Gagne, Research & Planning, WY DWS, 4/5/18.

Figure 2.6: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming by Selected Education Level and Industry of Employment, 2016**

study of the state's gender wage gap, and would provide the public with a greater understanding of the differences in pay and occupation for men and women in Wyoming.

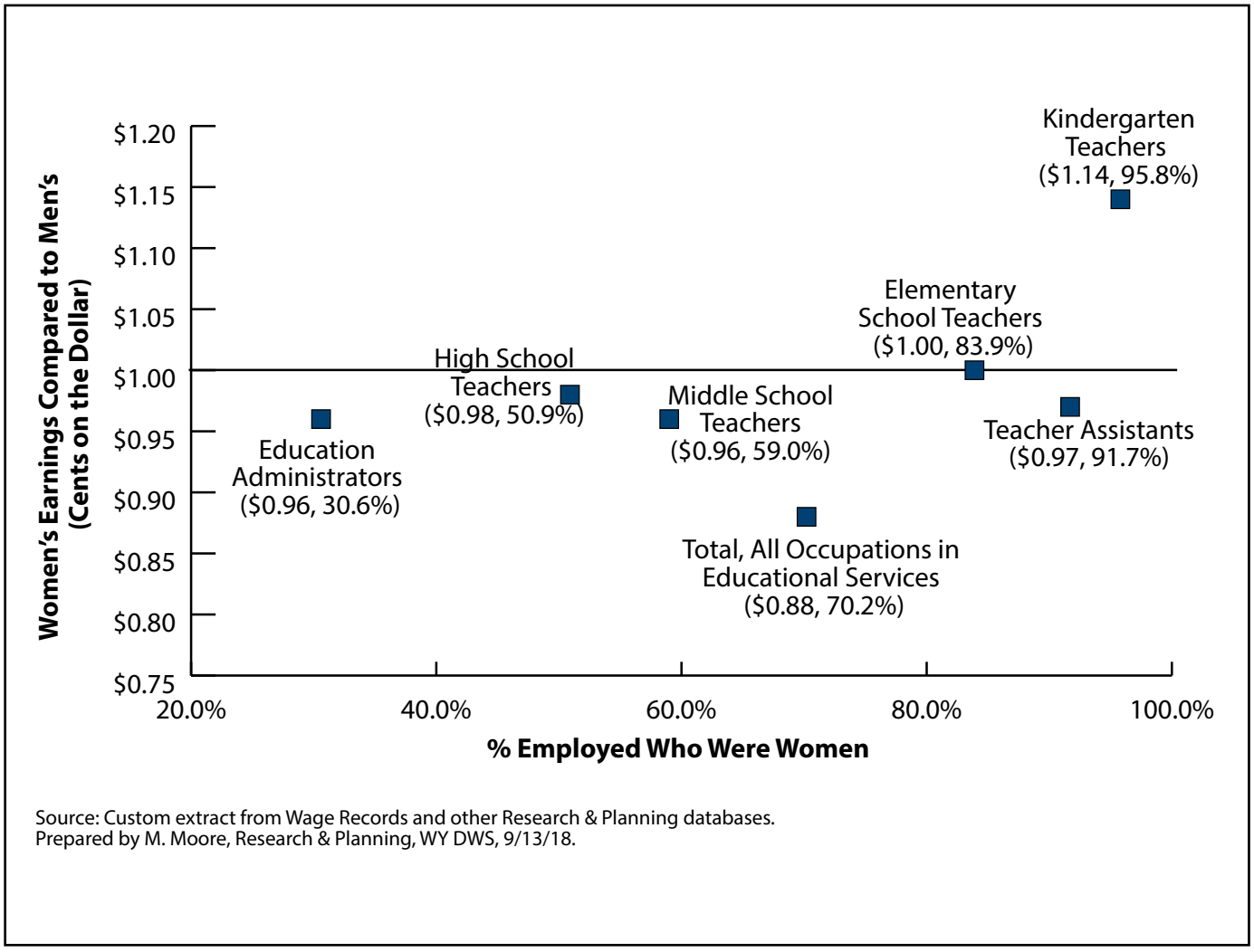
Occupation

Examining the gender wage gap by industry can highlight potential areas of concern, but may not tell the whole story. Choice of occupation is often cited as one of the primary factors contributing to the gender wage gap. Education-related occupations were chosen as an example for this chapter because R&P has access to occupational data for public schools through a memorandum of understanding with the Wyoming Department of Education.

These occupational data allow R&P to examine wage disparity by occupation within the educational services industry. The wage gap was narrower for many occupations in this industry. Among teachers, the wage disparity varied from women earning $0.96 on a man's dollar for middle school teachers to $1.14 on a man's dollar for kindergarten teachers (see Figure 2.7). In

other educational services occupations, women earn $0.96 on a man's dollar as administrators and $0.97 on a man's dollar as teacher assistants.

Although the wage gap within education-related occupations is small and sometimes even in women's favor, women earned only $0.88 for every dollar earned by men in the educational services industry as a whole. The proportion of men and women in each of these occupations helps to explain the overall wage gap for the industry. The highest paid of the occupations examined was education administrators, with a median annual wage of $97,071 as of September 2016, according to data collected as part of the Occupational Employment Statistics (OES) survey. As shown in Figure 2.7, just 31% of education administrators in 2016 were women. The occupation with the greatest employment, teacher assistants, was made up of nearly 92% women and was also the lowest paid of the occupations examined, with a median annual wage of $28,812. The large number of women working as teacher assistants depressed the overall average wage for women in the educational services industry.



Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by M. Moore, Research & Planning, WY DWS, 9/13/18.

Figure 2.7: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) and Percent of Individuals Who Were Women in Selected Occupations in Educational Services in Wyoming, 2016**

Births

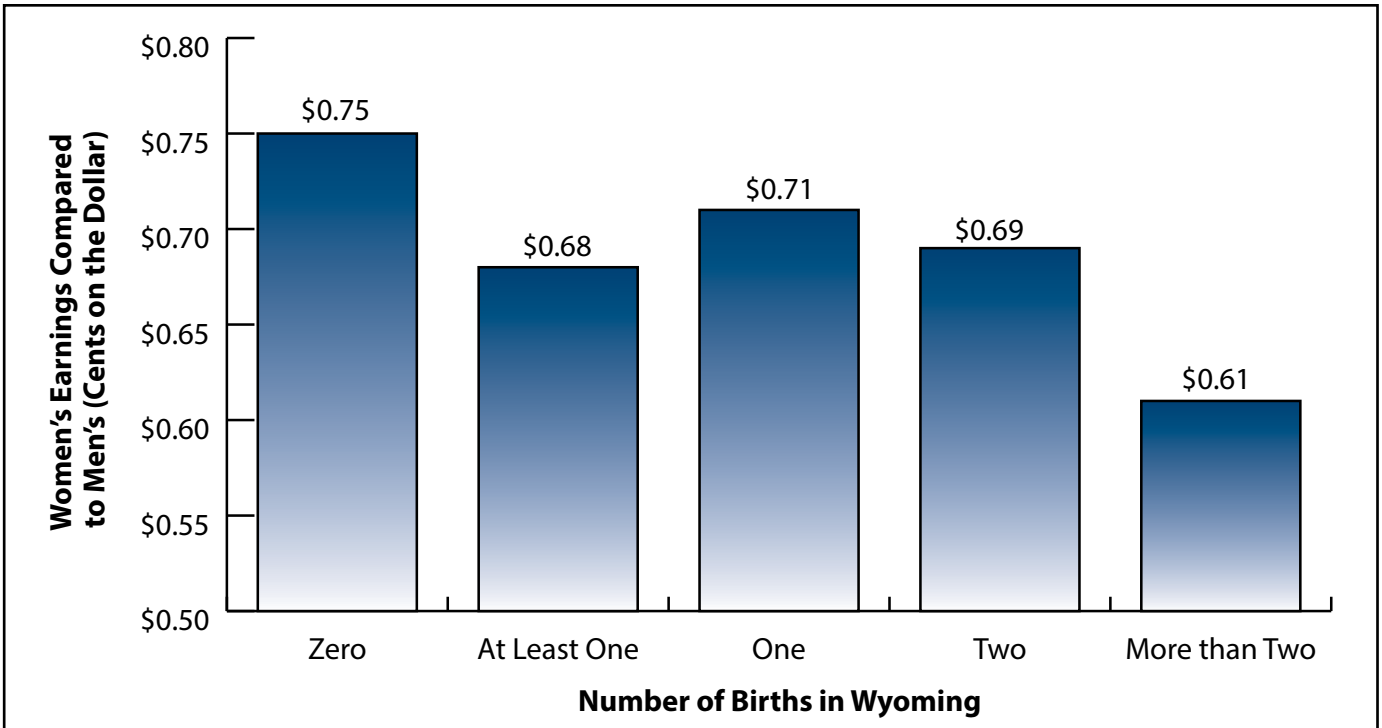
As mentioned earlier, the motherhood penalty affects the wages women earn relative to men. After having a child, women's wages tend to decrease while men's tend to increase. Using data from vital statistics, R&P can see if an individual has had a baby in Wyoming. However, the data are not representative of the correct number of children an individual has if that person had children outside of Wyoming.

As shown in Figure 2.8, women with zero births in Wyoming earned $0.75 on the dollar compared to men with zero births in Wyoming. By comparison, women who had at least one birth earned $0.68 on the dollar compared to men with at least one birth. The wage gap widened with the number of births a person had: $0.71 for women with one birth, $0.69 for two births, and $0.61 for more than two births.

Mining and Economic Downturns

In addition to different life situations, Wyoming's reliance on the oil & gas industry and the associated economic changes also impact the gender wage gap. Wyoming draws many workers into the state with the high wages that can be earned in the energy industry. During periods of economic downturn[1], however, many of those high paying jobs in mining

1 An economic downturn is defined as an over-the-year decrease in average monthly employment (jobs worked) and total wages for at least two consecutive quarters.



Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by M. Moore, Research & Planning, WY DWS, 8/15/18.

Figure 2.8: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) by Number of Births in Wyoming through 2017**

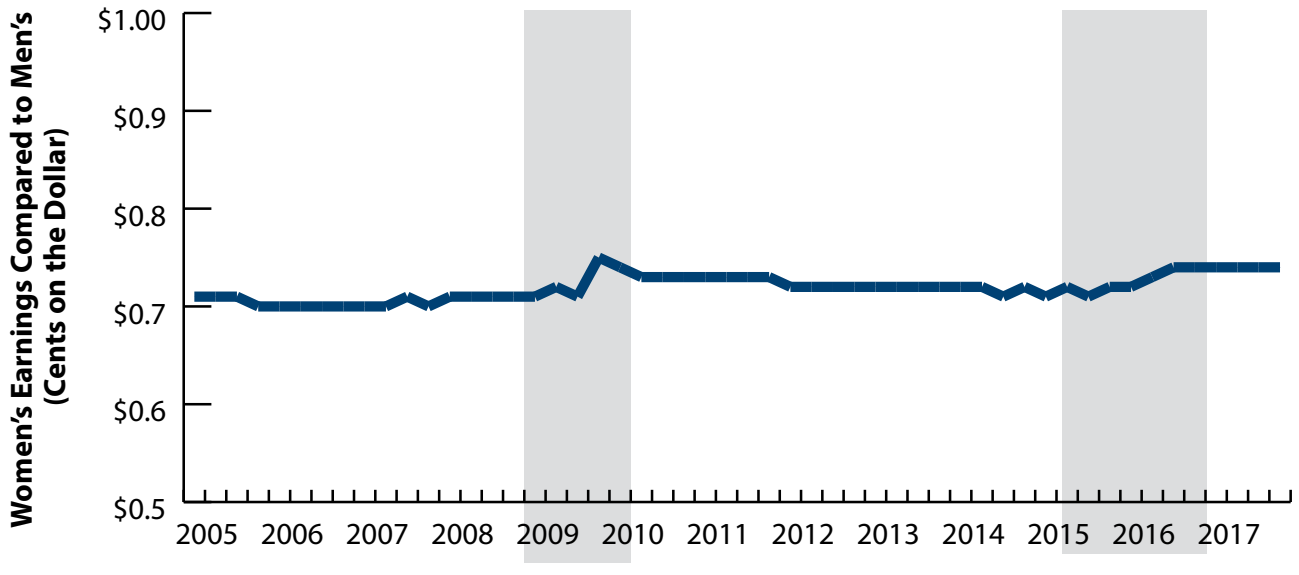
are lost. As a result, men tend to lose high paying jobs during periods of economic downturn, and the wage gap narrows.

Figure 2.9 shows the cents on a man's dollar that women earned from first quarter 2005 (2005Q1) to fourth quarter 2017 (2017Q4). During the two most recent downturns, 2009Q1-2010Q1 and 2015Q2-2016Q4 (Moore, 2018), the cents on a man's dollar that women earned rose slightly. In 2009Q4, women earned about $0.75 on the dollar, a jump from about $0.71 in the prior quarter. During the most recent downturn, Wyoming's labor force decreased and the unemployment rate remained relatively low, suggesting that many workers left the state. Due to the in- and out-migration of primarily male workers bound for the energy industry, the economic expansion and contraction caused by the fluctuating energy market can impact the gender wage gap.

Quarters Worked

Figure 2.10 (see page 28) shows the wages women made compared to men between 2005Q1 and 2017Q2 for individuals who appeared in Wyoming wage records for at least 20 quarters (five years) and individuals who appeared for fewer than nine quarters (two years). These groups were selected to capture individuals with a continuity of attachment to Wyoming's labor force, compared to individuals that may have been transient workers with the ebbs and flows of the energy industry.

During the downturn from 2009Q1 to 2010Q1, the wages women earned compared to men peaked, and women who worked in Wyoming for at least five years earned about $0.06 on a man's dollar more than women who worked in the state two years or less. However, during the most recent downturn, from 2015Q2-2016Q4, women who worked



Shaded areas indicate periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-2016Q4.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by L. Mohondro, Research & Planning, WY DWS, 4/5/18.

Figure 2.9: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming, 2005Q1-2017Q4**

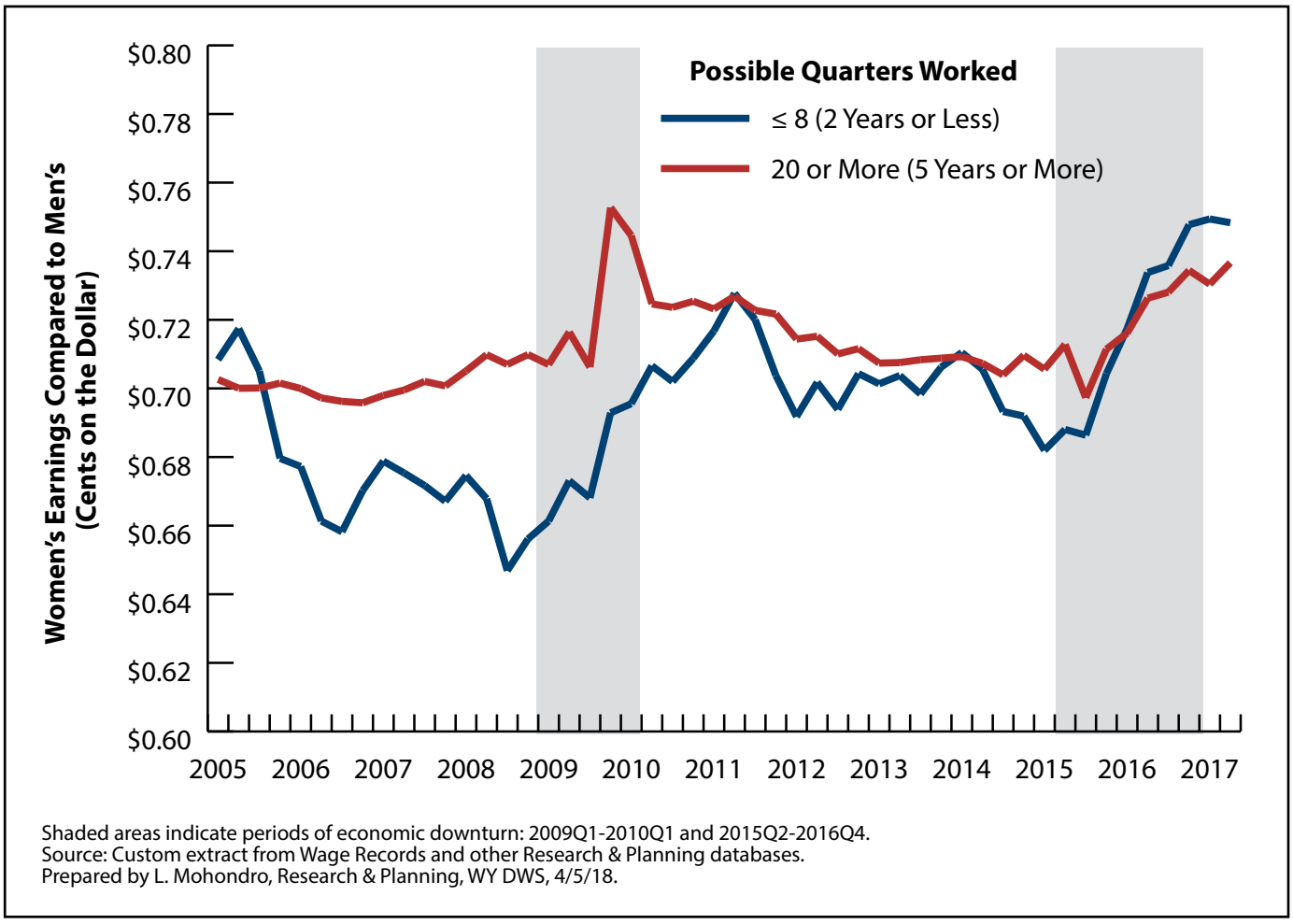
in Wyoming two years or less earned slightly more compared to men than women who worked in Wyoming for at least five years.

Women working for two years or less experienced more fluctuations in their wages compared to men's wages than women who worked in Wyoming longer.

Employer Tenure

Figure 2.11 (see page 29) shows the effect that employer tenure has on the gender wage gap. In 2009Q4, women who worked continuously for the same employer for five or more years earned over $0.78 on the dollar. During the most recent downturn (2015Q2-2016Q4) women who worked continuously for the same employer in Wyoming for two years or less earned more relative to men than women who worked for the same employer in Wyoming for five years or more.

As seen in Figure 2.12 (see page 30), men who worked for the same employer in Wyoming for at least five years experienced the greatest decrease in wages during the most recent downturn, followed by men who worked for the same employer for two years or less. Women's wages remained relatively steady during the most recent economic downturn.



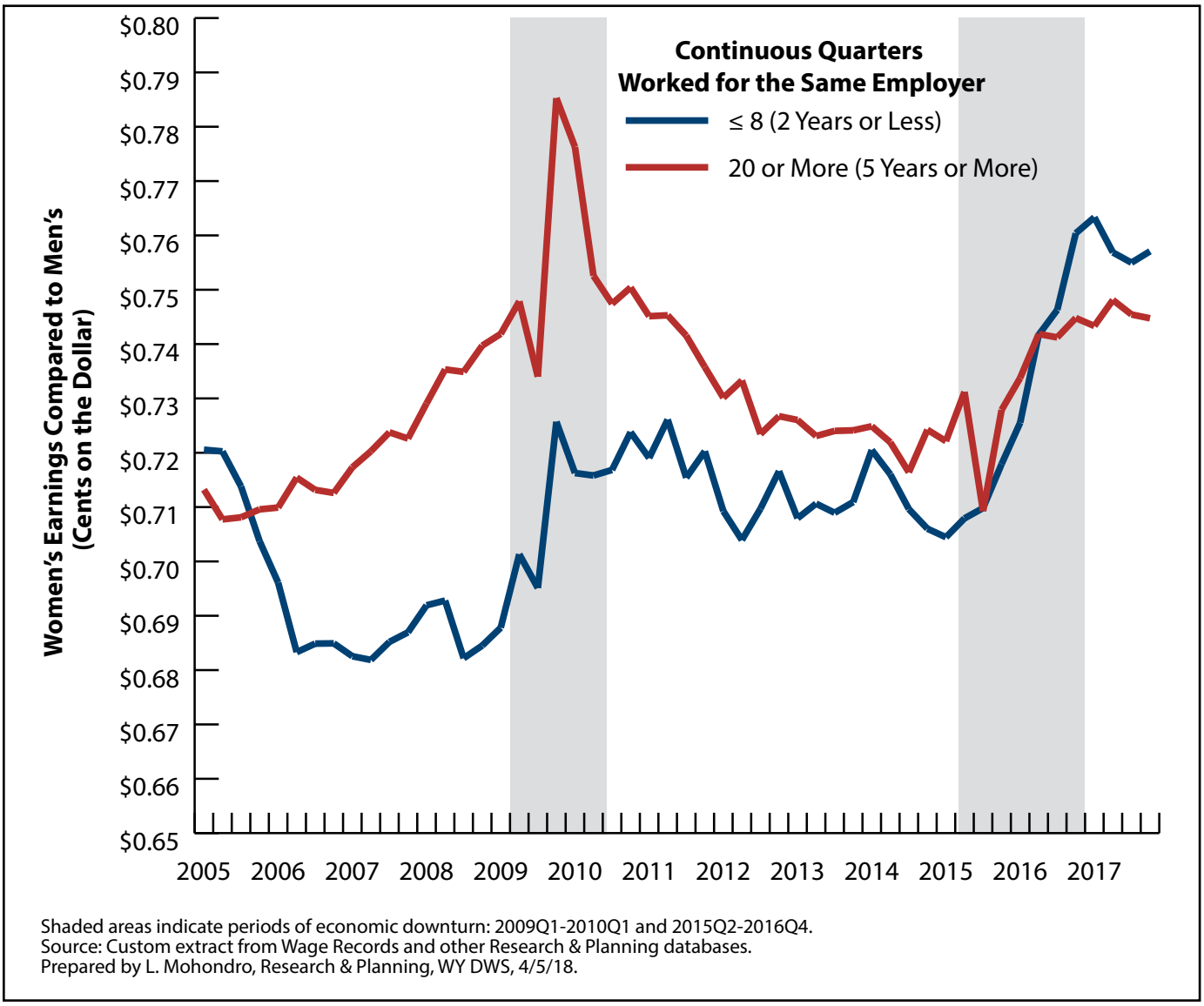
Shaded areas indicate periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-2016Q4.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by L. Mohondro, Research & Planning, WY DWS, 4/5/18.

Figure 2.10: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming by Possible Quarters Worked, 2005Q1-2017Q4**

Firm Size

Women who worked for firms with 50 or more employees tended to earn more relative to men than women who worked for firms with fewer than 50 employees. Figure 2.13 (see page 31) shows the impact that employer size can have on the gender wage gap. The disparity was greatest in 2009Q4 when women working for firms with 50 or more employees earned almost $0.78 on a man's dollar, while women working for firms with fewer than 50 employees earned about $0.68 on a man's dollar.

As seen in Figure 2.13, there was a large increase in the cents women earned on a man's dollar from 2009Q3 to 2009Q4 for women working for firms with 50 or more employees. This change was mainly due to an increase in women's average hourly wage in the educational services industry. In 2016, women working for firms with 50 or more employees earned about $0.74 on a man's



Shaded areas indicate periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-2016Q4.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by L. Mohondro, Research & Planning, WY DWS, 4/5/18.

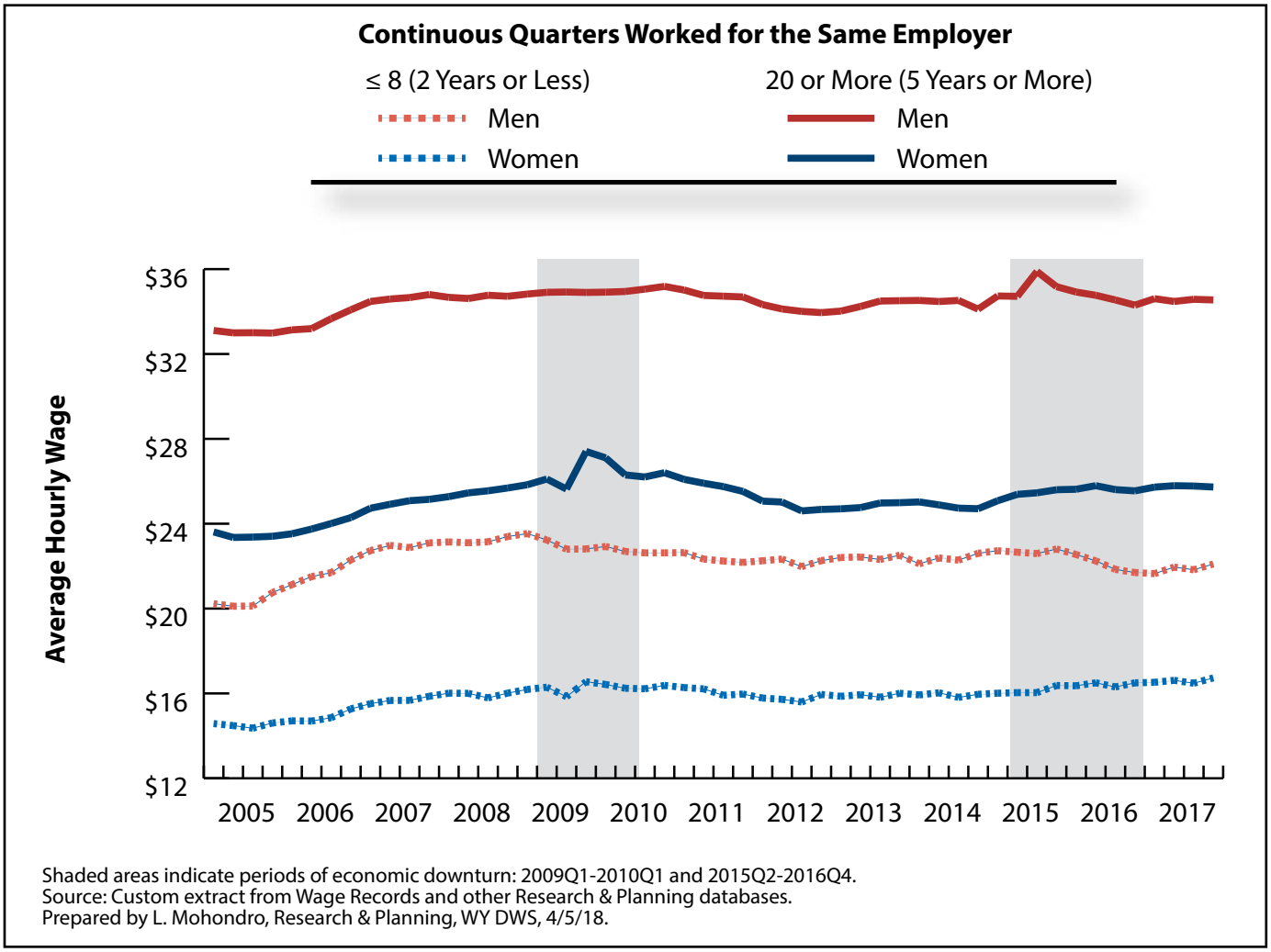
Figure 2.11: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming by Employer Tenure, 2005Q1-2017Q4**

dollar, and women working for firms with fewer than 50 employees earned about $0.72 on a man's dollar.

The general increase of the cents on a man's dollar for women who worked for small employers suggests that small employers have begun paying women higher wages. This could result in narrowing the gender wage gap.

Conclusion

As individuals take different paths, the wage women in Wyoming earn compared to men may increase or decrease from the average of $0.74. The state of the economy also plays a role in the gender wage gap. During times of economic contraction, men's wages tend to decrease, narrowing the gap. The overall gender wage gap provides only a small picture of the wage disparity between men and women. Examining the gender wage gap for particular segments of the population provides a more thorough representation. More complete data in areas such as individual's hours worked, education level, and occupation would improve the accuracy of comparisons of wages between men and women.



Shaded areas indicate periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-2016Q4.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by L. Mohondro, Research & Planning, WY DWS, 4/5/18.

Figure 2.12: **Average Hourly Wage for Persons Working in Wyoming by Gender and Employer Tenure, 2005Q1-2017Q4**

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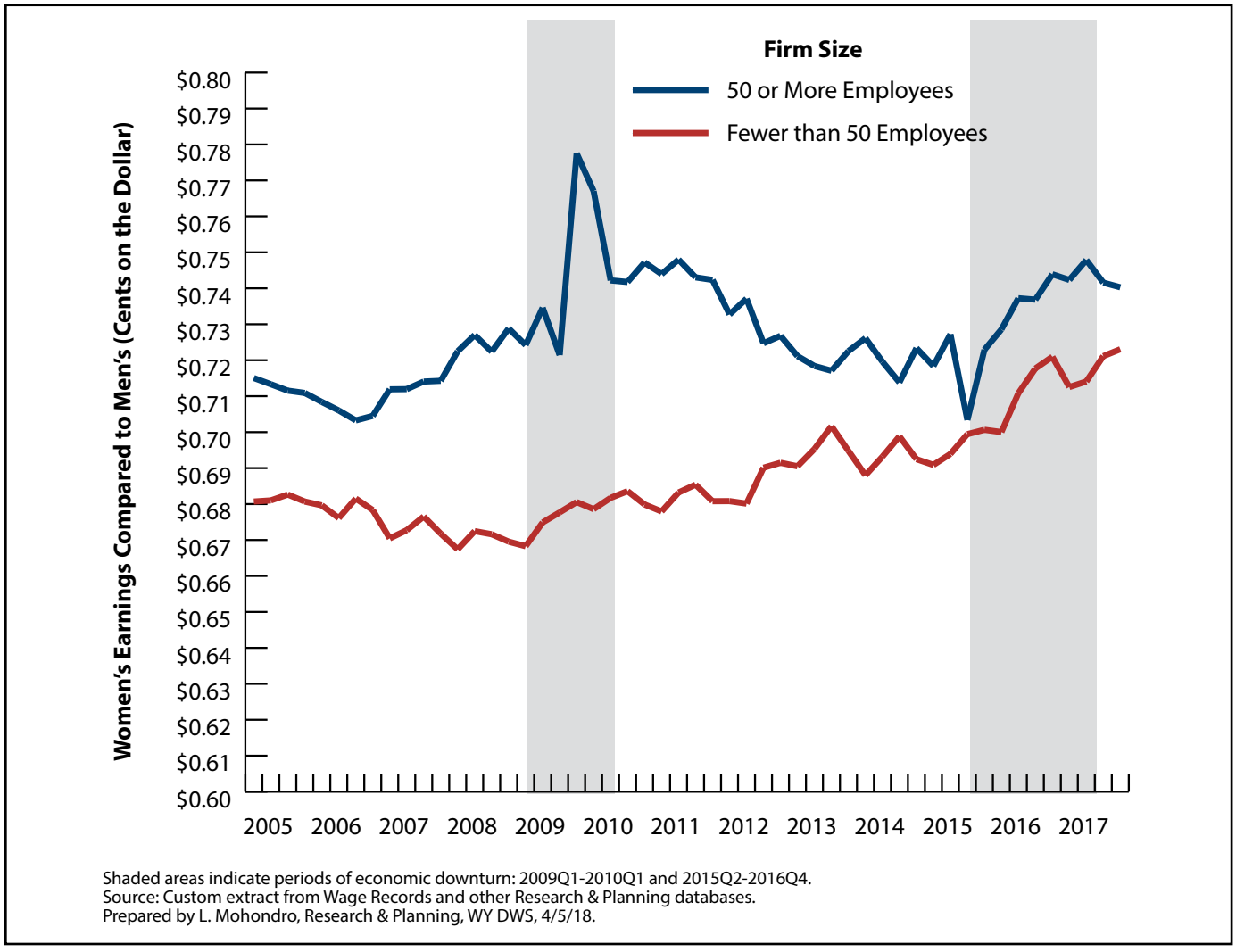

Shaded areas indicate periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-2016Q4.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by L. Mohondro, Research & Planning, WY DWS, 4/5/18.

Figure 2.13: **Women's Earnings Compared to Men's Earnings (Cents on the Dollar) in Wyoming by Firm Size, 2005Q1-2017Q4**

Chapter 3

Occupations and Hourly Wages

by: Lisa Knapp, Senior Research Analyst

Among individuals who met the criteria explained in this chapter, women earned $0.86 on the dollar compared to men on average.

The ratio of women's to men's wages, known as the gender wage gap, has grown smaller during the past 50 years, but still persists today. In 1955, women were paid approximately $0.64 for every dollar men were paid on average in the U.S. The gender wage gap was widest in 1975, when women earned $0.59 for every dollar earned by men (Hegewisch & Williams-Baron, 2017). By 2016, women were paid approximately $0.81 for every dollar paid to men (Semega, Fontenot, & Kollar, 2017).

Several factors have been shown to influence gender pay differences, including human capital factors such as educational attainment and investment in gaining labor market experience. Other factors that influence the gender wage gap can include marital status and presence of children, or a difference in hours worked by women compared to those worked by men. Current research also indicates the possibility of a *motherhood penalty* faced by childbearing aged women, as well as potential psychological differences in the ways men and women face taking risks in the workforce and job or salary negotiation (Blau & Kahn, 2017).

Research indicates that women have made great strides in closing many of these gaps. For instance, research shows that each generation of women has faced less occupational segregation than the previous, and they are more often working in higher paying professional jobs. While only 15% of managers were women in 1960, 38% of managers were women in 2000. Similar gains have been documented for professions such as lawyers, doctors, accountants, and others (Hegewisch & Hartmann, 2014). Women also have closed gaps in terms of educational attainment. In 1967, only 47.2% of female high school graduates were enrolled in a postsecondary institution, but in 2015, 72.5% of women who recently graduated from high school attended college, compared to 65.8% of men. Also, as of 2015, 40% of women ages 25-29 had a bachelor's degree compared to approximately 33% of similarly aged men (Semuels, 2017).

In some areas, however, improvement has been lacking. For example, research suggests that men may have a propensity for *overwork*, or working longer hours, especially those working in professional occupations

such as management, finance, and banking, which may be disproportionately compensated at higher rates and may affect variances in wages (Cha & Weeden, 2014; Miller, 2017). Also, research suggests that women are punished for having and caring for children (the afore mentioned motherhood penalty), which results in an average wage decrease of 4% per child. Cornell, Bernard, Paik (2007) and Budig (2014) suggested that women who stay home to care for their children experience a loss in wages over their lifetimes, and are sometimes passed over for raises or promotions. Men, the authors argued, often receive pay increases after having children, especially those in higher paying professional jobs. This phenomenon is referred to as the fatherhood bonus and it results in an average pay increase of 6% for these men, according to Budig (2014).

Although there are many factors that can influence the gender wage gap, the research presented in this chapter is preliminary and intended to simply identify any differences between men's and women's hourly wages in Wyoming at the occupational level that may be due to more than just chance.

Methodology

The Research & Planning (R&P) section of the Wyoming Department of Workforce Services maintains several large databases, including the Wyoming wage records system, which includes records of wages paid to each employee every quarter. These data are collected by all states, and some states simultaneously collect data on the occupation each individual works. Unfortunately, Wyoming does not collect occupation data, which limits the types of gender wage research that are possible. However, through several memoranda of understanding (MOU), R&P does collect occupation data for several jobs that require a license (including nurses, pharmacists, and therapists), all people working for the Wyoming Department of Education, and all state employees. Additionally, R&P conducts a quarterly survey called the Wyoming Job Skills Survey, also known as the New Hires Survey, which collects occupation data for a sample of employees in the state.

By combining the records in these data sets for all available years from 2005 to 2017 to the corresponding wages from wage records, R&P was able to create a data set with enough records to produce statistical analyses comparing men's and women's wages for several occupations.

For the purposes of this analysis, the most current quarterly wage record for each occupation in which a person worked was chosen. If a person worked in more than one occupation, such as someone who was a certified nurse aide before becoming a nurse, then that individual is included in the analysis once for each occupation.

For the research presented in this chapter, the Wilcoxon's Ranked Sum statistical procedure was used to compare men's and women's wages at the occupational level. This procedure compares the mean wages of two independent groups (men and women) and produces a probability value (p-value). If that p-value is equal to or less than 0.05, then the difference in wages is considered statistically significant, which means differences in wages are not due simply to chance.

In order to be considered for this analysis, a worker had to have wages in 2016 and quarters of continuous employment at the job. In total, this meant

there were wages for 30,536 men and 56,185 women working between 2005 and 2017 available for analysis. All wages were adjusted to 2016 levels using the Consumer Price Index (CPI), and all wages were compared to the 90th percentile wage for the corresponding occupation from the Occupational Employment Statistics (OES) program; if a wage was greater than the 90th percentile, that record was not included in the computations. In addition, the minimum wage used for this model was $7.25. If a record had a wage lower than $7.25, it was excluded from the computations. All jobs were assigned a Standard Occupation Classification (SOC) code, and computations were performed for both the three-digit minor group level and the six-digit detailed occupation level (see Figure 3.1). Statistical analysis only was conducted for occupations that had wage records available for at least five women and five men. Statistical results are displayed in the appendix tables at the

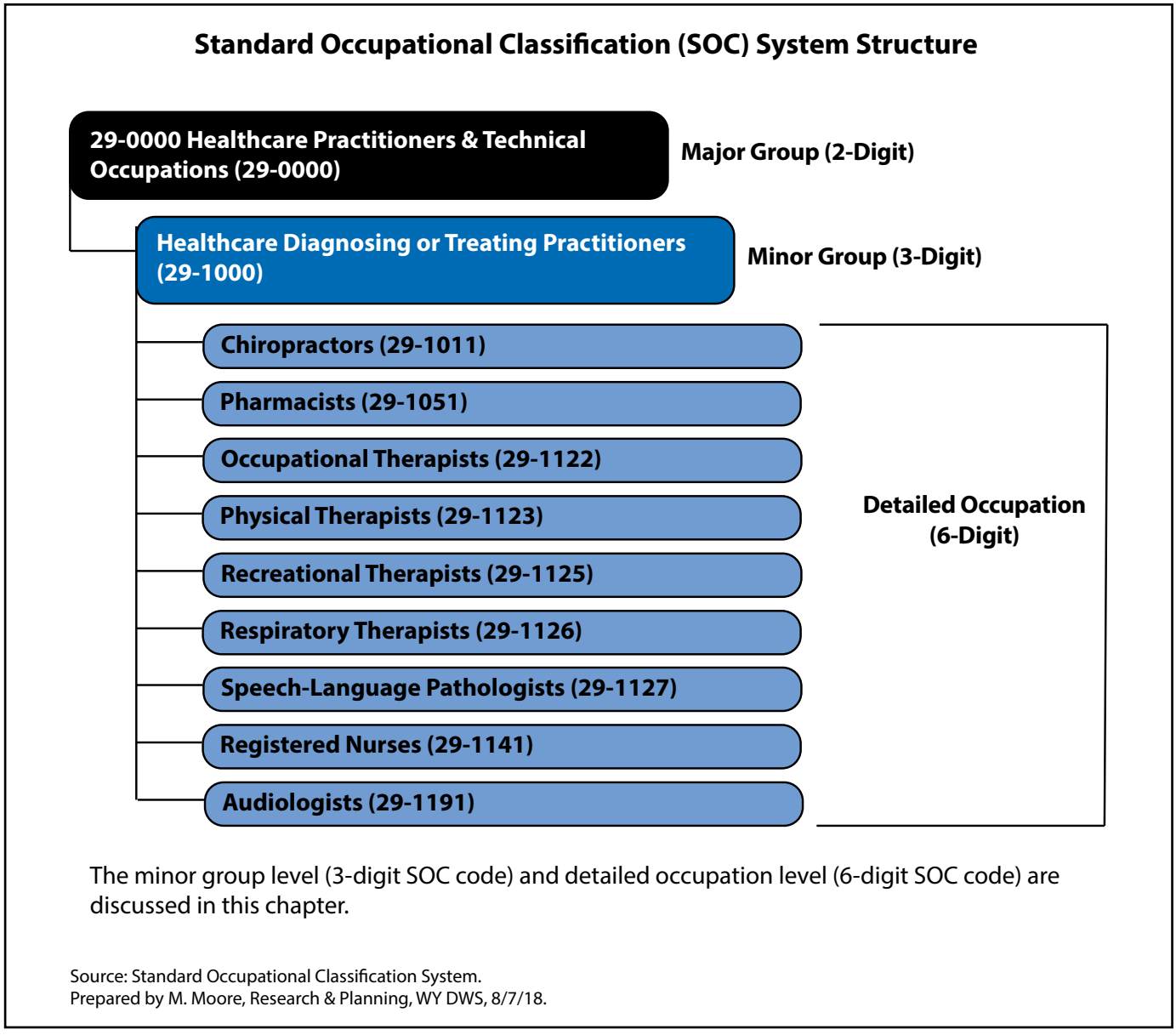

Figure 3.1: **Standard Occupational Classification System Sample Structure**

back of this publication for all occupations that met these parameters, but only those with statistically significant results will be discussed in this chapter.

Analysis

Minor Occupation Group (3-Digit SOC)

Table 3.1 contains a sample of the results of the statistical analysis comparing men's and women's wages at the three-digit SOC level; the full table is provided in the appendix materials. Of the 80 minor groups with enough records to be included in the analysis, 42 occupation groups had statistically significant results. Men were paid higher wages than women in all but two of these occupation groups: cooks & food preparation workers (SOC 35-2000) and food & beverage serving workers (SOC 35-3000).

Overall, for all occupation groups, women were paid $0.86 for every dollar men were paid. This varied by occupation group, however. For example, women working in the metal workers & plastic workers occupation group (SOC 51-4000) were paid $0.71 on the dollar, while those

Table 3.1: **Number of Persons Working in Wyoming and Mean Hourly Wage by Gender and Selected Minor Occupation Group (3-Digit SOC[a]), 2005-2017**

Excerpted from Appendix Table 3.1.

			Women		Men		Hourly Wage Difference		
	SOC Code	Occupation Title	N	Mean Hourly Wage	N	Mean Hourly Wage	Difference (W-M)	Cents on Dollar (W/M)	P-Value[b]
✓	**0**	**Total, All Occupations**	**66,485**	**$20.73**	**33,066**	**$24.15**	**-$3.42**	**$0.86**	**<.0001**
✓	11-1000	Top Executives	163	$35.58	265	$43.10	-$7.52	$0.83	0.0001
✓	17-2000	Engineers	86	$30.74	498	$34.40	-$3.66	$0.89	<.0001
✓	29-9000	Other Healthcare Practitioners & Technical Occupations	34	$26.72	86	$30.96	-$4.23	$0.86	0.0041
●	35-2000	Cooks & Food Preparation Workers	1,760	$13.59	299	$13.07	$0.52	$1.04	0.0046
●	35-3000	Food & Beverage Serving Workers	700	$11.34	224	$10.83	$0.51	$1.05	0.0084
✓	43-6000	Secretaries & Administrative Assistants	3,647	$17.41	185	$18.21	-$0.80	$0.96	0.0223
✓	51-4000	Metal Workers & Plastic Workers	12	$16.81	329	$23.77	-$6.97	$0.71	0.0013

✓ = Occupation in which men's wages were statistically significantly higher than women's wages.
● = Occupation in which women's wages were statistically significantly higher than men's wages.
[a]Standard Occupational Classification System.
[b]Wilcoxon ranked sum test results. A p-value that is less than or equal to 0.05 indicates a statistically significant gender wage gap between men and women.
Source: Custom extract of Research & Planning databases.
Prepared by L. Knapp, Research & Planning, WY DWS, 7/17/18.

working as secretaries & administrative assistants (SOC 43-6000) were paid $0.96 on the dollar. Women working as cooks & food preparation workers (SOC 35-2000) and food & beverage serving workers (SOC 35-3000) earned approximately $0.04 or $0.05 more than every dollar a man earned, respectively.

The actual hourly dollar amount difference between men's and women's mean wages for the workers included in this particular analysis are also included in Table 3.1. Men working as top executives (e.g. chief executives and general managers; SOC 11-1000), where women earned $0.83 on the dollar, were paid approximately $7.52 per hour more than women in that group. Over the course of the year, a full-time male employee working an average of 2,080 hours as a top executive would be paid $15,641 more than a woman working full-time. Likewise, a man working full-time as an engineer (SOC 17-2000), where women were paid $0.89 on the dollar, would be paid $7,614 more than a woman in that field. In the other healthcare practitioners & technical occupations (SOC 29-9000), where women were paid $0.86 on the dollar, a woman working full-time would receive $8,803 less than a man over the course of a year.

Women working as cooks & food preparation workers (SOC 35-2000), where women were paid $1.04 for every dollar paid to men, had wages that were approximately $0.52 per hour higher than men's wages, resulting in an additional $1,082 per year for full-time work. Similarly, women working as food & beverage serving workers (SOC 35-3000), where women earned $1.05 on the dollar, were paid $0.51 more per hour, or $1,065 per year for full-time employment.

Detailed Occupation (6-Digit SOC)

Table 3.2 (see page 37) contains a sample of the results of this statistical analysis for six-digit detailed occupations. Out of the 228 occupations that had at least five wage records each for men and women, 81 occupations had statistically significant wage differences. In the majority of cases (76), men were paid more than women. The five occupations where women were paid more than men were: office & administrative support workers, all other (SOC 43-9199; $1.31 on the dollar); lifeguards, ski patrol, & other recreational protective service workers (SOC 33-9092; $1.15 on the dollar); training & development specialists (SOC 13-1151; $1.05 on the dollar); combined food preparation & serving workers, including fast food (SOC 35-3021; $1.05 on the dollar); and executive secretaries & administrative assistants (SOC 43-6011; $1.03 on the dollar).

The differences between men's and women's wages varied by detailed occupation. In some occupations, such as eligibility interviewers, government programs (SOC 43-4061), women were paid $0.97 on the dollar, but in others, the differences in wages were much more pronounced. For example, women working as mobile heavy equipment mechanics, except engines (SOC 49-3042) were paid $0.63 on the dollar. Those working as roustabouts, oil & gas (SOC 47-5071) were paid $0.61 on the dollar, and women working as package & filling machine operators & tenders (SOC 51-9111) were paid $0.64 on the dollar.

Generally speaking, however, the wage

(Text continued on page 38)

Table 3.2: **Number of Persons Working in Wyoming and Mean Hourly Wage by Gender and Selected Detailed Occupation (6-Digit SOC[a]), 2005-2017**
Excerpted from Appendix Table 3.2.

			Women		Men		Hourly Wage Difference		
	SOC Code	Occupation Title	N	Mean Hourly Wage	N	Mean Hourly Wage	Difference (W-M)	Cents on Dollar (W/M)	P-Value[b]
✓	**0**	**Total, All Occupations**	**66,485**	**$20.73**	**33,066**	**$24.15**	**-$3.42**	**$0.86**	**<.0001**
✓	11-1021	General & Operations Managers	163	$35.58	265	$43.10	-$7.52	$0.83	0.0001
●	13-1151	Training & Development Specialist	457	$31.97	185	$30.34	$1.62	$1.05	0.0105
✓	13-2011	Accountants & Auditors	833	$24.74	263	$27.54	-$2.80	$0.90	<.0001
✓	29-1051	Pharmacists	482	$43.75	413	$47.77	-$4.02	$0.92	0.0014
✓	29-1071	Physician Assistants	154	$49.94	139	$53.16	-$3.22	$0.94	0.0372
✓	31-1014	Nursing Assistants	11,540	$13.24	1,259	$13.96	-$0.72	$0.95	<.0001
✓	33-3021	Detectives & Criminal Investigators	57	$27.63	134	$34.82	-$7.18	$0.79	<.0001
●	33-9092	Lifeguards, Ski Patrol, & Other Recreational Protective Service Workers	71	$12.47	60	$10.89	$1.58	$1.15	0.0015
●	35-3021	Combined Food Preparation & Serving Workers, Including Fast Food	218	$10.64	113	$10.19	$0.45	$1.04	0.0221
✓	41-2031	Retail Salespersons	263	$13.10	178	$14.31	-$1.22	$0.92	0.0009
✓	43-4061	Eligibility Interviewers, Government Programs	558	$20.65	80	$21.32	-$0.67	$0.97	0.0495
●	43-6011	Executive Secretaries & Administrative Assistants	843	$19.43	65	$18.88	$0.54	$1.03	0.0464
●	43-9199	Office & Administrative Support Workers, All Other	18	$16.29	8	$12.40	$3.89	$1.31	0.028
✓	47-5071	Roustabouts, Oil & Gas	7	$11.86	233	$19.57	-$7.71	$0.61	0.0006
✓	49-3042	Mobile Heavy Equipment Mechanics, Except Engines	6	$16.00	286	$25.22	-$9.22	$0.63	0.0011
✓	51-9111	Packaging & Filling Machine Operators & Tenders	10	$12.78	26	$20.02	-$7.24	$0.64	0.0101

✓ = Occupation in which men's wages were statistically significantly higher than women's wages.
● = Occupation in which women's wages were statistically significantly higher than men's wages.
[a]Standard Occupational Classification System.
[b]Wilcoxon ranked sum test results. A p-value that is less than or equal to 0.05 indicates a statistically significant gender wage gap between men and women.
Source: Custom extract of Research & Planning databases.
Prepared by L. Knapp, Research & Planning, WY DWS, 7/17/18.

(Text continued from page 36)

gaps among detailed occupations were less drastic than those examples. Women working in 31 occupations were paid $0.90 or more on the dollar. These occupations included accountants & auditors (SOC 13-2011; $0.90 on the dollar), pharmacists (SOC 29-1051; $0.92 on the dollar), physician assistants (SOC 29-1071; $0.94 on the dollar), and nursing assistants (SOC 31-1014; $0.95 on the dollar).

Women who worked as general & operations managers (SOC 11-1021) were paid $35.58 on average, compared to $43.10 per men. Using those wages, a woman who worked full-time over the course of a year (2,080 hours per year) would be paid $74,006, compared to $89,648 for a man who worked in the same occupation full-time, a difference of $15,642. If the woman worked fewer hours than the man, the difference in wages would be even greater. Women working full-time as detectives and criminal investigators (SOC 33-3021; $0.79 on the dollar) would take home $14,936 less per year than men working full-time. Women working full-time as retail salespersons (SOC 41-2031; $0.91 on the dollar) would earn $2,533 less per year than men. In comparison, women working full-time as office & administrative support workers, all other (SOC 43-9199; $1.31 on the dollar), would earn an average of $8,081 per year more than men.

Conclusion

Overall, this comparison of men's and women's hourly wages indicated that there was a statistically significant gap in wages for workers in nearly half of the occupations analyzed. This gap ranged from near wage parity of $0.97 on the dollar to the largest gap of $0.44. This analysis found only a handful of occupations in which women were paid significantly more than men. As discussed, this difference in hourly wages can impact take home pay considerably.

The research presented in this chapter was preliminary, based solely on a comparison of mean hourly wages for men and women. The occupation data available to R&P for research purposes was limited to information collected through the Wyoming Job Skills Survey and records collected from entities with which R&P has data-sharing agreements, such as state licensing agencies and the Wyoming Department of Education. Some other states, including Alaska and Nebraska, collect occupation information for each worker when they collect mandatory quarterly wage data. If Wyoming were to do this, it would provide R&P a larger, more complete pool of data from which to draw, thus providing the people of Wyoming a more complete picture of the gender wage gap.

There were 86,721 records for people working between 2005 and 2017 that fit the parameters of this study. However, during fourth quarter 2017 alone, there were more than 300,000 jobs recorded in the wage records files that had the possibility of inclusion. More complete worker records would allow for the analysis of any potential wage gap for the occupations that were not included in this research due to the small number of workers on which to conduct computations. More complete records would also allow R&P to study things such as the effect of job tenure and occupational and labor market experience have on wage variation and allow for the analysis of any change in the wage gap over time. R&P currently collects information regarding educational attainment, vital records (such as

marriages and births), and workers' compensation, all of which could be integrated into this type of research.

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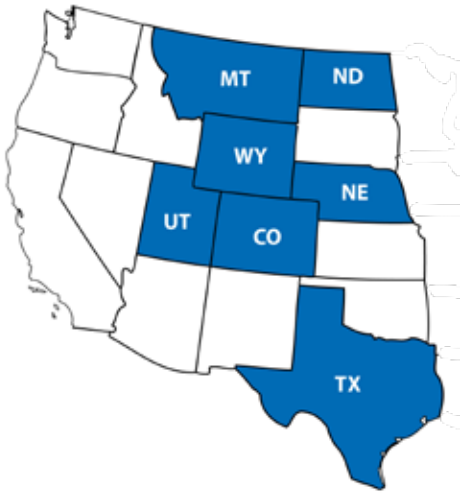
Chapter 4

Regional Occupational Comparison



by: Lisa Knapp, Senior Research Analyst

The gender wage gap varies by state. As noted in Chapter 1, among full-time, year-round workers, women in the United States were paid approximately $0.80 on the dollar paid to men in 2016. However, during that same year, women in Wyoming were paid $0.68 for every $1 paid to men, ranking the state 51st in terms of gender wage gap, according to five-year estimates from the American Community Survey (ACS; see Table 4.1, page 42). There are several possible reasons for this disparity in pay, including occupation, educational attainment, labor force participation, and family status (Blau & Kahn, 2017; Budig, 2014; and Hegewicsh & Hartmann, 2014), but some of the difference may be due to the region in which a person lives and works. As shown in Table 4.1, Montana, North Dakota, and Utah also had some of the widest wage gaps of all states. Certain jobs, including higher paying jobs or jobs that tend to be dominated by one gender or another may be more likely to be found in some regions but not in others (Mulhere, 2018).

In order to identify regions or occupations with substantially different patterns of staffing or pay, this chapter uses wage and occupation data from the U.S. Census Bureau to analyze differences in several regions including Wyoming, areas with large or small populations, and areas with potentially different or similar staffing patterns. Included in this analysis are Montana (a pay gap of $0.73 on the dollar, 49th in the nation), North Dakota ($0.74 on the dollar, 46th in the nation), Nebraska ($0.77 on the dollar, 37th in the nation), and Texas ($0.79 on the dollar, 28th in the nation; see Table 4.1). Also included are two metropolitan statistical areas (MSAs): the Denver-Aurora MSA and the Salt Lake City MSA. This research is intended to be descriptive only, and no statistical procedures were utilized.

Methodology

The purpose of this chapter is to illustrate regional differences in the ratio of women's wages to those of men, presented as cents on the dollar. Several states and MSAs were chosen for a variety of reasons. Larger MSAs such as Denver and Salt Lake City were included in order to examine any potential effect of a larger workforce and different

Table 4.1: **Women's Wages Compared to Men's Wages (Cents on the Dollar) for Full-Time, Year-Round Workers Ages 16 and Older by State, 2016**

Rank	State	Cents on the Dollar
1	Puerto Rico	$1.01
2	District of Columbia	$0.87
3	New York	$0.87
4	California	$0.86
5	Florida	$0.86
6	Vermont	$0.85
7	Maryland	$0.84
8	Rhode Island	$0.83
9	Nevada	$0.82
10	Delaware	$0.82
11	Arizona	$0.82
12	New Mexico	$0.82
13	North Carolina	$0.82
14	Massachusetts	$0.82
15	Hawaii	$0.82
16	Tennessee	$0.81
17	Minnesota	$0.81
18	New Jersey	$0.81
19	**Colorado**	**$0.81**
20	Georgia	$0.81
21	Connecticut	$0.80
22	Oregon	$0.80
23	Maine	$0.80
24	South Carolina	$0.80
	U.S.	**$0.80**
25	**Texas**	**$0.79**
26	Illinois	$0.79
27	Pennsylvania	$0.78
28	Virginia	$0.78
29	Wisconsin	$0.78
30	Arkansas	$0.78
31	Kentucky	$0.78
32	Missouri	$0.78
33	**Nebraska**	**$0.78**
34	Iowa	$0.77
35	New Hampshire	$0.77
36	South Dakota	$0.77
37	Kansas	$0.77
38	Mississippi	$0.76
39	Ohio	$0.76
49	Washington	$0.76
41	Michigan	$0.76
42	Alaska	$0.76
43	Indiana	$0.75
44	Idaho	$0.74
45	Oklahoma	$0.74
46	Alabama	$0.74
47	**Montana**	**$0.73**
48	**North Dakota**	**$0.71**
49	**Utah**	**$0.70**
50	West Virginia	$0.70
51	**Wyoming**	**$0.68**
52	Louisiana	$0.66

Source: U.S. Census Bureau, 2016 American Community Survey 5-Year Estimates.
Prepared by M. Moore, Research & Planning, WY DWS, 8/10/18.

workforce distribution by occupation group. Similarly, data from Texas were included in order to compare Wyoming wage differences to those of a state with a strong extraction industry and large workforce. States that surround Wyoming, such as Montana, North Dakota, and Nebraska were included in order to compare Wyoming wage differences to those in similarly populated states.

Data from the American Community Survey (ACS) were used in order to study wage and staffing differences. The ACS is a sample survey conducted annually by the Census Bureau, and the responses collected are used to create estimates for the general population. This analysis utilizes data from the 2016 ACS five-year estimates, which include data collected between 2012 and 2016. For the purposes of this research, only data for full-time workers are presented, due to comparatively small numbers of part-time workers and the uncertainty of estimate accuracy. The public use microdata files used for this research were obtained from IPUMS USA (Ruggles, Flood, Goeken, Grover, Meyer, Pacas, & Sobek, 2018).

In order to ensure a large enough number of men and women for comparison, occupations for this chapter were rolled up to the two-digit major group level. Occupational staffing patterns were created by dividing the number of men and women working in each major group by the total number of workers. Gender staffing patterns were created for each major group by dividing the number of women employed in each occupation by the total and multiplying by 100, resulting in the percentage of women working in each occupation. Similarly, the gender wage ratio was created by dividing women's wages by men's wages, which provides a ratio of cents paid to women per one dollar paid to men.

Analysis

Table 4.2 shows the estimated proportion of workers by major occupation group and region (occupational staffing pattern) in 2016. Figure 4.1 (see page 44) illustrates selected major occupations that had noticeable differences by region. A larger proportion of Wyoming's workforce (11.4%) was employed in construction & extraction occupations compared to other regions. The Denver-Aurora MSA had a larger proportion of jobs in management occupations (14.4%), business & financial operations (7.1%), and computer & mathematical occupations (5.4%) compared to other regions, although the proportion of management jobs in Montana (13.9%) was nearly as large.

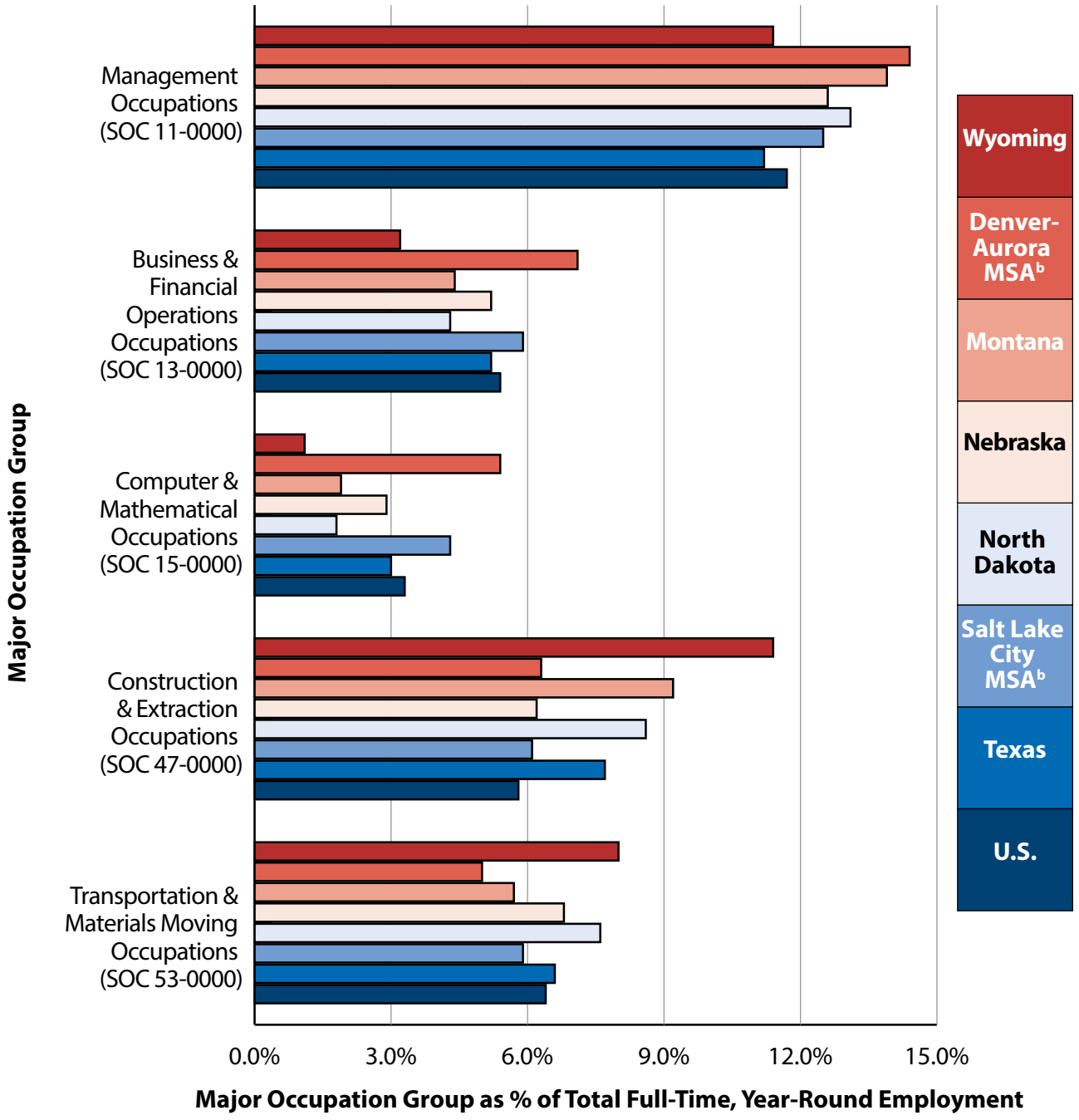
In Wyoming, the largest proportions of workers were employed in management (11.4%), construction & extraction (11.4%), and office & administrative support (10.7%). A slightly larger proportion of

(Text continued on page 44)

Table 4.2: **Percent of Full-Time, Year-Round Workers Ages 16 and Older by Major Occupational Group and Region, 2016**

Two-Digit SOC[a] Code	Major Occupation Group	Region							
		Wyoming	Denver-Aurora MSA[b]	Montana	Nebraska	North Dakota	Salt Lake City MSA[b]	Texas	U.S.
11-0000	Management Occupations	11.4	14.4	13.9	12.6	13.1	12.5	11.2	11.7
13-0000	Business & Financial Operations Occupations	3.2	7.1	4.4	5.2	4.3	5.9	5.2	5.4
15-0000	Computer & Mathematical Occupations	1.1	5.4	1.9	2.9	1.8	4.3	3.0	3.3
17-0000	Architecture & Engineering Occupations	2.0	3.1	1.6	1.5	2.0	2.5	2.3	2.2
19-0000	Life, Physical, & Social Sciences Occupations	1.1	1.1	1.5	0.9	1.1	1.2	0.8	0.9
21-0000	Community & Social Service Occupations	1.9	1.6	2.0	1.8	1.5	1.4	1.4	1.7
23-0000	Legal Occupations	1.1	1.6	1.1	0.9	0.8	1.3	1.1	1.3
25-0000	Educational Instruction & Library Occupations	6.5	4.9	5.6	6.2	5.7	4.3	6.0	5.6
27-0000	Arts, Design, Entertainment, Sports, & Media Occupations	1.2	2.0	1.3	1.3	1.0	1.7	1.3	1.7
29-0000	Healthcare Practitioners & Technical Occupations	4.6	4.8	5.7	5.8	5.5	4.8	5.2	5.7
31-0000	Healthcare Support Occupations	1.8	1.6	1.9	2.1	2.4	1.6	1.9	2.1
33-0000	Protective Service Occupations	2.6	1.9	2.5	1.8	2.1	1.5	2.4	2.4
35-0000	Food Preparation & Serving Related Occupations	3.9	4.0	4.2	2.9	3.4	3.0	4.0	3.7
37-0000	Building & Grounds Cleaning, & Maintenance Occupations	4.0	2.9	3.2	2.9	2.3	3.1	3.5	3.5
39-0000	Personal Care & Service Occupations	2.4	2.2	3.1	2.5	2.7	1.7	2.3	2.6
41-0000	Sales & Related Occupations	8.3	10.3	9.1	8.7	8.4	10.0	9.8	9.4
43-0000	Office & Administrative Support Occupations	10.7	12.4	11.5	13.1	12.3	15.7	13.0	12.8
45-0000	Farming & Fishing & Forestry Occupations	1.0	0.3	1.8	1.4	1.8	0.2	0.5	0.8
47-0000	Construction & Extraction Occupations	11.4	6.3	9.2	6.2	8.6	6.1	7.7	5.8
49-0000	Installation, Maintenance, & Repair Occupations	6.1	3.0	4.3	4.2	4.7	3.5	4.1	3.8
51-0000	Production Occupations	5.1	3.9	4.2	8.0	6.2	7.7	6.2	6.9
53-0000	Transportation & Materials Moving Occupations	8.0	5.0	5.7	6.8	7.6	5.9	6.6	6.4
	Total, All Occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Total may not equal 100 due to rounding.
[a]Standard Occupational Classification.
[b]Metropolitan Statistical Area.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 4/25/18.



[a]Standard Occupational Classification.
[b]Metropolitan Statistical Area.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 4/25/18.

Figure 4.1: **Proportion of Full-Time, Year-Round Workers Ages 16 and Older Workers by Selected Major Occupational Group and Region, 2016**

(Text continued from page 42)

Wyoming's workers (8.0%) were employed in transportation & materials moving occupations compared to other regions as well.

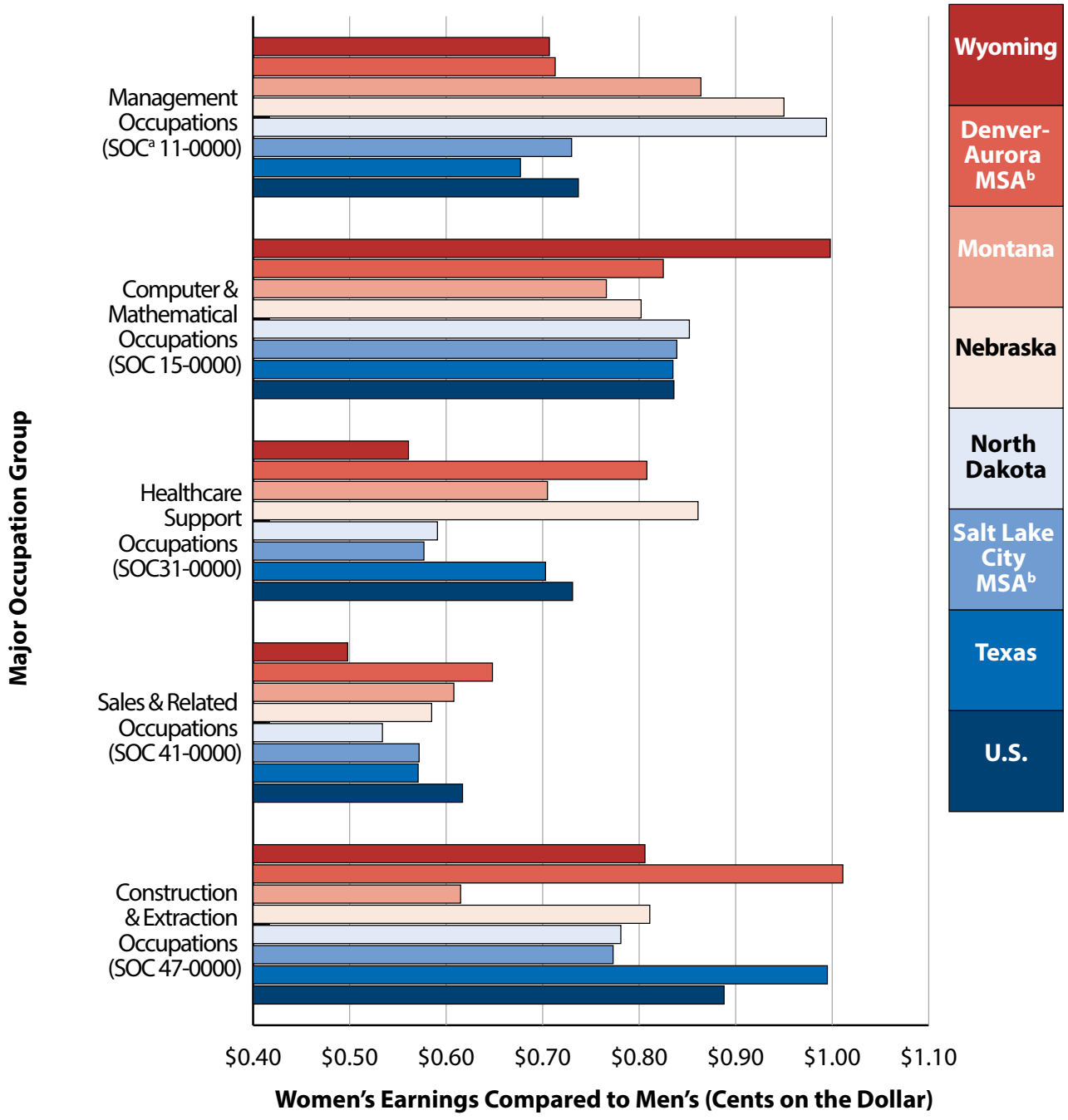
Table 4.3 contains the gender wage ratio (cents on the dollar) by major occupation group and region. This ratio varied sometimes quite drastically by region; selected regional differences are illustrated in Figure 4.2 (see page 46). For example, the gender wage ratio for women working in management occupation was $0.74 on the dollar for the U.S. as a whole, compared to $0.99 in North Dakota and $0.68 in Texas. The only instances of women earning more than men were found in construction & extraction occupations in the Denver-Aurora MSA ($1.01) and in community & social service occupations in North Dakota ($1.10) and Wyoming ($1.09). Wyoming women working in sales & related occupations had a larger wage disparity ($0.50) compared to their counterparts in other regions. Wyoming women working in computer & mathematical occupations were paid practically the same as men working

(Text continued on page 46)

Table 4.3: Women's Wages Compared to Men's Wages (Cents on the Dollar) for Full-Time, Year-Round Workers Ages 16 and Older by Major Occupation Group and Region, 2016

Two-Digit SOC[a] Code	Major Occupation Group	Region							
		Wyoming	Denver-Aurora MSA[b]	Montana	Nebraska	North Dakota	Salt Lake City MSA[b]	Texas	U.S.
11-0000	Management Occupations	$0.71	$0.71	$0.86	$0.95	$0.99	$0.73	$0.68	$0.74
13-0000	Business & Financial Operations Occupations	$0.71	$0.71	$0.65	$0.67	$0.70	$0.68	$0.69	$0.70
15-0000	Computer & Mathematical Occupations	$1.00	$0.83	$0.77	$0.80	$0.85	$0.84	$0.84	$0.84
17-0000	Architecture & Engineering Occupations	$0.70	$0.81	$0.76	$0.72	$0.70	$0.80	$0.80	$0.82
19-0000	Life, Physical, & Social Sciences Occupations	$0.81	$0.72	$0.90	$0.99	$0.78	$0.95	$0.67	$0.80
21-0000	Community & Social Service Occupations	$1.09	$0.97	$0.88	$0.92	$1.10	$0.76	$0.91	$0.94
23-0000	Legal Occupations	$0.65	$0.61	$0.53	$0.47	$0.48	$0.53	$0.56	$0.59
25-0000	Educational Instruction & Library Occupations	$0.75	$0.78	$0.75	$0.72	$0.77	$0.71	$0.73	$0.74
27-0000	Arts, Design, Entertainment, Sports, & Media Occupations	$0.70	$0.80	$1.00	$0.79	$0.65	$0.72	$0.75	$0.81
29-0000	Healthcare Practitioners & Technical Occupations	$0.47	$0.54	$0.49	$0.45	$0.38	$0.49	$0.53	$0.52
31-0000	Healthcare Support Occupations	$0.56	$0.81	$0.71	$0.86	$0.59	$0.58	$0.70	$0.73
33-0000	Protective Service Occupations	$0.83	$0.83	$0.83	$0.78	$0.96	$0.73	$0.76	$0.80
35-0000	Food Preparation & Serving Related Occupations	$0.80	$0.86	$0.86	$0.84	$0.95	$0.82	$0.79	$0.82
37-0000	Building & Grounds Cleaning, & Maintenance Occupations	$0.66	$0.63	$0.65	$0.73	$0.59	$0.69	$0.69	$0.71
39-0000	Personal Care & Service Occupations	$0.50	$0.56	$0.75	$0.44	$0.54	$0.65	$0.64	$0.65
41-0000	Sales & Related Occupations	$0.50	$0.65	$0.61	$0.59	$0.53	$0.57	$0.57	$0.62
43-0000	Office & Administrative Support Occupations	$0.68	$0.85	$0.75	$0.74	$0.71	$0.84	$0.77	$0.80
45-0000	Farming & Fishing & Forestry Occupations	$0.72	$0.84	$0.70	$0.91	$0.63	$0.78	$0.74	$0.69
47-0000	Construction & Extraction Occupations	$0.81	$1.01	$0.61	$0.81	$0.78	$0.77	$0.99	$0.89
49-0000	Installation, Maintenance, & Repair Occupations	$0.83	$0.92	$0.79	$0.80	$0.80	$0.84	$0.89	$0.93
51-0000	Production Occupations	$0.52	$0.71	$0.53	$0.75	$0.70	$0.75	$0.62	$0.69
53-0000	Transportation & Materials Moving Occupations	$0.64	$0.81	$0.66	$0.63	$0.67	$0.63	$0.70	$0.73

[a]Standard Occupational Classification.
[b]Metropolitan Statistical Area.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 4/25/18.



[a]Standard Occupational Classification.
[b]Metropolitan Statistical Area.
Note: Full-time, year-round civilian employed population 16 years and over with earnings.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 4/25/18.

Figure 4.2: **Women's Wages Compared to Men's Wages (Cents on the Dollar) for Full-Time, Year-Round Workers Ages 16 and Older by Major Occupation Group and Region, 2016**

(Text continued from page 44)

in the same occupations, which was a smaller variance than at the national level ($0.84) or in any of the selected regions.

Table 4.4 contains the ratios of women to men working in major occupation groups by region; Figure 4.3 (see page 48) illustrates five selected occupations with substantial differences by region. In Wyoming, women made up 92.3% of persons working in healthcare support occupations, compared to 85.7% nationally and 78.0% in the Salt Lake City MSA. The large proportion of women working in healthcare support occupations (92.3%) was the largest difference between men and women in all of the selected regions and occupations.

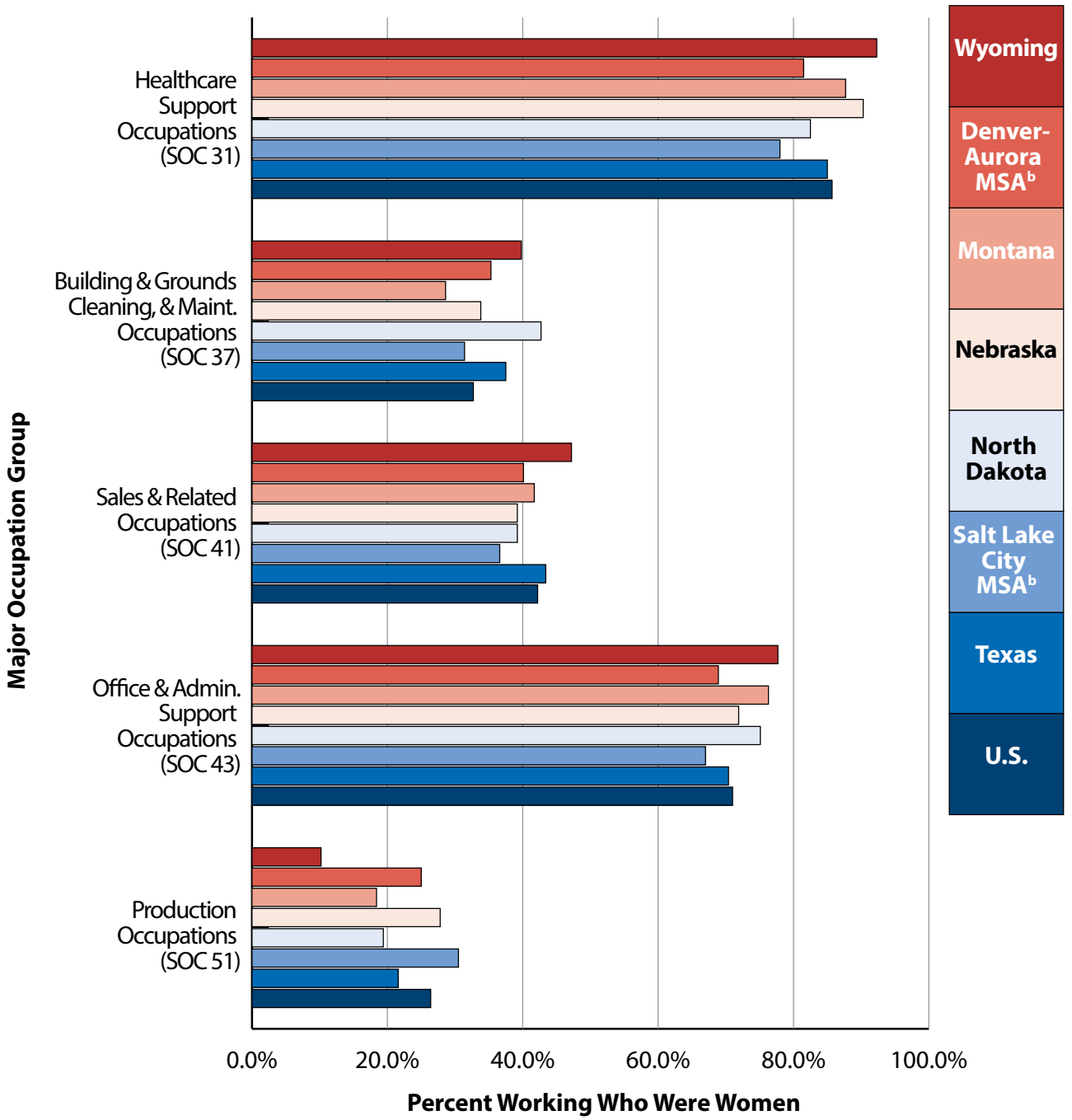
Women also made up a larger proportion of persons working in sales & related occupations (47.2%) and office & administrative support occupations (77.7%) than in any other region. On

(Text continued on page 48)

Table 4.4: Women as a Percent of Persons 16 and Older Working Full-Time, Year-Round by Selected Major Occupation Group and Region, 2016

Two-Digit SOC[a] Code	Major Occupation Group	Region							
		Wyoming	Denver-Aurora MSA[b]	Montana	Nebraska	North Dakota	Salt Lake City MSA[b]	Texas	U.S.
11-0000	Management Occupations	35.3	37.7	34.9	32.7	26.5	32.8	37.0	38.2
13-0000	Business & Financial Operations Occupations	59.4	53.8	56.8	56.2	59.0	47.5	53.8	53.8
15-0000	Computer & Mathematical Occupations	25.8	23.0	30.6	24.0	29.4	18.3	24.4	25.2
17-0000	Architecture & Engineering Occupations	14.9	17.4	13.8	12.9	12.1	7.6	13.4	14.2
19-0000	Life, Physical, & Social Sciences Occupations	30.8	47.3	45.0	35.8	29.2	35.0	39.0	43.7
21-0000	Community & Social Service Occupations	68.1	65.4	61.9	67.1	59.6	55.8	61.3	63.3
23-0000	Legal Occupations	61.2	52.3	55.7	52.5	54.6	40.9	52.2	50.5
25-0000	Educational Instruction & Library Occupations	71.0	73.1	72.4	69.8	71.9	66.9	73.9	71.7
27-0000	Arts, Design, Ent., Sports, & Media Occupations	46.3	46.2	39.1	41.9	49.8	43.9	41.3	42.6
29-0000	Healthcare Practitioners & Tech. Occupations	68.5	71.9	70.9	75.5	77.1	66.7	70.4	72.0
31-0000	Healthcare Support Occupations	92.3	81.5	87.7	90.3	82.5	78.0	85.0	85.7
33-0000	Protective Service Occupations	20.9	19.8	20.8	20.0	13.3	17.9	22.6	19.8
35-0000	Food Prep. & Serving Related Occupations	52.5	43.1	54.2	57.8	59.1	44.5	50.6	47.0
37-0000	Building & Grounds Cleaning, & Maintenance Occupations	39.8	35.3	28.6	33.8	42.7	31.4	37.5	32.7
39-0000	Personal Care & Service Occupations	83.6	74.6	75.6	81.9	82.8	73.0	76.9	74.7
41-0000	Sales & Related Occupations	47.2	40.1	41.7	39.2	39.2	36.6	43.4	42.2
43-0000	Office & Admin. Support Occupations	77.7	68.9	76.3	71.9	75.1	67.0	70.4	71.0
45-0000	Farming & Fishing & Forestry Occupations	8.4	22.9	16.7	17.5	11.8	3.6	13.8	21.0
47-0000	Construction & Extraction Occupations	5.0	2.8	4.7	1.6	3.3	2.2	2.3	2.6
49-0000	Installation, Maint., & Repair Occupations	3.3	4.3	2.2	3.3	3.4	4.1	3.4	3.6
51-0000	Production Occupations	10.2	25.0	18.4	27.8	19.4	30.5	21.6	26.4
53-0000	Transport. & Materials Moving Occupations	11.9	14.6	7.5	12.5	8.9	13.0	12.0	13.8
	Total, All Occupations	**39.8**	**42.3**	**41.7**	**42.7**	**40.1**	**39.1**	**41.8**	**43.0**

[a]Standard Occupational Classification.
[b]Metropolitan Statistical Area.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 4/25/18.



[a]Standard Occupational Classification.
[b]Metropolitan Statistical Area.
Note: Full-time, year-round civilian employed population 16 years and over with earnings.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 4/25/18.

Figure 4.3: **Number of Women per 100 Men Ages 16 and Older Working Full-Time, Year-Round by Selected Major Occupation Group and Region, 2016**

(Text continued from page 46)

the other hand, women made up just 10.2% of persons working in production occupations, the smallest proportion in the region.

Conclusion

The purpose of this research was to determine if any relationships in staffing and pay ratios exist. For example, do regions with a larger proportion of workers employed in management occupations have a noticeably different wage disparity than those with a smaller proportion of workers? Or, do occupations with greater proportions of employees who are women have a different wage ratio in certain regions? While there are differences in all of these factors by region and occupation as discussed earlier, there are no obvious patterns to these differences when they are viewed side by side.

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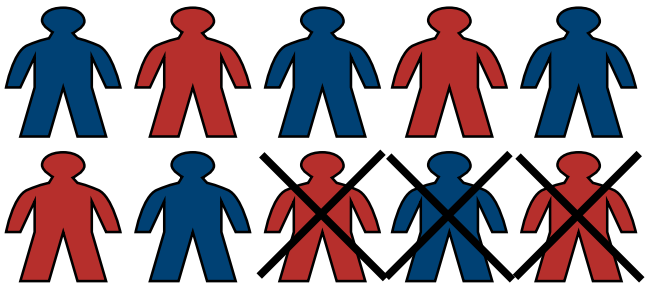
Chapter 5

Predicting Gender Using Logistic Regression



by: Patrick Manning, Principal Economist

By using primary industry and labor market experience as independent variables, R&P was able to accurately predict gender 71.7% of the time.

This chapter presents an inverted approach to the traditional methodologies of studying the gender wage gap. Using logistic regression analysis, this approach will attempt to determine a worker's gender based on other known information, such as the primary industry in which that person worked, elements of work history, age, and occupation (when available). Wages were purposely excluded from this analysis to demonstrate the ability to predict gender based on individuals' interactions with the labor market.

Logistic regression is often used when the dependent variable is binary, or one of two possibilities (Allison, 1999). In a logistic regression analysis, the dependent variable is labeled as 0 or 1 in the model to represent situations such as male/female, yes/no, pass/fail, and win/lose. In this analysis, female workers were coded as 1 while male workers were coded as 0. This method of regression restricts the predicted dependent variable to the range between 0 and 1 (see Table 5.1).

Because the goal is to predict whether a particular individual is male or female, the most likely predictors (i.e. independent variables) are variables where there is a noticeable difference between the genders. Two examples of variables with major differences and one example of a variable with very little difference are discussed below.

Table 5.1: **Example of Logistic Regression Estimates**
PROC LOGISTIC is modeling the probability that gender = 1 (female).

Individual	Gender	Predicted Value	Correct (50% Threshold)
1	Male	0.23461	Yes
2	Female	0.84319	Yes
3	Male	0.04314	Yes
4	Female	0.81756	Yes
5	Male	0.50741	No
6	Male	0.1005	Yes
7	Female	0.45205	No
8	Female	0.83588	Yes
9	Male	0.31679	Yes
10	Male	0.48231	Yes
11	Male	0.11763	Yes
12	Male	0.45869	Yes
13	Female	0.82909	Yes
14	Male	0.50292	No
15	Female	0.82857	Yes

Prepared by P. Manning, Research & Planning, WY DWS, 8/20/18.

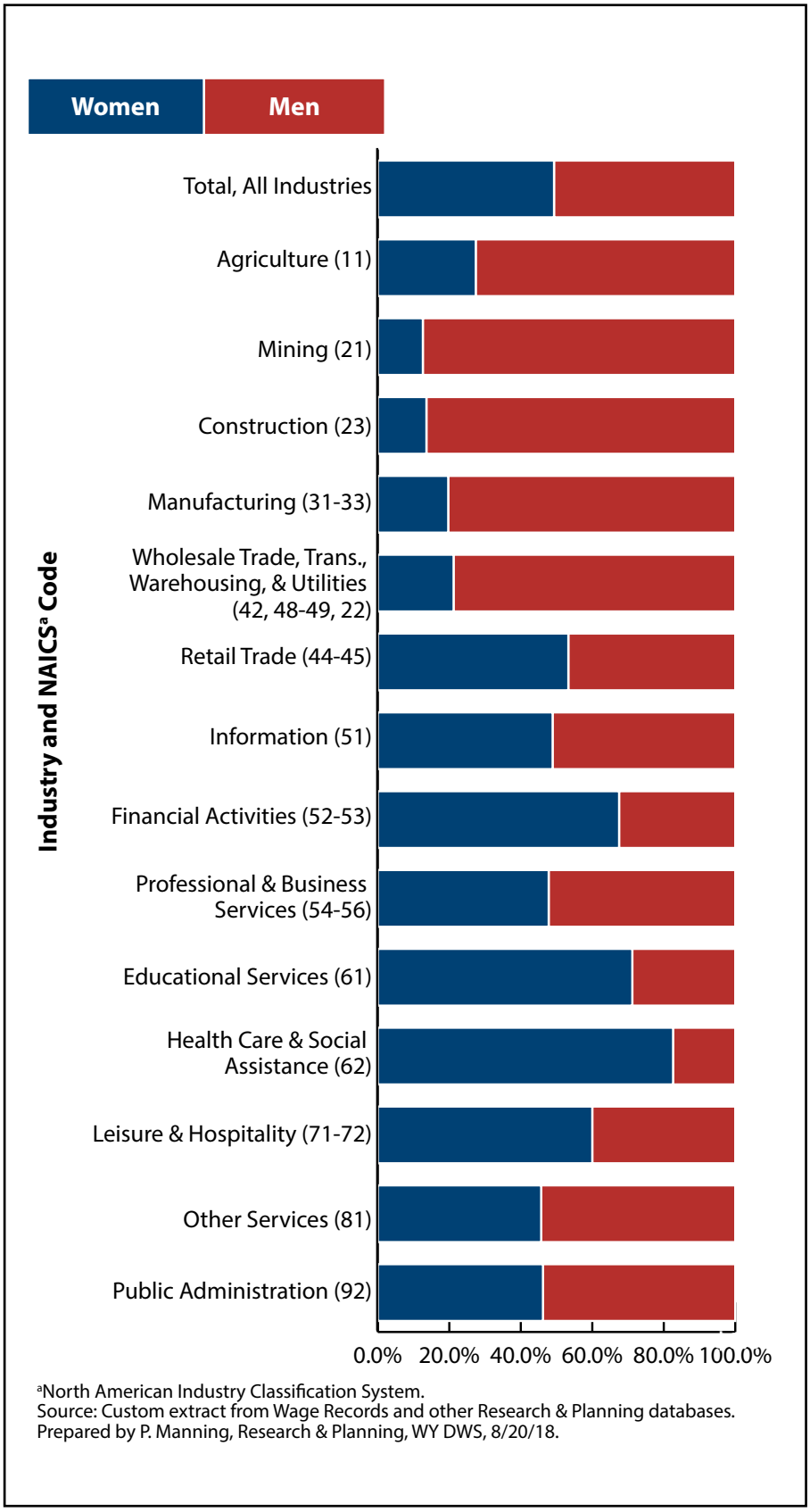


Figure 5.1: **Distribution of Persons Working in Wyoming by Gender and Industry, 2016**

This chapter focuses on persons working in 2016. The analysis included workers who had at least five years of attachment to Wyoming and its labor market. The full dataset for 2016 contained 103,836 observations. The dataset was relatively evenly split between genders: there were 51,187 women (49.3%) and 52,649 men (50.7%).

Primary Industry

Industries are defined by the North American Industry Classification System (NAICS). A roll-up to the super sector level is used in this analysis. These industry sectors had vastly different male/female employment ratios (see Figure 5.1). Employment in mining (NAICS 21) was most dominated by men (87.4% men to 12.6% women), while health care & social assistance (NAICS 62) was dominated by women (82.6% women to 17.4% men). Retail trade was the industry that demonstrated a ratio closest to parity (53.3% women to 46.7% men). It is hypothesized that the primary industry in which a person is employed will greatly affect the odds of being a particular gender.

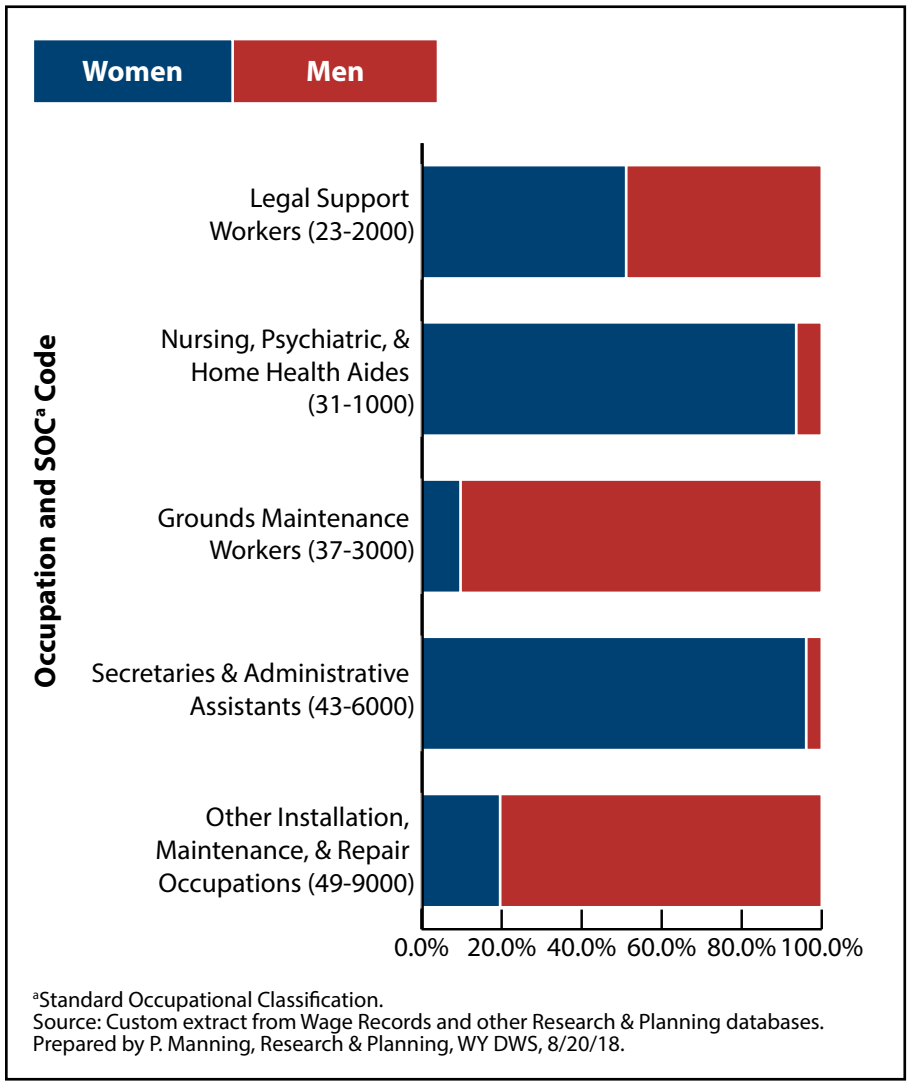
Occupation

Occupations are defined by the Standard Occupational Classification (SOC) system. Three-digit SOC codes were used for the research presented in this chapter. For example, computer programmers were included in computer & information research scientists (15-1000). There were 99 possible occupations at the three-digit SOC level in this research. For any given model there will be considerably fewer due to the exclusion of occupations with fewer than 50 workers, or fewer than five workers of a given gender.

As mentioned in Chapter 2, occupation data are not collected as a part of unemployment insurance wage records, so occupation data for this research were limited. In order to identify occupation, R&P relied on data sources such as state licensing boards (i.e. the Wyoming State Board of Nursing), Wyoming Department of Education, state employee data files, and the New Hires Job Skills Survey. Figure 5.2 demonstrates selected occupations represented by widely different proportions across gender. For example, grounds maintenance workers are comprised of over 90% male workers, while secretaries & administrative assistants are dominated by over 90% female workers. Also shown are legal support workers with a relatively even distribution of 51.1% female and 48.9% male.

The majority of workers in the full 2016 dataset do not have an SOC code assigned.

Generally, R&P has access to more occupational codes for female-dominated occupations, such as nursing and other health care occupations. Therefore, while the full dataset in 2016 had 103,836 observations with 49.3% being female, the dataset with assigned SOC codes only has 33,746 observations with 67.3% being female. Given



[a]Standard Occupational Classification.
Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by P. Manning, Research & Planning, WY DWS, 8/20/18.

Figure 5.2: **Distribution of Persons Working in Wyoming by Gender and Selected Occupation**

these limitations, a model implementing occupation as an independent variable will be briefly discussed.

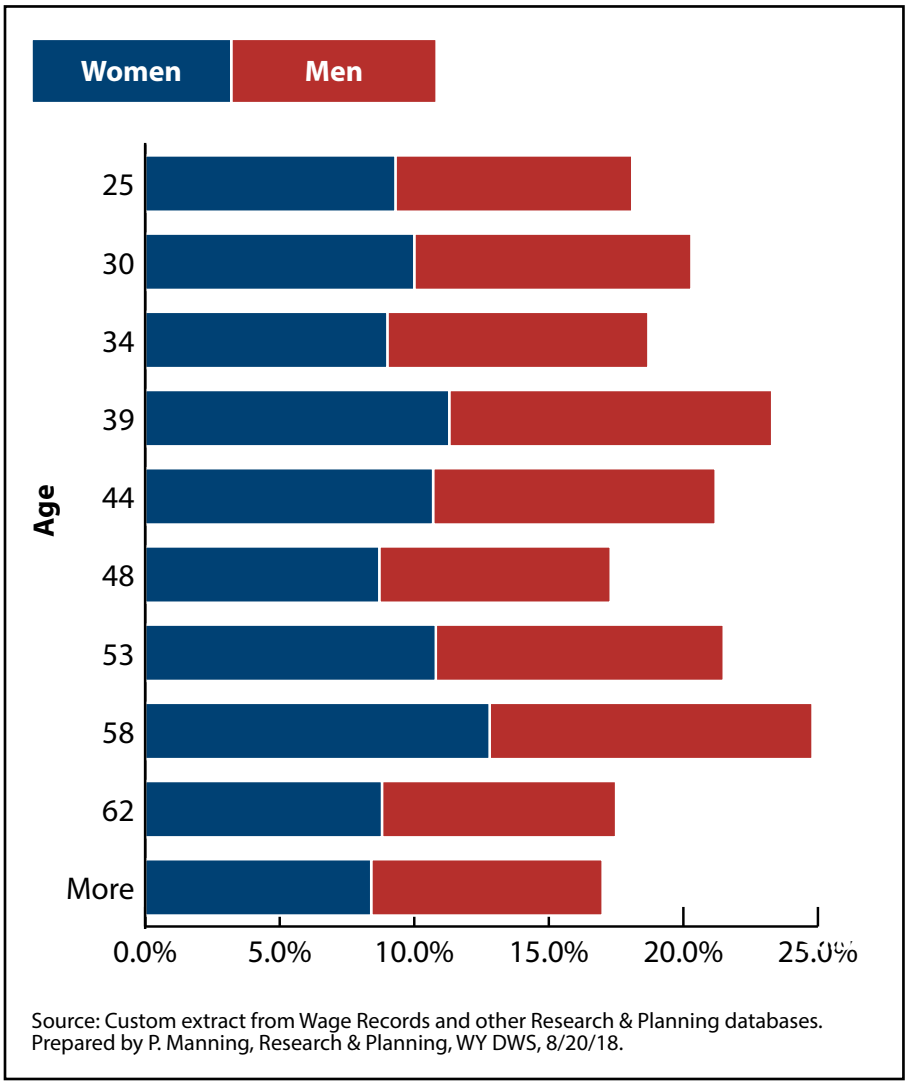
Exclusion of Age from Models

Depending on the specification of the model, age may or may not be significant. However, even when it was a significant explanatory variable, it had very little effect on determining whether a particular worker was male or female. The reason is that the distribution of age across gender was very similar (see figure 5.3). Therefore, age was not used as an independent variable in the models discussed in the results section.

Methodology

Only individuals with at least five years with a Wyoming driver's license and working in 2016Q4 were included in the research presented in this chapter as a measure of attachment to Wyoming, regardless of labor force activity. Throughout the analysis, a 95% confidence level was employed to assess significance; p-values in the output can be used by the reader to choose a confidence level (see Appendix Table 5). The odds ratio estimates are discussed in the results section of this chapter, as those are more meaningful than the point estimates. An odds ratio greater than 1 increased the chances of an individual being female, while those below 1 decreased the probability.

The results section will provide the C-statistic for each model. The C-statistic, also called the *concordance statistic* is a "goodness of fit measure for binary outcomes in a logistic regression model. In clinical studies, the C-statistic gives the probability a randomly selected patient who experienced an event (e.g. a disease or condition) had a higher risk score than a patient who had not experienced the event. …



Source: Custom extract from Wage Records and other Research & Planning databases.
Prepared by P. Manning, Research & Planning, WY DWS, 8/20/18.

Figure 5.3: **Distribution of Persons Working in Wyoming by Gender and Age**

A value of 0.5 means that the model is no better than predicting an outcome than random chance. Values over 0.7 indicate a good model. Values over 0.8 indicate a strong model. A value of one means that the model perfectly predicts those group members who will experience a certain outcome and those who will not" (Statistics How To, 2016).

Results

Table 5.2 shows the results from each model, which are discussed in this section. Appendix Table 5 shows the statistical output for the second model discussed below. Interpretations should be drawn from the odds ratio estimates rather than the maximum likelihood estimates (Allison, 1999).

Model 1
Dependent variable: Gender.
Independent variable: Primary industry in 2016 only.

Model 1 was correct 69.6% of the time. Since primary industry was the only independent variable in the model, this indicates that the primary industry in which a worker was employed had a substantial impact on the model's predictive power.

The likelihood ratio, score, Wald tests, and type 3 analysis of effects ($p < .0001$) all showed that the model was significantly better than the null model (i.e. an intercept only). Primary industry is a dummy variable, with retail trade chosen as the baseline to which all other industries were compared. Retail trade was chosen due to a nearly equal number of men and women (see Figure 5.1).

All industries had a significant impact on the odds of a particular individual being female. For example, an individual in health services was 4.2 times more likely to be female than in retail trade. Conversely, if an individual's primary industry was construction, then the odds of that individual being female were extremely slim.

Model 2
Dependent variable: Gender.
Independent variables: Primary industry in 2016, number of total employers (since 1992), percentage of quarters worked, and percentage of full-time equivalents (FTEs) worked to date.

Model 2 was correct 71.7% of the time.

Table 5.2: **Summary of Models**

Model	Model Number	N Observations	C	% Correct	N Female	N Male	% Female
Primary Industry Only	1	103,836	0.765	69.6	51,187	52,649	49.3
Primary Industry and Labor Market Experience	2	103,836	0.793	71.7	51,169	52,595	49.3
Primary Industry, Labor Market Experience, and Occupation	3	33,746	0.833	79.6	22,717	11,029	67.3
Primary Industry and Labor Market Experience (2008)	2008	92,840	0.797	72.2	44,593	48,247	48.0

Retail trade again was used as the baseline industry. The number of employers, percentage of quarters worked, and percentage of FTEs worked over time were used as indicators of a worker's interaction with the labor market.

The results of this model were very similar to the primary industry only model. The likelihood ratio, score and Wald tests all show that the model was significantly better than the null model (i.e. the intercept only). The type 3 analysis of effects demonstrated that all independent variables were significant individually. The c statistic was 0.793 (see Table 5.2).

The majority of industries had a significant impact on the odds of a particular individual being female, with the exception of the information, leisure & hospitality, and public administration industries. Relative to retail trade, health services and educational services increased the odds of an individual being female by a factor of 4.4 and 1.9 times higher, respectively.

The odds ratio estimate of percentage of quarters worked was greater than one (albeit only slightly), which indicates the higher percentage of the quarters worked, the more likely the worker was to be female. This refutes the hypothesis that on average, men were more likely to work a higher percentage of possible quarters and women were more likely to take time off of work for instances such as child-rearing. A related interaction with the labor market was the intensity of work is measured by the percentage of FTEs worked. The odds ratio was less than 1 (again only slightly), which indicates that the more hours an individual worked, the more likely that worker was to be male.

Model 3
Dependent variable: Gender.
Independent variables: Primary industry in 2016, number of total employers total since 1992, percentage of quarters worked, percentage of full-time equivalents (FTEs) worked to date, and occupation.

Model 3 was correct 79.6% of the time. Although this model cannot be directly compared to the previous models due to the lower number of observations, the increase from 71.7% in model 2 to 79.6% correct indicates that occupation has substantial explanatory power.

Although occupation data are sparse as indicated earlier, it is worth discussing a model that includes workers' occupations, because occupation does have explanatory power as an independent variable. As previously noted, the number of observations decreased due to missing occupation data, and the proportion of female observations increased relative to the other models (see Table 5.2).

The likelihood ratio, score, and Wald tests all showed that the model was significantly better than the null model (i.e. the intercept only). The type 3 analysis of effects demonstrated that all five independent variables were significant individually. Relative to retail trade, health care & social assistance, and educational services increased the odds of an individual being female by a factor of 1.9. An individual employed in construction was over four times less likely to be female.

The baseline occupation was legal support workers. Individuals employed as secretaries & administrative assistants were 4.4 times more likely to be female

than those working in legal support. The chances of being in construction relative to legal work was very unlikely.

Model 2008
Dependent variable: Gender.
The same independent variables as Model 2 discussed previously.

While this chapter focused on data from 2016, it was worth discovering whether these models would yield similar results in a different calendar year. R&P chose to examine data from 2008, as economic conditions were much different from 2016. The results were similar to model 2. The likelihood ratio, score, and Wald tests all showed that the model was significantly better than the null model. The type 3 analysis of effects demonstrated that all four independent variables were significant individually. The 2008 model was correct 72.2% of the time.

Conclusions and Future Research

The difference in the independent variables between the genders allows researchers to forecast the gender of an individual correctly approximately 70% to 80% of the time. Without these differences, the ability to predict gender would likely tend toward the 50% threshold.

The collection of occupational codes on Wyoming wage records would increase the accuracy of modeling and provide a greater understanding of gender wage disparity in Wyoming. Alaska and Nebraska are currently collecting occupation data. Currently, a workers' experience in a given industry and/or organization can be calculated using wage records, but not the experience in a given occupation. The objective of collecting occupation data with wage records would be to improve the ability to control for all possible factors to better assess the gender wage gap.

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Chapter 6

Breaking Down the Gender Wage Gap

by: Matthew Halama, Economist

Hours worked, industry of employment, and other characteristics accounted for $0.15 of the $0.28 wage gap in 2016. The reasons for the remaining $0.13 could not be identified.

The Equal Pay Act was signed into law in 1963. The intention of this law was to prohibit employers from discriminating on the basis of sex by compensating workers differently for jobs that required equal skill, effort, and responsibility. More than 50 years have passed and arguments continue over whether or not a gender wage gap exists. Some argue the existence of a gender wage gap involves subconscious bias by employers, businesses not being transparent with pay structures, and interview processes that require providing employers with past salary history that reinforce the wage gap (National Committee on Pay Equity, n.d.). Arguments that a wage gap doesn't exist involve different lifestyle and occupational choices between men and women (Perry, 2017), and that if a wage gap did exist and all other variables were equal between men and women, then the price of labor for men is overvalued and businesses would have an economic incentive to have a workforce staffed entirely by women (Schow, 2015).

The gender wage gap has become a controversial topic politically and economically. The purpose of this research is to provide distinction between the raw and adjusted gender wage gap and to provide an analysis on the size of Wyoming's gender wage gap. This article will discuss prior research on the wage gap, the methodology and variables used, followed by the results of a decomposition analysis, and concluding with a discussion on the limitations and ideas for future research.

Review of the Literature

Ronald Oaxaca's 1973 paper brought decomposition models into econometrics, a branch of economics that uses mathematical models to help explain economic theory (e.g., supply and demand and wage distribution). The decomposition model works by separating characteristics and the returns of each characteristic by group; in Oaxaca's research, men and women. Since Oaxaca wrote about wages and income, the term returns was used instead of regression coefficient. In

economics, returns on investment are discussed, and Oaxaca discussed whether returns were based on an occupation or industry in which an individual worked. Having done this, Oaxaca (1973) examined wage differentials in urban labor markets for male and female workers and concluded with other researchers that unequal pay for equal work did not account for very much of the male-female differential.

In 2008, professors from the University of Wyoming and Montana State University completed a study measuring wage equality for female professors at the University of Wyoming (Alexander, Ballenger, Muller, and Stock, 2008). The professors wrote that differences in the mean annual salaries of men and women largely disappeared once other factors expected to influence salary were controlled for in a regression model. They further noted that Oaxaca decomposition modeling implied that differentials in the returns to the characteristics of the groups served to narrow rather than increase the gender wage gap.

CONSAD Research Corporation (CRC) was contracted by the U.S. Department of Labor in 2009 to analyze the differences in wages between men and women. In 2009, CRC published their results using the Outgoing Rotations Group files of the Current Population Survey (CPS). The CPS is a monthly survey of 60,000 U.S. households conducted by the U.S. Census Bureau for the Bureau of Labor Statistics (BLS) that asks about an individual's employment or unemployment status. Some variables that CRC included were marital status, number of children, race, and whether an individual worked full-time. CRC concluded that the raw wage gap in 2007 was 20.4%, or approximately $0.80 on the dollar. Accounting for other variables that influence wages, using a conventional and alternative decomposition analysis found the adjusted wage gap at 4.8%, meaning that women earned approximately $0.95 on the dollar earned by men.

In 2012, the American Association of University Women published a paper titled, "Graduating to a Pay Gap," looking at the earnings of women and men one year after college graduation. The raw gender wage gap of women under 35 who graduate with a bachelor's degree was $0.82 for every dollar men earned (Corbett and Hill, 2012). Variables included the occupation an individual worked in, marital status as single or never married, married or cohabitating, or divorced, separated, or widowed. Region of residence in the United States was represented by Northeast, Midwest, South, West, and outside of U.S. Undergraduate majors were represented by education, computer science or engineering or science or technology or math, general studies, social sciences, humanities, health, and business and other applied. Other variables included undergraduate grade point average, hours worked, multiple jobs, and type of university represented by public university, public college, private university, private college and for-profit four-year institution. For both men and women, hours worked per week was statistically significant at the 5% level and the coefficient was 7.5%. This means that for each hour worked, an individual's wage would increase 7.5% on average. The multiple jobs variable was also statistically significant at the 5% level but was -7.1%, meaning a person with multiple jobs would earn 7.1% less than a person with one job. This could be the result of individuals working multiple part-time

jobs at a lower pay scale than individuals working a full-time job. Accounting for multiple variables, the regression analysis result left an unexplained wage gap of 6.6%, meaning that women earned $0.93 for every dollar earned by men one year after college graduation. The adjusted R-squared for their regression analysis was 36.5%. This meant that the model could account for 36.5% of the variation in wages one year after college graduation, while 63.5% of the variation in wages remained unexplained.

Heinze (2006), Engles (2015), and Kooistra (2017) discussed how company size influenced the gender wage gap. Heinze computed mean gender wage gaps within firms and the size of the business by categorizing size between 20 and 99 employees and 100 and over. Heinze found that wage gaps within the firms and business sizes analyzed were both smaller than the overall gender wage gap in Germany. Heinze's overall conclusion about firm size and wage gaps was similar to Engels and Kooistra respective theses that the raw gender wage gap was larger with smaller firms compared to larger firms in the Netherlands.

Methodology

Data for this research came from the Wyoming Wage Records database, Quarterly Census of Employment and Wages (QCEW), Wyoming licensing boards, Wyoming Department of Health, Community College Commission, University of Wyoming, the Wyoming Department of Education, the Wyoming driver's license file and the New Hires Job Skills Survey. R&P collects and maintains quarterly wage records data through the Unemployment Insurance (UI) system from 1992 to present, based on employers' quarterly wage and employment reports to the Unemployment Insurance (UI) tax section of the Wyoming Department of Workforce Services, which includes approximately 92% of Wyoming employment. R&P selected individuals who lived and worked in Wyoming in 2016, who worked between 12 and 60 hours a week, and had high school or college education records in the state. This provided R&P with 27,226 observations of men and 27,764 observations of women. These data also enabled R&P to analyze age, marital status, number of children, highest education level, experience in industry and occupation, dominant industry and occupation, hours worked, county of employment, private or public sector, if working multiple jobs, and workforce turnover.

Marital status was categorized as unknown, single, married, or divorced in Wyoming's vital records. If marriages or divorces were categorized as null in the records, they were assigned unknown marital status. If the count of marriages was larger than divorces, that observation was given the status married. If the count of divorces was larger than marriages than the observation was given the status divorced. When marriages and divorces had the same count, the one that happened most recently was chosen as the marital status. Number of children was categorized as unknown, no child, one, two, or three or more children. If the variable births listed null for an observation, the status unknown was assigned. Depending on the number of children the observation contained it was put in the appropriate category. The variable birth year represents whether a man or woman had a child in Wyoming in

2016; data for births outside of the state were not available.

Highest education completed was categorized as the highest level of education one received in Wyoming. The highest education completed variables included less than high school, high school diploma or equivalent, some college no degree, a postsecondary certificate, associate's degree, bachelor's degree, master's degree, and doctorate or professional degree. Some of the education values were manually changed due to the difference in the education received in Wyoming and the occupation an individual had in 2016. For example, if an individual had his or her highest level of education obtained as a bachelor's degree but occupational data from Wyoming's licensing boards showed the individual was a dentist or surgeon, that persons' education obtained was changed from bachelor's to doctorate.

Classification of Instructional Program (CIP) was categorized based in conjunction with the highest education level obtained. If an individual graduated with a bachelor's degree in history and a master's degree in economics, the CIP code for economics would be used. Some college, no degree educational attainment was assigned the same CIP code as high school completion due to not being awarded a degree the highest level of instructional program completed was high school. If someone had their highest education level as less than high school then a dummy variable for less than high school was created as CIP code 98. If the CIP code was null or 999999 for an individual, it was categorized as missing CIP code 99. From the prior explanation of highest education level obtained, those who had occupational data showing they were doctors or teachers had their CIP code changed to missing because their CIP code obtained prior to being awarded a higher degree could be incorrect.

Workforce turnover is defined as the percentage the individual changed employers over their lifetime working in Wyoming from 1992 to 2016. If an employee entered the workforce (entry), left the workforce (exit), or both (entry & exit) in a quarter, it would be counted only in the quarter the event happened. For example, if an employee worked 10 quarters and had only an entry in the first quarter and continuous employment the rest of the nine quarters, that person's workforce turnover would be 10%. Continuous employment is defined as employment where an individual worked the prior quarter and quarter after for the same company. Multiple jobs include those who had continuous employment with more than one employer for any quarter in 2016. Full-time employment, according to the Internal Revenue Service, is based on working an average of 30 or more hours a week, or 130 hours of service for each month.

Business size was determined by the number of employees a business had in 2016. A small business was classified as having 1-49 employees, medium business was classified as having 50-499 employees, and a large business was classified with 500 or more employees. The reasoning for the classification of business size was to keep the employment distribution similar. For this research, R&P identified 19,353 individuals working in small businesses, 22,225 working in medium businesses, and 13,218 working in large businesses. Dominant industry and occupation are based on the industry and occupation in which an individual

accrued the most wages annually in 2016. Industry and occupational experience are counted in quarters. Location is based on the county of an individual's employer due to production emanating from the employer.

Table 6.1: **Characteristics That Help Explain the Gender Wage Gap in Wyoming, 2016**

Wage Gap Due To:	Characteristics	Coefficients
		1
		Male-Female
		0.282
Age	-0.005	0.232
Marital Status	-0.002	-0.016
Children	-0.002	0.029
Hours	0.090	0.036
Wyoming Experience	0.002	0.015
Workforce Characteristics	-0.003	-0.029
Firm Size	-0.011	-0.008
Private/Public Sector	0.004	-0.005
Education	-0.028	-0.059
Classification of Instructional Program	0.017	-0.002
Industry	0.121	-0.023
Industry Experience	-0.009	-0.008
Occupation	-0.036	0.009
Occupational Experience	0.002	-0.020
County	0.010	0.025
Intercept	-	-0.052
Total Explanatory Characteristics	**0.149**	**0.125**
Raw Gender Wage Gap	**$0.72**	
Total Explanatory Characteristics	**$0.15**	
Unexplained Difference	**$0.13**	
Adjusted Gender Wage Gap	**$0.87**	

Positive numbers indicate characteristics that helped explain the gender wage gap.
Negative numbers indicate characteristics that were not explanatory.
Source: Decomposition analysis of custom extract of Research & Planning administrative databases.
Prepared by M. Halama, Research & Planning, WY DWS, 8/28/18.

As an example, picture the comparison variables as a single individual without children or unknown child status employed in Laramie County with a high school or equivalent degree working as a salesperson for a large private company in the retail trade industry. Laramie County was chosen because it contains the largest population and would have variation among industries worked.

Results

For this research, R&P economists used the logarithm of annual wages because it transformed a skewed distribution into a normal distribution that would make it acceptable for the use of linear regression analysis, as annual wages for both genders were skewed towards the lower end of the wage distribution. Variables that were grouped within education, CIP code, industry, occupation, or location equaled 1 for males and females. Using the highest level of education for men as an example, 3.2% of men had less than a high school education, 6.2% had a high school degree or general equivalency diploma, 64.9% completed some college without a degree, 2.4% obtained a postsecondary certificate, 6.7% earned an associate's degree, 11.4% earned a bachelor degree, 1.4% obtained a master's degree, and 3.2% earned a doctorate or professional degree, totaling 100.0% of men in this study.

This approach showed the raw gender wage gap was $0.28, meaning that women earned about $0.72 for every dollar earned by men when only annual wages and gender were taken into consideration.

Table 6.1 is a simplified version of the

results of the decomposition analysis that aggregates categorical variables. The first column of Table 6.1 lists the aggregated independent variables used in the decomposition model. The second column lists the characteristics, while the third column displays the coefficients.

Characteristics were either the mean value of a variable, or when a dummy variable was used, characteristics refer to the percentage that dummy variable represented in this study by group, either male or female representation. When the number was positive, such as hours, it meant that men on average in 2016 worked more hours than women. When the number was negative, such as age, it meant that women on average in 2016 were older than men in this study.

Coefficients were estimates of the unexplained residual portions or what could be attributed to discrimination, variables not included in the regression model, or a combination of both.

The full decomposition analysis is available online at http://doe.state.wy.us/LMI/WYWageGap2018.htm.

As previously mentioned, the original raw wage gap for this study was $0.28, meaning women earned approximately $0.72 for every dollar earned by men. As shown in Table 6.1, industry accounted for approximately $0.12 of the $0.28 difference, while hours worked accounted for approximately $0.09. Negative numbers in Table 6.1 mean that women made up a larger portion of those characteristics then men. For example, education explained -$0.03 and occupations explained -$0.04; the explanation for these negative numbers is that women made up a greater proportion than men for these variables, with the exceptions of individuals who completed less than high school, some college but no degree, postsecondary certificate, and doctorate or professional degree. The same was true with occupations due to the type of data provided to R&P from Wyoming's different licensing boards.

Discussion

The raw gender wage gap in this analysis was $0.28, meaning that on average women earned $0.72 for every dollar paid to men. By analyzing 121 variables and 11 comparison variables in the decomposition analysis, the adjusted wage gap became $0.12, meaning that women earned $0.88 for every one dollar paid to men. Variables that took into account age, marital status, number of children, size of business, private or public sector, having multiple jobs, workforce turnover, education, program of study, experience, hours worked, industry, occupation, and location helped identify $0.15 of the raw gender wage gap. The remaining $0.13 of the adjusted gender wage gap were unaccounted for due to factors that were unknown, which could include discrimination.

The industry and hours an individual worked stand out as the most important variables that helped explain the gender wage gap. Hours worked explain $0.09 of the raw gender wage gap of $0.28. Men and women both had regression coefficients of .002; the difference is that in this study, men on average worked 143 hours more than women over the year, which explained the hours worked portion of the wage gap.

(Text continued on page 63)

2008 Decomposition Analysis

For comparison purposes, a decomposition analysis was also performed on data from 2008, a year that was much different economically for Wyoming. The 2008 analysis included 14,105 men and 13,593 women. According to the 2008 analysis, women earned approximately $0.64 per one dollar earned by men, leaving a wage gap of approximately $0.36.

It should be noted that R&P analysts faced even more limitations with 2008 data than with 2016 data. For example, occupational data were missing for the majority of men (83.6%) and women (57.2%); therefore, occupations were not used at all in the 2008 analysis.

Table 6.2 displays which variables provided the largest explanation of the gender wage gap in Wyoming. Hours worked explained approximately $0.10 of the raw gender wage gap, while the industry an individual worked in explained $0.08. County of employment accounted for approximately $0.04 of the raw gender wage gap. The sector in which an individual worked (public or private) explained approximately $0.02 of the raw wage gap. Education and industry experience did not have an explanatory effect on the wage gap, as both numbers were negative.

In total, the variables accounted for approximately $0.20 of the raw gender wage wage gap, leaving $0.16 unexplained in 2008.

Table 6.2: **Characteristics That Help Explain the Gender Wage Gap in Wyoming, 2008**

Wage Gap Due To:	Characteristics	Coefficients
		1
		Male-Female
		0.357
Age	-0.004	0.112
Marital Status	-0.003	-0.013
Children	0.000	0.015
Hours	0.101	0.142
Wyoming Experience	0.004	-0.053
Workforce Characteristics	-0.005	-0.028
Firm Size	-0.002	0.010
Private/Public Sector	0.023	-0.042
Education	-0.025	-0.012
Classification of Instructional Program	0.015	-0.013
STEM	-0.001	0.000
Industry	0.077	0.087
Industry Experience	-0.019	-0.007
Occupation	*	*
Occupational Experience	*	*
County	0.035	0.044
Intercept	-	-0.080
Total Explanatory Characteristics	**0.197**	**0.161**
Raw Gender Wage Gap	**$0.64**	
Total Explanatory Characteristics	**$0.20**	
Unexplained Difference	**$0.16**	
Adjusted Gender Wage Gap	**$0.84**	

Positive numbers indicate characteristics that helped explain the gender wage gap.
Negative numbers indicate characteristics that were not explanatory.
Due to lack of occupational data, occupation and occupation experience were not used in this analysis.
Source: Decomposition analysis of custom extract of Research & Planning administrative databases.
Prepared by M. Halama, Research & Planning, WY DWS, 8/28/18.

(Text continued from page 61)

Limitations

Several limitations should be addressed in this article. First, there were several variables not included in this analysis that could further explain portions of the wage gap. Those variables include race, union representation, past criminal history, and whether an individual had wage records from another state. Education and CIP code data from the community colleges and University of Wyoming were from 2006 to 2016, which limited the number of observations in our study; access to additional years of education data before 2006 would help overcome this observational deficit. When compared to CIP codes where an individual had less than a high school studies, high school studies or missing data (CIP codes 53, 98, and 99), many of the programs had negative results. This could be attributed to those going to school foregoing wages in order to get a degree in a field they want to study, whereas those who graduate high school and go right into the workforce are looking at maximizing their wages, gaining experience, and receiving promotions.

Finally, R&P had a disproportionate number of observations of women that had occupational data (52.1%) compared to men (25.9%). A reason for the disproportionate observations can be explained by the licensing data available to R&P, as a majority of the licensing files are in health professions or education, which are industries and occupations dominated by women. This also created issues as the composition of those previously mentioned occupations was accurate, while the other occupations could not be accurate due to missing data which may skew the occupational portion of the decomposition analysis. Since part of the occupational data comes from the New Hires Survey, this skewed occupational experience towards less experienced individuals with the exception of occupations that were gathered from the licensing boards. Other limitations involved subjective criteria; for instance there is no measurement for negotiating ability, but individuals do frequently negotiate pay and/or benefits.

Future studies should combine what was done in this research and try to add additional years of college records prior to 2006, as well as examining ways to increase occupational data collection. Incorporating these steps may lower residuals of the unexplained portion of the raw wage gap.

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Chapter 7

Analysis of Benefits in Wyoming

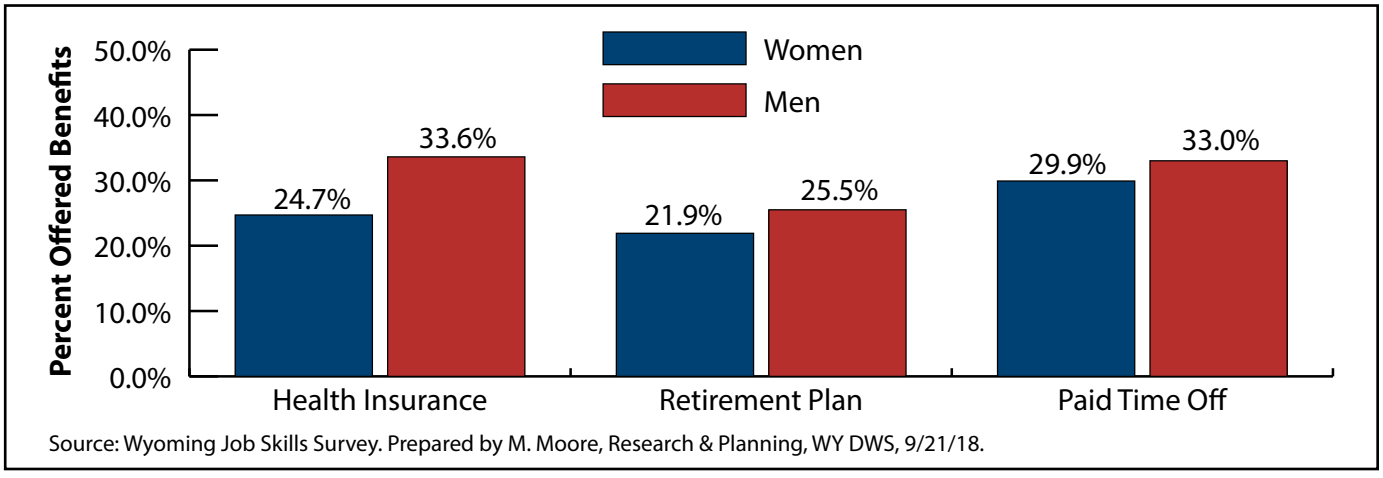
by: Lisa Knapp, Senior Research Analyst

This analysis includes two sections, each using a different data source: 2016 estimates from the Wyoming Job Skills Survey (new hires) and 2016 five-year estimates from the U.S. Census Bureau's American Community Survey (ACS).

New Hires

The first section uses data from the Wyoming Job Skills Survey to compare how job benefits are offered to newly hired men and women. Although R&P also conducts a benefits survey that is designed to specifically collect data about how companies offer benefits to their employees, that data cannot be divided by employee gender. The Wyoming Job Skills Survey, however, was designed to be sent to a sample of employers who hired a worker who had not previously worked for that company (a *new hire*) and collects information about the job that worker filled, such as job duties, rate of pay, benefits, and skills needed for the job. Because this survey references an individual employee rather than a company, results can be broken out and computed for both men and women. The caveat to using these data is that the scope of the survey is focused on newly hired employees rather than for the state's entire working population. For more information about the Job Skills Survey, please visit http://doe.state.wy.us/lmi/newhires.htm.

Three types of benefits were chosen for this analysis: health insurance, retirement plan, and paid time off, which included sick leave, vacation leave, and combined paid time off. As shown in Figure 7.1, a greater proportion of men were offered all three benefits than women.



Source: Wyoming Job Skills Survey. Prepared by M. Moore, Research & Planning, WY DWS, 9/21/18.

Figure 7.1: **Percent of New Hires Offered Selected Benefits in Wyoming by Gender, 2016**

Health Insurance

Table 7.1 (see page 66) contains the proportion of newly hired men and women who were offered health insurance by their employers by major occupation group.

Overall, 29.6% of all employees were offered this benefit. A larger proportion of men (33.6%) had access to health insurance than women (24.7%).

In all but five occupations, a larger

Table 7.1: Number and Percent of New Hires Offered Health Insurance by Gender and Two-Digit Occupation, 2016 Estimates*

	Women			Men			Total		
Occupation	N	% Offered	% Not Offered	N	% Offered	% Not Offered	N	% Offered	% Not Offered
Management Occs. (11)	674	39.4	60.6	1,205	52.4	47.6	1,879	47.7	52.3
Business & Financial Operations Occs. (13)	338	63.8	36.2	371	78.9	21.1	709	71.7	28.3
Computer & Mathematical Occs. (15)	136	100.0	0.0	404	90.4	9.6	540	92.9	7.1
Architecture & Engineering Occs. (17)	264	39.4	60.6	482	70.6	29.4	746	59.6	40.4
Life, Physical, & Social Science Occs. (19)	127	42.9	57.1	356	76.9	23.1	483	68.0	32.0
Community & Social Services Occs. (21)	701	37.8	62.2	220	49.9	50.1	921	40.7	59.3
Legal Occs. (23)	194	49.0	51.0	142	65.9	34.1	336	56.1	43.9
Education, Training, & Library Occs. (25)	1,532	32.7	67.3	627	34.5	65.5	2,158	33.2	66.8
Arts, Design, Entertainment, Sports, & Media Occs. (27)	320	44.6	55.4	302	32.6	67.4	622	38.8	61.2
Healthcare Practitioners & Technical Occs. (29)	1,625	55.9	44.1	493	68.9	31.1	2,118	58.9	41.1
Healthcare Support Occs. (31)	1,611	44.3	55.7	264	51.3	48.7	1,875	45.3	54.7
Protective Service Occs. (33)	448	22.8	77.2	722	28.8	71.2	1,171	26.5	73.5
Food Preparation & Serving Related Occs. (35)	9,301	6.4	93.6	7,043	8.1	91.9	16,344	7.2	92.8
Building & Grounds Cleaning & Maintenance Occs. (37)	3,674	10.7	89.3	3,883	16.0	84.0	7,557	13.4	86.6
Personal Care & Service Occs. (39)	2,989	14.3	85.7	1,349	8.3	91.7	4,338	12.4	87.6
Sales & Related Occs. (41)	6,487	20.5	79.5	5,917	23.5	76.5	12,404	21.9	78.1
Office & Administrative Support Occs. (43)	7,366	36.1	63.9	2,548	30.5	69.5	9,914	34.6	65.4
Farming, Fishing, & Forestry Occs. (45)	238	10.7	89.3	740	11.7	88.3	979	11.5	88.5
Construction & Extraction Occs. (47)	718	42.4	57.6	11,154	37.6	62.4	11,871	37.9	62.1
Installation, Maintenance, & Repair Occs. (49)	732	37.8	62.2	3,967	53.5	46.5	4,698	51.1	48.9
Production Occs. (51)	658	47.8	52.2	1,903	52.5	47.5	2,560	51.3	48.7
Transportation & Material Moving Occs. (53)	2,397	27.7	72.3	7,774	44.5	55.5	10,171	40.5	59.5
Total	**42,529**	**24.7**	**75.3**	**51,864**	**33.6**	**66.4**	**94,393**	**29.6**	**70.4**

*Includes data from 2015 and 2016.
Source: Wyoming New Hires Job Skills Survey.
Prepared by L. Knapp, Research & Planning, WY DWS, 9/17/18.

percent of men were offered this benefit. In particular, 68.9% of men working in health care practitioners & technical occupations were offered health insurance compared to 55.9% of women. It should also be noted that far more women (1,625) worked in these occupations than men (493). Among those hired in health care support occupations, 51.3% of men were offered health insurance compared to 44.3% of women. There were approximately eight times as many women (1,611) than men (264) working in these occupations.

Among new hires working in management occupations, 52.4% of men were offered health insurance compared to 39.4% of women. Men (1,205) made up nearly twice as many new hires as women (674) in these occupations.

In some instances, a greater percentage of women were offered health care than men. For example, 14.3% of women working in personal care & service occupations were offered health insurance compared to 8.3% of men. There were more than twice as many women (2,989) than men (1,349) hired for these occupations.

Arts, design, entertainment, sports, & media occupations had a similar number of men (302) and women (320). In these occupations, 44.6% of women were offered health insurance compared to 32.6% of men.

Retirement Plan

Table 7.2 (see page 68) contains the proportion of men and women who were offered a retirement plan of some kind by major occupation group. In all, only 23.9% of new hires were offered this benefit. Slightly more men (25.5%) were offered a retirement plan than women (21.9%).

Again, a larger proportion of men were offered this benefit in the majority of occupations. For example, in management occupations, 51.7% of men were offered a retirement plan compared to 35.4% of women. There were nearly twice as many men (1,205) than women (674) in this occupation.

Among architecture and engineering occupations, 62.7% of men were offered retirement benefits compared to 41.7% of women. For those working in healthcare practitioner & technical occupations, 61.6% of men were offered a retirement plan compared to 51.4% of women. The difference was less pronounced in healthcare support occupations, where 38.5% of men were offered this benefit compared to 34.4% of women.

In comparison, 37.3% of women working in arts, design, entertainment, sports, & media occupations were offered retirement benefits compared to 23.9% of men. Among those working in computer and mathematical occupations, 72.5% of women were offered these benefits compared to 67.7% of men, and 18.8% of women working in personal care and service occupations were offered retirement benefits compared to 15.8% of men.

Paid Time Off

Table 7.3 (see page 69) contains the proportion of men and women who were offered paid time off, which included paid holidays, sick leave, and vacation time, by major occupation group. Fewer than one-third (31.9%) of all new hires were offered this benefit. A slightly larger proportion

of men (33.0%) than women (29.9%) were offered paid time off.

A larger proportion of men were offered this benefit in 14 of 22 occupations. Among those working in community & social service occupations, 73.1% of men were offered paid time off, compared to 68.6% of women. Of those working in protective service occupations, 28.1% of men were offered this benefit compared to 23.0% of women, and among people

Table 7.2: Number and Percent of New Hires Offered a Retirement Plan by Gender and Two-Digit Occupation, 2016 Estimates*

	Women			Men			Total		
Occupation	N	% Offered	% Not Offered	N	% Offered	% Not Offered	N	% Offered	% Not Offered
Management Occs. (11)	674	35.4	64.6	1,205	51.7	48.3	1,879	45.9	54.1
Business & Financial Operations Occs. (13)	338	63.6	36.4	371	83.8	16.2	709	74.2	25.8
Computer & Mathematical Occs. (15)	136	72.5	27.5	404	67.7	32.3	540	68.9	31.1
Architecture & Engineering Occs. (17)	264	41.7	58.3	482	62.7	37.3	746	55.3	44.7
Life, Physical, & Social Science Occs. (19)	127	25.4	74.6	356	60.5	39.5	483	51.2	48.8
Community & Social Services Occs. (21)	701	47.5	52.5	220	57.6	42.4	921	49.9	50.1
Legal Occs. (23)	194	61.7	38.3	142	70.5	29.5	336	65.4	34.6
Education, Training, & Library Occs. (25)	1,532	29.4	70.6	627	35.1	64.9	2,158	31.0	69.0
Arts, Design, Entertainment, Sports, & Media Occs. (27)	320	37.3	62.7	302	23.9	76.1	622	30.8	69.2
Healthcare Practitioners & Technical Occs. (29)	1,625	51.4	48.6	493	61.6	38.4	2,118	53.8	46.2
Healthcare Support Occs. (31)	1,611	34.4	65.6	264	38.5	61.5	1,875	35.0	65.0
Protective Service Occs. (33)	448	24.6	75.4	722	33.8	66.2	1,171	30.3	69.7
Food Preparation & Serving Related Occs. (35)	9,301	6.5	93.5	7,043	4.3	95.7	16,344	5.6	94.4
Building & Grounds Cleaning & Maintenance Occs. (37)	3,674	7.9	92.1	3,883	11.6	88.4	7,557	9.8	90.2
Personal Care & Service Occs. (39)	2,989	18.8	81.2	1,349	15.8	84.2	4,338	17.9	82.1
Sales & Related Occs. (41)	6,487	18.4	81.6	5,917	17.9	82.1	12,404	18.1	81.9
Office & Administrative Support Occs. (43)	7,366	29.8	70.2	2,548	22.0	78.0	9,914	27.8	72.2
Farming, Fishing, & Forestry Occs. (45)	238	1.6	98.4	740	3.6	96.4	979	3.1	96.9
Construction & Extraction Occs. (47)	718	35.0	65.0	11,154	27.0	73.0	11,871	27.5	72.5
Installation, Maintenance, & Repair Occs. (49)	732	26.2	73.8	3,967	38.9	61.1	4,698	36.9	63.1
Production Occs. (51)	658	41.6	58.4	1,903	38.1	61.9	2,560	39.0	61.0
Transportation & Material Moving Occs. (53)	2,397	23.1	76.9	7,774	31.6	68.4	10,171	29.6	70.4
Total	**42,529**	**21.9**	**78.1**	**51,864**	**25.5**	**74.5**	**94,393**	**23.9**	**76.1**

*Includes data from 2015 and 2016.
Source: Wyoming New Hires Job Skills Survey.
Prepared by L. Knapp, Research & Planning, WY DWS, 9/17/18.

working in production occupations, 49.0% of men were offered paid time off compared to 38.5% of women.

In comparison, 22.4% of women working in personal care & service occupations were offered this benefit compared to only 15.5% of men, and 38.5% of women working in education, training, & library occupations were offered paid time off compared to 36.5% of men.

Table 7.3: Number and Percent of New Hires Offered Paid Time Off (Including Paid Time Off, Sick Leave, Vacation Leave, and Combined Paid Time Off) by Gender and Two-Digit Occupation, 2016 Estimates*

	Women			Men			Total		
Occupation	N	% Offered	% Not Offered	N	% Offered	% Not Offered	N	% Offered	% Not Offered
Management Occs. (11)	674	65.6	34.4	1,205	68.4	31.6	1,879	67.4	32.6
Business & Financial Operations Occs. (13)	338	72.8	27.2	371	79.8	20.2	709	76.4	23.6
Computer & Mathematical Occs. (15)	136	95.6	4.4	404	90.4	9.6	540	91.7	8.3
Architecture & Engineering Occs. (17)	264	41.7	58.3	482	75.6	24.4	746	63.6	36.4
Life, Physical, & Social Science Occs. (19)	127	33.4	66.6	356	75.2	24.8	483	64.2	35.8
Community & Social Services Occs. (21)	701	68.6	31.4	220	73.1	26.9	921	69.7	30.3
Legal Occs. (23)	194	73.9	26.1	142	78.7	21.3	336	75.9	24.1
Education, Training, & Library Occs. (25)	1,532	38.5	61.5	627	36.5	63.5	2,158	37.9	62.1
Arts, Design, Entertainment, Sports, & Media Occs. (27)	320	37.1	62.9	302	30.5	69.5	622	33.9	66.1
Healthcare Practitioners & Technical Occs. (29)	1,625	65.9	34.1	493	66.2	33.8	2,118	65.9	34.1
Healthcare Support Occs. (31)	1,611	53.9	46.1	264	52.5	47.5	1,875	53.7	46.3
Protective Service Occs. (33)	448	23.0	77.0	722	28.1	71.9	1,171	26.1	73.9
Food Preparation & Serving Related Occs. (35)	9,301	10.7	89.3	7,043	8.0	92.0	16,344	9.5	90.5
Building & Grounds Cleaning & Maintenance Occs. (37)	3,674	12.1	87.9	3,883	17.3	82.7	7,557	14.8	85.2
Personal Care & Service Occs. (39)	2,989	22.4	77.6	1,349	15.5	84.5	4,338	20.2	79.8
Sales & Related Occs. (41)	6,487	23.3	76.7	5,917	26.0	74.0	12,404	24.6	75.4
Office & Administrative Support Occs. (43)	7,366	42.8	57.2	2,548	34.6	65.4	9,914	40.7	59.3
Farming, Fishing, & Forestry Occs. (45)	238	7.9	92.1	740	25.8	74.2	979	21.4	78.6
Construction & Extraction Occs. (47)	718	27.0	73.0	11,154	34.2	65.8	11,871	33.8	66.2
Installation, Maintenance, & Repair Occs. (49)	732	58.5	41.5	3,967	50.0	50.0	4,698	50.6	49.4
Production Occs. (51)	658	38.5	61.5	1,903	49.0	51.0	2,560	46.4	53.6
Transportation & Material Moving Occs. (53)	2,397	29.9	70.1	7,774	38.2	61.8	10,171	36.2	63.8
Total	**42,529**	**29.9**	**70.1**	**51,864**	**33.0**	**67.0**	**94,393**	**31.6**	**68.4**

*Includes data from 2015 and 2016.
Source: Wyoming New Hires Job Skills Survey.
Prepared by L. Knapp, Research & Planning, WY DWS, 9/17/18.

ACS Estimates

This section, which includes a descriptive table of health insurance coverage types for all state residents between the ages of 16 and 65, relies on data gathered by the U.S. Census Bureau's American Community Survey (ACS). Specifically, these calculations use the 2016 five-year estimates, which combine data collected in 2016 and the preceding four years. Because five years of responses are used to create these estimates, they tend to be more accurate for smaller populations. The age range of 16-65 was chosen because people in this age range are more likely to be employed, making it easier to compare results to those from the Job Skills Survey.

Table 7.4 contains ACS statistics on health insurance coverage for all individuals living in Wyoming who were between the ages of 16 and 65, ages where people are more likely to be employed. Overall, a slightly larger proportion of women (84.9%) were covered by some type of insurance plan compared to men (83.4%). According to these estimates, 63.4% of women and 63.1% of men were covered by an employer or union provided health insurance plan. Similarly, 12.5% of women and 11.3% of men were covered by an insurance plan that they had directly purchased. A larger proportion of women in the state (9.4%) relied on Medicaid for health care coverage compared to men (6.6%).

Conclusion

Overall, as indicated by the results of the 2016 ACS for people ages 16 to 65, there was very little difference in the proportion of women and men who were covered by a health insurance plan. Even when examining each type of coverage, women and men maintained similar levels of coverage. The exceptions were Medicaid coverage, by which a larger proportion of women were covered, and Veteran's Administration coverage, by which a larger

Table 7.4: **Number and Percent of Men and Women Ages 16 to 65 by Health Insurance Type and Coverage in Wyoming, 2016 (2016 ACS 5-Year Estimates)**

	Women		Men		Total	
Type of Insurance	**N**	**%**	**N**	**%**	**N**	**%**
Employer/Union Provided	117,704	63.4	125,718	63.1	243,422	63.2
Direct Purchase	23,281	12.5	22,615	11.3	45,896	11.9
Medicare	8,765	4.7	8,654	4.3	17,419	4.5
Medicaid	17,534	9.4	13,155	6.6	30,689	8.0
TRICARE	6,219	3.3	7,637	3.8	13,856	3.6
Veteran's Administration	1,763	0.9	9,048	4.5	10,811	2.8
Indian Health Services	3,186	1.7	3,029	1.5	6,215	1.6
Total Covered by Any Health Insurance	157,556	84.9	163,666	82.1	321,222	83.4
Total Not Covered	28,129	15.1	35,630	17.9	63,759	16.6
Total	**185,685**	**100.0**	**199,296**	**100.0**	**384,981**	**100.0**

Note: Individuals may be covered by more than one type of insurance.
Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.
Prepared by L. Knapp, Research & Planning, WY DWS, 9/21/18.

proportion of men were covered.

There were noticeable differences in the proportions of men and women offered selected benefits in the data collected with the Wyoming Job Skills Survey. For each of the benefits analyzed, a larger proportion of men were offered benefits. Additionally, a larger proportion of men were offered these benefits in a majority of major occupation groups. Exceptions included occupations such as personal care & service occupations, office & administrative support occupations, and healthcare support occupations, where women made up the larger proportion of employees.

There are several factors to take into consideration regarding the results of the Wyoming Job Skills Survey. First, these data are derived from a comparatively small sample of employees, although the sample was selected in a manner to be statistically representative of the general population. Second, the jobs that this survey collects data on are filled by new hires. These results don't take into account full- or part-time work status, previous work experience, employer size class, geographic region, or any other elements that may or may not affect how job benefits are offered. Also, in the case of health insurance benefits, these results don't account for the types of health insurance plans offered, the level of coverage offered, or the costs of premiums to employees, all of which may have different economic impacts on men and women. Finally, these calculations are intended only as a basic descriptive analysis of how benefits are offered to newly hired employees. As such, these results are not intended to definitively say there is a statistically significant difference in the way job benefits are offered to men and women, just that there could be a difference.

Chapter 8

Benefits of Reducing Wage Disparities

by: Patrick Manning, Principal Economist

House Bill 0209 (2017) required that this study include a focus on "benefits and costs of eliminating or reducing any wage and benefit disparities." To address this focus, Research & Planning (R&P) economists created a scenario in which the hourly wage of women was increased to the hourly wage of men while leaving the total number of hours worked unchanged (see Box 8.1). It should be noted, however, that this scenario is not entirely realistic, in that profits would decrease with the increased labor costs, which could cause a lowering of primary output.

As shown in Box 8.1, in 2016, there were 86,162 men and 80,198 women working in Wyoming who met the criteria of the analysis as described in Chapter 2. Men worked a total of 723,465,005 hours in 2016, compared to 588,474,203 hours worked by women. Overall, women earned $0.74 per $1 earned by men, a difference of $0.26.

For this scenario, additional labor income was calculated by multiplying the wage difference by the number of hours worked by women; in this case, multiplying the $0.26 wage difference by the 588,474,203 hours worked for women resulted in additional labor income of $153,003,293.

This labor income was then used as an input to IMPLAN (Impact Analysis for Planning) modeling software through a change in employee compensation.

Box 8.1: Effects of Eliminating the Gender Wage Gap

2016
Number of men working = 86,162
Number of women working = 80,198

Hours worked by men = 723,465,005
Hours worked by women = 588,474,203

Women's wages per $1 of men's wages = $0.74

Scenario: Hourly wage of women was increased to the hourly wage of men while leaving the total number of hours worked unchanged.

Wage difference ($0.74) x hours worked by women ($588,474,203) = increased labor income ($153,003,293)

IMPLAN software provides analysts with three types of estimates:

1. Direct impacts: economic impacts as a result of actual project spending, such as the hiring of a general contractor to perform a construction project that subsequently increases employment to complete the project.

2. Indirect impacts: economic impacts as a result of business-to-business spending when projects or events occur, such as a ready-mix company that purchases aggregate from a local supplier because of a new project.

3. Induced impacts: economic impacts as a result of household spending changes because of a project or event

Table 8.1: **Impact Summary**

Impact Type	Increase in Employment	Labor Income	Total Value Added	Output
Direct Effect	0.0	$0	$0	$0
Indirect Effect	0.0	$0	$0	$0
Induced Effect	604.1	$22,237,060	$45,161,537	$80,072,090
Total Effect	**604.1**	**$22,237,060**	**$45,161,537**	**$80,072,090**

Source: IMPLAN (Impact Analysis for Planning) modelling software

Table 8.3: **Top 10 Sectors by Increased Labor Income**

IMPLAN Sector	Description	Increased Jobs	Increased Labor Income	Total Value Added	Total Output
475	Offices of physicians	15.9	$1,684,765	$1,628,699	$2,388,687
395	Wholesale trade	13.6	$1,210,660	$2,122,594	$3,222,433
482	Hospitals	12.6	$991,061	$1,196,420	$2,034,307
440	Real estate	41.2	$797,687	$4,396,324	$6,828,398
501	Full-service restaurants	36.6	$762,933	$810,986	$1,681,914
433	Monetary authorities and depository credit intermediation	11.0	$704,449	$1,207,400	$2,216,740
504	Automotive repair and maintenance, except car washes	12.6	$637,561	$828,110	$1,233,791
405	Retail - General merchandise stores	21.1	$612,386	$1,102,733	$1,630,894
502	Limited-service restaurants	33.2	$602,454	$1,507,130	$2,723,683
400	Retail - Food and beverage stores	18.4	$599,150	$966,028	$1,388,483

Source: IMPLAN (Impact Analysis for Planning) modelling software.

Table 8.2: **Top 10 Sectors by Increased Employment**

IMPLAN Sector	Description	Increased Jobs	Increased Labor Income	Total Value Added	Total Output
440	Real estate	41.2	$797,687	$4,396,324	$6,828,398
501	Full-service restaurants	36.6	$762,933	$810,986	$1,681,914
502	Limited-service restaurants	33.2	$602,454	$1,507,130	$2,723,683
405	Retail - General merchandise stores	21.1	$612,386	$1,102,733	$1,630,894
503	All other food and drinking places	19.8	$436,918	$486,424	$841,764
485	Individual and family services	19.0	$438,325	$388,959	$590,001
400	Retail - Food and beverage stores	18.4	$599,150	$966,028	$1,388,483
475	Offices of physicians	15.9	$1,684,765	$1,628,699	$2,388,687
407	Retail - Nonstore retailers	14.0	$192,805	$827,463	$1,599,919
395	Wholesale trade	13.6	$1,210,660	$2,122,594	$3,222,433

Source: IMPLAN (Impact Analysis for Planning) modelling software.

occurrence, such as an electrician who wires a new school building and then takes his family out to dinner because of the increase in wages.

For this study, the change in employee compensation only affects the induced impacts (i.e. household spending changes) of this economic activity.

The infusion of $153 million in labor income resulted in an induced effect of an additional 604 jobs, approximately $22.2 million in additional labor income, and over $80 million in output to the Wyoming economy, measured in 2016 dollars (see Table 8.1, page 76).

In terms of increased employment, the real estate (41.2 jobs) and full-service restaurants (36.6 jobs) would see the greatest increase in jobs (see Table 8.2, page 76). In terms of increased labor income, offices of physicians and the wholesale trade sectors were the most affected, at approximately $1.8 million and $1.2 million, respectively (see Table 8.3, page 76). Additionally, this increase in labor income would increase state and local taxes by more than $5 million.

2017 *STATE OF WYOMING* **17LSO-0482**
ENGROSSED

HOUSE BILL NO. HB0209

Disparity in wages and benefits between men and women.

Sponsored by: Representative(s) Connolly and Halverson

A BILL

for

AN ACT relating to employment; providing for a study and a report on wage and benefit disparities; and providing for an effective date.

Be It Enacted by the Legislature of the State of Wyoming:

Section 1.

(a) The department of workforce services shall update and expand upon the 2003 study and resulting report entitled, "A Study of the Disparity in Wages and Benefits Between Men and Women in Wyoming" authorized in 2002 Wyoming Session Laws, Chapter 85.

(b) On or before October 1, 2018, the department of workforce services shall present a report to the joint

labor, health and social services interim committee and the joint minerals, business and economic development interim committee. The study and report shall focus on:

(i) If and where disparities exist, including:

(A) Data and analysis according to county;

(B) Data and analysis according to occupation;

(C) Comparative state data with other state and federal information;

(ii) The causes of any wage and benefit disparities;

(iii) The impacts of any wage and benefit disparities on Wyoming's economy;

(iv) Possible solutions and workforce development programs to reduce or eliminate any wage and benefit disparities;

(v) Benefits and costs of eliminating or reducing any wage and benefit disparities.

Section 2. This act is effective July 1, 2017.

(END)

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