

IDENTIFYING THE PREDICTORS OF FEMALE PROJECT MANAGERS'
SALARIES IN THE UNITED STATES

A Thesis

by

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ABSTRACT

This study seeks to explore the predictors of female project managers' salary in the construction industry, and to analyze their impacts on determining the salary.

Experience, age, marital status, motherhood, having children at home, and the number of children at home were selected as the independent variables. Snowball sampling method was used to identify the potential participants, and surveys were sent to participants to collect data. 206 responses were collected and comprehensive descriptive and statistical analyses were performed on the responses.

The study finds that experience and age have a positive relationship with female project managers' salaries. Being married and having children at home have significant negative impacts on female project managers' salaries. A regression model is also built to determine the prediction power of variables. Fifty-one percent of the variability in salary can be accounted for by the variables included in this model.

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1. INTRODUCTION

1.1 Background

For many years the construction industry has been the domain of men and its work environment has been known to be tough for women. In 1960's and 1970's the United States government began attempts to reduce discrimination in different industries, including the construction industry (Shah 2004). However, women still constitute only 9.0percent of the workforce in the construction industry and only 13percent of women in the construction industry are involved in the professional and management sections (NAWIC 2010).

There have been discussions regarding inequality and salary differentials between men and women in industry for many years. However, studies do not show a considerable salary gap between men and women in the construction industry, especially when compared to other industries. The construction industry is among the very few industries that women earn more than 90 percent of their male counterparts' mean weekly salary (U.S. Bureau of Labor Statistic 2009).

Women's participation in the construction industry is on the rise, but society has not been very supportive of women's new roles in nontraditional careers. In the United States being a mother is accompanied by a wage penalty (Budig and England 2001; Waldfogel 1997) and the number of young children in a house has a significant negative impact on women's salary, but has no effect on men's earnings (Hundley 2001).

This study seeks to determine if family-related factors have consequences affecting women's salaries in construction, and, if so, to identify the factors that have the strongest impact.

1.2 Statement of the Problem

The purpose of this study is to identify and analyze the effects of construction experience, age, marital status, motherhood, having children at home, and the number of children at home on the salary of professional female employees in the construction industry.

1.3 Research Objectives

The research objectives are: (1) to explore the predictors of female project managers' salary in the construction industry, and (2) to analyze their impacts on determining salary.

1.4 Null Hypotheses

Null Hypothesis 1

There is no significant relationship between salary and *years of construction experience* in the construction industry for women.

Null Hypothesis 2

There is no significant relationship between salary and *age* in the construction industry for women.

Null Hypothesis 3

There is no significant relationship between salary and *marital status* in the construction industry for women.

Null Hypothesis 4

There is no significant relationship between salary and *motherhood* in the construction industry for women.

Null Hypothesis 5

There is no significant relationship between women's salary and *having their children living at home* in the construction industry.

Null Hypothesis 6

There is no significant relationship between salary and *the number of children living at home* in the construction industry for women.

1.5 Delimitations

1. This study only considers female employees that are holding a project management position in construction companies.
2. This study only considers female employees with a Bachelor's degree from accredited construction programs.
3. This study considers the female employees of construction companies in the United States of America.

1.6 Assumptions

It is assumed that all survey questions were answered honestly.

It is assumed that all respondents had the requisite knowledge to answer the surveys.

It is assumed that the study instruments are valid and reliable.

1.7 Definition of Terms

Snowball sampling: Snowball sampling is a non-probability sampling method that researchers identify potential participants through their acquaintances. Therefore enough data is collected as the sample group grows like a rolling snowball.

Motherhood: Motherhood is the state of being a mother. In this study a mother is a woman who has given birth to a child or has raised a child. Motherhood is associated with the social role of raising a child and both biological and non-biological female parents are considered as mothers.

1.8 Significance of the Study

There are many books and papers that have studied factors shaping labor force participation for women. Books and papers have investigated women holding management positions and the impacts of their age, experience, and family decisions on their careers and salaries. Yet, little has been done to study the effects of experience, age, marital status, and having children on women managers working specifically in the construction industry. This study will help to better understand the current situation of female project managers in the construction industry.

2. REVIEW OF THE RELATED LITERATURE

2.1 Women in Labor force

Women have been successful in gaining higher education and eventually more professional occupations during the last century. For women, it appears that there is a direct relationship between a high-level of education and the likelihood of being in the labor force. Educational attainment is considered as a consistent and robust predictor of females' participation in the labor force (Davidson and Burke 2004). Every year since the early 1980s, women were able to earn more than half of all bachelor's degrees. However, in engineering and technology-related fields, women still earn noticeably less than half of bachelor's degrees. Having fewer women involved in these fields is problematic since technology-related fields are where the job demand is the highest (Davidson and Burke 2004).

Studies related to women's participation in the labor force show an "M" curve for their age distribution. The "M" curve demonstrates that women tend to choose to leave their careers between the ages of 24 to 45 to dedicate time to their families- but then return at a later time. In early 80s, however the "M" curve transformed into a very different shape, an inverted bowl (Figure 1). This trend is similar to the trend observable in men (Women's Bureau 2000).

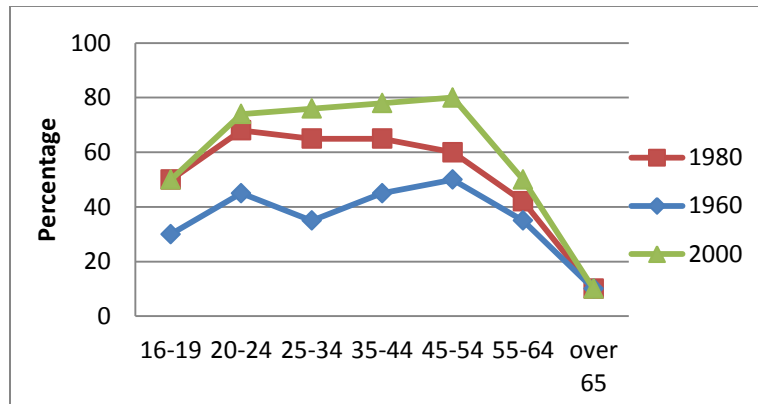


Figure 1- Labor force percentage participation rates for women, Women’s Bureau 2000

This transformation is the outcome of several changes. First, family make-up has changed significantly in recent years. The number of married couples has decreased, while the divorce rate and the number of single women have increased. Many mothers are working now whereas they had not before. Also, having children and the age of children seems to affect mothers’ participation rate (Figure 2). Many women decide, nowadays, not to have children. Middle-aged women without children were prevalent in 80s and 90s and more recently, they are up to 20percent of the total female labor force. Having older children seems to enable them to contribute more in the workforce (Davidson and Burke 2004).

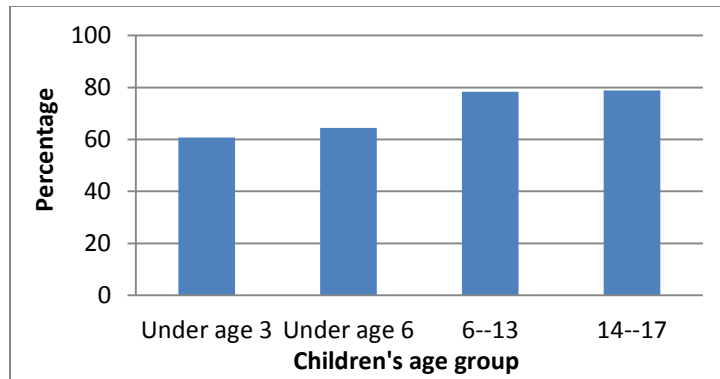


Figure 2- Labor force participation rates of mothers by children's age group, Women's Bureau 2000

2.2 Women in Management

Women comprised half of the workers in the “high-paying management, professional, and related occupations” in 2010. The largest portions of these professional women are involved in occupations traditionally held by women such as nursing, teaching, and social worker positions. Only 20 percent of professionals in engineering are women (Women's Bureau 2010).

The total number of women managers is increasing; however, the progress of women in high-level managerial positions has not been very noticeable. According to Davidson and Burke (2004) only 12.5percent of top-level positions are women. Only very few women “occupy the positions of chief executive officer, president, chief operating officer, or executive vice-president (Davidson and Burke 2004, p. 198).”

Women have made great achievements in pursuing higher management positions in the last century. However, invisible barriers, known as the glass ceiling, still remain intact for women. The glass ceiling still keeps women in “staff/support roles” and

prevents them from progressing into more influential management positions. The invisible ceiling remains undamaged since only a few number of women have been able to break it (Davidson and Burke 2004).

2.3 Women in the Construction Industry

According to The National Association of Women in Construction, 807,000 women were employed in various occupation sectors of the construction industry as of the last day of 2010. Women comprise less than 10 percent of the workforce in the construction industry, while the percentage of women in all industries is 46percent. Only 13percent of women in the construction industry are involved in professional and management roles. Table 1 is a breakdown of women by occupation sector in the construction industry (NAWIC 2010).

Table 1 - Breakdown of Women in Construction, NAWIC 2010

Occupation Sector	Number of Women	Percentage
Sales and Office	418,000	76%
Professional & Management	234,000	13%
Natural Resources, Construction & Maintenance	138,000	2%
Service Occupations	10,000	19%
Transportation & Material Moving	21,000	2%

The women’s bureau defines a nontraditional occupation for women as an occupation in which women make up less than one-fourth of the total employees

(Women’s Bureau 2007). Based on this definition, 153 occupations are identified as nontraditional and over 20percent of theses occupations are construction-related. The nontraditional construction-related occupations are divided into the trades and paraprofessional/professional sections. The proportion of women in the trades is more than three times that of women in the professional sector (Menches and Abraham 2007).

Table 2 indicates the nontraditional paraprofessional and professional occupations and the percentage of women involved in each field. The construction managers and engineering managers fields consist of less than 10percent women and only the architecture field has slightly more than 20 percent women.

Table 2 - Percentage of women employed in paraprofessional and professional construction occupations (Women’s Bureau 2007)

Career field	Percent of women employed
Architects	20.4
Drafters	18.8
Engineering technicians	18.4
Cost estimators	14.7
Design engineers	9.5
Construction inspectors	9.4
Construction managers	6.3
Engineering managers	4.9

2.4 Challenges and Barriers for Women in Construction

The literature relevant to women in construction associates women's barriers in this industry with "physiological and psychological phenomena, sociological phenomena, and specific work activities and actions (Menches and Abraham 2007, p. 702)." According to Menches and Abraham (2007) the major challenges that women encounter in construction are:

1. Slow career progression that leads to discouragement
2. Difficulty in balancing work and family responsibilities, specifically child rearing responsibilities
3. Attitude barriers due to male-oriented culture
4. Inflexible structure of construction jobs
5. Dominance of masculine culture that includes conflict and aggression

Family and child-care pressures primarily affect women's career paths in the construction industry. Women find construction with limited opportunities for part-time employment and therefore are not attracted to this industry as a long-term career option (Menches and Abraham 2007). On the other hand, the construction industry needs to increase the number of women who choose construction as a career, particularly now that this industry is facing an aging workforce, a significant number of retirements, and trends in post-graduate education that does not supply formally trained personnel. "Introducing or improving flexible working practices and career-change strategies can

improve women’s entry and retention in construction (Menches and Abraham 2007, p. 705)”.

2.5 Women’s Earnings

In 2009, according to the U.S Bureau of Labor Statistic, 44,712 women worked full time in wage and salary jobs and had average weekly earnings of \$657, which is 80 percent of men’s average weekly earnings. Industries that had the highest women’s-to-men’s earnings ratio were construction, real estate and rental and leasing, management and administrative, and agriculture and related industries (Table 3).

Table 3 - Industries with highest women’s-to-men’s earnings ratio, Bureau of labor statistic 2010

	Total, both sexes		Women		Men		Women's earnings as percent of men's
	Women	Men	Total employed	Median weekly earnings	Total employed	Median weekly earnings	
Industry	99,820	\$739	44,712	\$657	55,108	\$819	80.2
Agriculture and related industries	905	477	162	413	743	488	84.6
Construction	6,336	748	568	696	5,768	755	92.2
Real estate and rental and leasing	1,717	728	734	699	983	749	93.3
Management, administrative, and waste services	3,764	568	1,366	518	2,398	594	87.2

Though women’s earnings in industry have increased considerably in the last couple of decades, women are still “underrepresented among the highest earners” and “overrepresented among the lowest earners” (Figure 3). Based on the data from the Current Population Survey in 2005, women constitute only 31 percent of highest earners in the fourth quartile, as seen in the figure 3. On the other hand, women were slightly dominant in the first quartile with 53.2 percent (U.S. Department of Labor 2006).

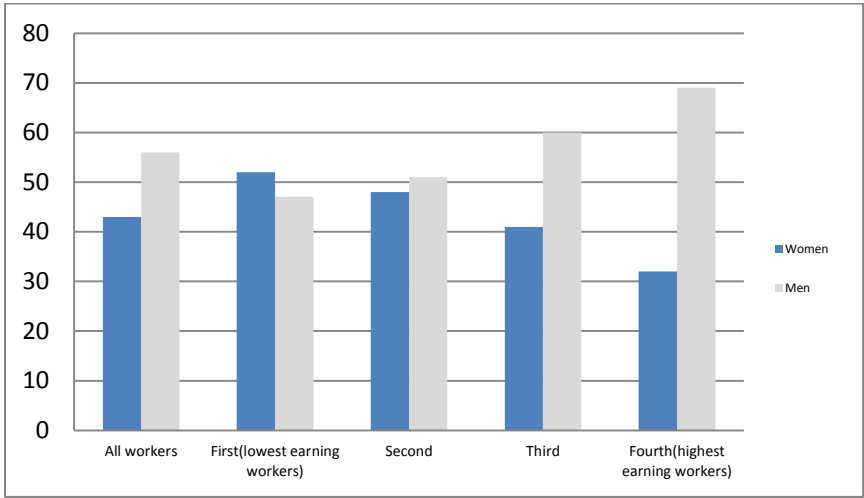


Figure 3 - Percent of full-time wage and salary workers by quartile and sex, U.S. Department of Labor 2006

Sixty percent of the highest earners women are involved in “educational and health services, professional and business services, and financial activities.” Construction and manufacturing are the two industries that have the largest gender-based difference in the number of highest earners. More than 25 percent of highest earning

men worked in construction and manufacturing industries, while only 10 percent of highest earning women are involved in these industries (U.S. Department of Labor 2006).

2.6 Wage Penalty for Women

2.6.1. Motherhood

Motherhood is associated with a wage penalty for women. Investigations by Budig and England (2001) indicate a wage penalty of 7 percent per child, which is decreased to 5 percent after controlling for experience. Budig and England (2001) suggest four possible reasons for this penalty:

1. Mothers tend to spend more time at home to take care of their children. This may interrupt their job experience or their full-time employment.
2. Women tend to choose low-paying jobs that are easier to cope with family responsibilities over high-paying jobs that are not flexible.
3. Child rearing pressures may leave women distracted at work and consequently less productive.
4. Mothers may be discriminated against by employers.

Wage penalty for mothers has great significance because it is related to greater issues of gender inequality. “Most women are mothers” and mothers are responsible for the majority of child rearing responsibilities. Therefore, “Any price of being a mother that is not experienced by fathers will affect many women and contribute to gender inequality (Budig and England 2001, p. 205).”

According to Hundley (2001), the number of young children in the households has a significant negative effect on women's earnings, but has no effect on men's earnings. His investigation shows that if women have no young child at home, their earnings increase by 106 percent.

It is also suggested that child rearing pressures may leave women distracted at work. Women's prominent role as primary child caregiver has created presumptions that mothers are less productive at work. "No study has directly measured the effort or productivity of mothers versus non-mothers, or men versus women (Budig and England 2001, p. 207)."

The wage penalty for motherhood is reduced when mothers are involved in mother-friendly jobs. Mother-friendly jobs have characteristics such as "flexible hours, on-site day care, and few demands for traveling or weekend work (Budig and England 2001, p. 207)." Part-time jobs are also considered as one of the most appropriate jobs for mothers. Waldfogel's study (1997) finds that women who have one child bear a wage penalty of 6 percent which increases to 15 percent for women with more than one child. Further, when she adds a control for whether the "job was part-time or not and whether past experience was part-time or not," the wage penalty decreases to 4 percent and 12 percent respectively.

2.6.2. *Marital status*

The wage penalty for women has negative influences on both married and single women's lives. Lower earnings for single mothers contribute to a bigger gap in the income between houses headed by a single mother and houses headed by fathers. The wage penalty decreases married women's negotiating power with their husbands (Budig and England 2001).

It is not yet clear if the motherhood penalty is correlated with marital status. Some studies suggest that the motherhood penalty is higher for married women since married women are able to choose the positions that are mother-friendly and are able to spend more time at home with children because the family is also supported by their husband's income. On the other hand, some studies find lower wage penalties for married women, since they are able to share child rearing responsibilities and commit more at work. For the same reason they associate higher wage penalty for single mothers that are not able to share the child duties with the fathers (Budig and England 2001).

Budig and England (2001) study results show that marriage increases the wage penalty and suggests that husbands, however, do not have a significant role in child rearing but act as the financial support for the family. "At least some part of the penalty arises because the ratio of time and energy mothers allocate to children versus jobs is affected by whether they have a source of financial support other than their own earnings (Budig and England 2001, p. 218)".

2.6.3. Experience

Experience explains a big part of the wage penalty for women. In the Budig and England (2001) study, “one-third of the motherhood penalty is explained by years of past job experience including whether past work was part-time or not (Budig and England 2001, p. 219).” The reason might be that for some women, motherhood causes interruption in employment or leads to part-time employment and fewer years of experience. Consequently, fewer years of experience would negatively affect their future incomes. Also, the study reveals that the wage penalty is higher for women who are involved in full-time positions and have more years of experience.

A study by Hundley (2001) introduces housework as another factor that leaves women with less experience. Women have relatively higher hours of housework than men which decrease their hours of work outside the house. His investigation shows that if women reduce their average housework hours to the average housework of men, their earnings would increase by 29.6 percent. If women work the same hours inside and outside the same as men, their annual salary would increase by 94.7 percent.

2.7 Women’s Earning in Construction

A comprehensive study is conducted regarding the salary of 2,515 construction graduate students over a period of 17 years (Bilbo et al. 2010). The study reports that the percentage of female employees in 1998 was 16percent which increased to 19percent in 2004; on the other hand the percentage of male employees decreased by 3percent from

1998 to 2004. The findings are “consistent with a predominantly male workforce that is gradually becoming more diverse (Bilbo et al. 2010, p. 92).”

The study reports that in 2004, the average salary for employees in construction ranged from \$62,177 to \$169,885 depending on the years since graduation (figure 4). The average salaries have been rising over the years since there is an increasing gap between the number of graduates needed in the industry and the actual number of graduates entering the construction industry (Bilbo et al. 2010).

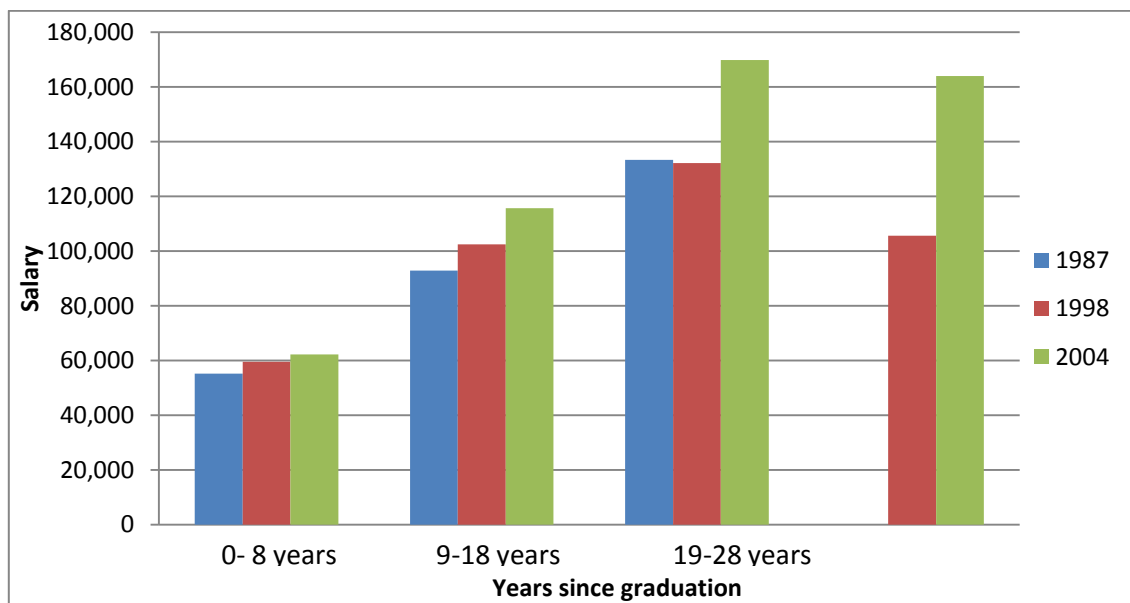


Figure 4- Average salaries by graduate group, Bilbo et al. 2010

The Bureau of Labor Statistics’ chart (figure 5) shows industries where women still earn less than men. Women in construction made 92.2 percent of men's weekly salaries. Women’s median weekly earnings in construction was \$696 while men’s

median weekly earnings was \$755. The only industries that women are earning more than 90 percent of men’s weekly earnings are construction with 92.2 percent and real estate, rental, and leasing with 93.3percent (Bureau of Labor Statistics 2010).

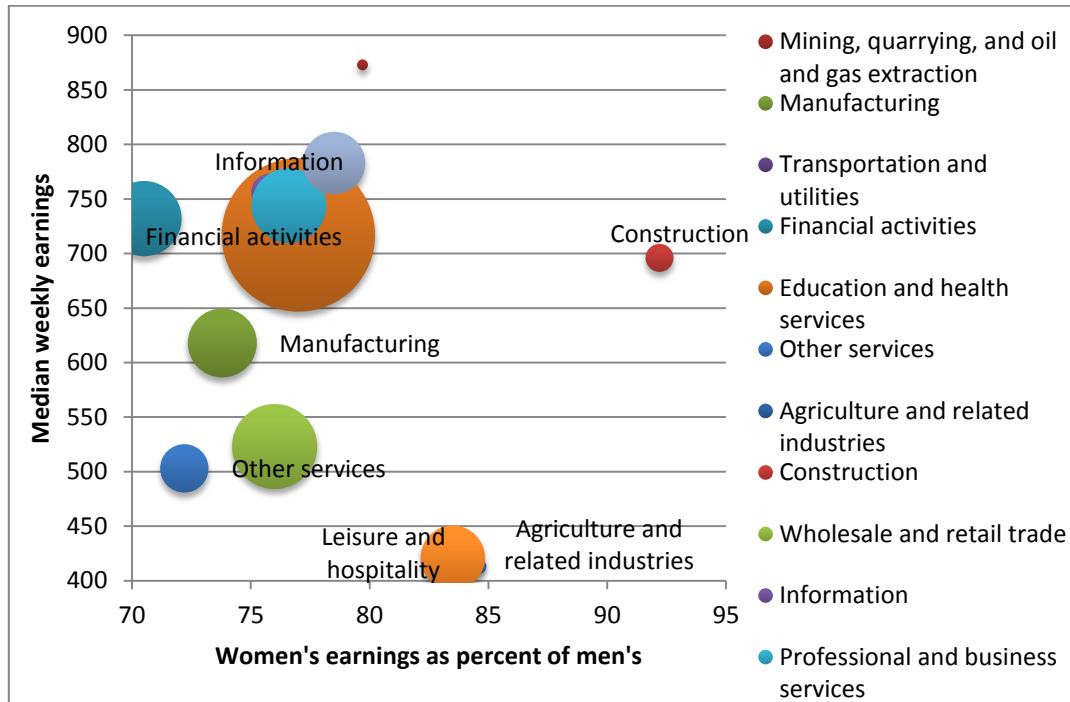


Figure 5- Employment and median usual weekly earnings of women by industry, The Bureau of Labor Statistics 2009

The fact that women are getting competitive salaries in the construction industry was also stated in *Ten Common Questions from Women Entering the Construction Industry: Two perspectives* (Bilbo and White 1999). According to Bilbo “Currently women graduates of established construction education programs are getting equivalent jobs and competitive entry level salaries. In fact women graduates from Texas A&M

University in the years 1990-1995 had a slightly higher entry level salary than their male counterparts (Bilbo and White 1999, p. 4).”

Although women in the construction industry may be getting equivalent jobs and competitive salaries, their decisions to start a family could have effects on future salary and promotions. For many positions in the construction industry employees are expected to be able to work almost 60 to 70 hours a week rather than regular 40 hours. In addition, they are expected to accommodate project based industry necessities, such as: travel and relocation with no advance notice. It is a tough job for employees to get the job completed without sacrificing some of the priorities in their lives. According to Bilbo when women decide to have a family, “this type of work environment is rarely suited to the female who must bear the responsibility for pregnancy and birthing, as well as, child rearing faced with the choice, it is virtually inevitable that women choose to place their family responsibilities ahead of their careers (Bilbo and White 1999, p. 8).”

3. METHODOLOGY

3.1 Overview

Before performing the research on women’s salaries, the researcher decided to obtain primary information on women in construction in the state of Texas. All Construction Management firms listed in Texas A&M 2011 Directory of Construction Firms in Texas were contacted. The companies were asked about the number of female managers they had and their positions. The data collected through this process showed that the majority of female managers in the state of Texas are project managers (Figure 6). The number of women holding project management position was significantly higher than other management positions. Therefore only female project managers were selected as the subjects of this study and other management positions were excluded.

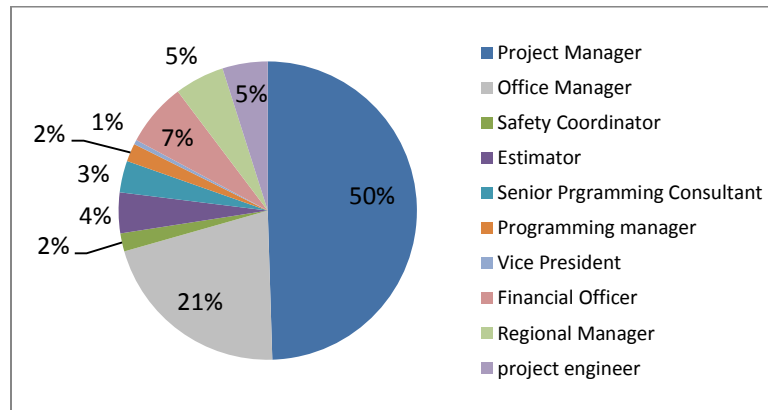


Figure 6- Women's managerial Positions in Construction in Texas

The necessary steps prior to perform the research on women's salaries were to identify a population, select a sample and gather the data. Due to issues in obtaining data on such sensitive subjects as salaries and personal information, it was decided to use snowball sampling. Requests for respondents were sent to a number of professional women in construction and they were asked to help identify women who meet the study requirements.

In order to maintain the confidentiality of study subjects' participation, construction companies were not contacted. Potential respondents' contact information was gained through the snowball sampling method. Respondents were also asked to encourage others to respond.

The survey had two major sections. The first section filtered out the respondents that did not fit the study requirements. The criteria in this section were based on the limitations that were set forth for the study:

- Job title
- Level of education
- Salary

The second section focused on the predictors of female project managers' salaries. This section considered the following factors:

- Experience
- Marital status
- Children
- Full-time employment
- Maternity leave

Due to time constraints involved in data collection, and for the ease of the respondents, the survey was designed for use through the internet. Participants were asked if they were interested in the subject and then the survey link along with an information sheet and a cover letter were e-mailed to them. Verbal consent was gained through phone calls and was implied when participants provided their email addresses and filled out the survey. A copy of the cover letter can be found in Appendix A. A copy of the survey can be found in Appendix B.

The information sheet was used to ensure respect for persons through provision of thoughtful consent for a voluntary act. The information sheet was written with simple language and had as few technical terms as possible so that the intended audience could understand it from a single reading. The information sheet can be found in Appendix C. Prior to issuing the survey to any participant, the study was approved by the Institutional Review Board (IRB). A copy of the IRB approval is included in Appendix D.

3.2 Correlation Regression Model

Considering the normal distribution of the data, the parametric tests of linear regression and analysis of variance (ANOVA) were used to analyze the data. Linear regression is a statistical method to model the correlation between a dependent variable and independent variables. Linear regression is specifically applicable to develop prediction models for continuous variables (Cohen et al. 2003). If variables were categorical then ANOVA was used to compare the means of groups based on the

categorical independent variable and to explore if there is significant difference between the means.

3.3 Interaction Effects Test

In addition to the effect of each individual variable on salary, the combined effects of the predictive variables that might have interactions with each other were also explored. This is due to the fact that when an interaction exists between two variables, the influence of “one variable depends on the level of the other variable (Stevens 2000, p. 1).”

To test the interaction effect, the variables that were found not to have significant relationship with salary were excluded- motherhood and number of children. Two-way ANOVA was used to test the presence of an interaction between categorical variables, and Multiple Regression was used to test the presence of an interaction between continuous variables.

3.4 Stepwise Regression

Finally, Stepwise Regression Model was used to find the variables that had the strongest effects on the dependent variable. Stepwise regression is the procedure of building a model by sequentially adding or removing variables based on their prediction power. Stepwise regression is also appropriate when willing to take into account the interaction effects. This analysis provides a model in its last step that only includes the strongest predictive variables, known as the “best fit model”.

4. DATA ANALYSIS AND RESULTS

4.1 Descriptive Analysis

The collected data showed that the respondents' salary ranges from \$35,100 to \$115,000. The number of female project managers increases as the annual salary goes higher, but only up to \$65,000. 21 percent, the largest portion, of female project managers working in the construction industry have an annual salary between \$65,000 to \$75,000. After this range, the percentage of women decreases as the annual salary increases (Figure 7). This would suggest that the female population in construction does not include many senior-level project managers with salaries higher than \$85,000. The percentage of female project managers that earn more than \$95,000 per year is lower than 12 percent.



Figure 7- Percentage of female project managers by salary groups

25 percent, the biggest portion, of female project managers have 5 to 10 years of construction experience. The number of female project managers decreases after this range as the years of experience increases. Women with more than 20 years of experience make up 22 percent of female project managers. Women with more than 30 years of experience make up less than 6 percent of female project managers (figure 8).

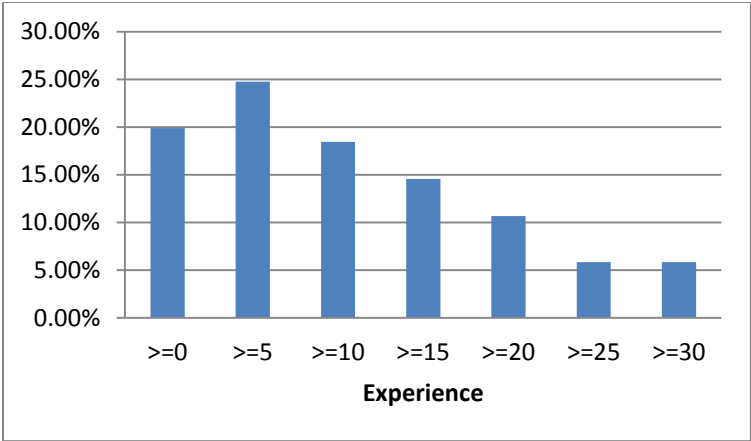


Figure 8 - Female project managers experience distribution

Less than 4 percent of female project managers are younger than 25 years old, which meets the research criteria to only include women with a bachelor’s degree. The biggest portion of female project managers are in the age range of 25 to 35. The number of female project managers drops down in the age range of 35 to 40 years old. This anomaly is due to women’s decision to leave work for motherhood. The age range in which, women leave work due to motherhood has shifted from 25-34 to 35-40. Only 6 percent of female project managers are above 55 years old (figure 9).

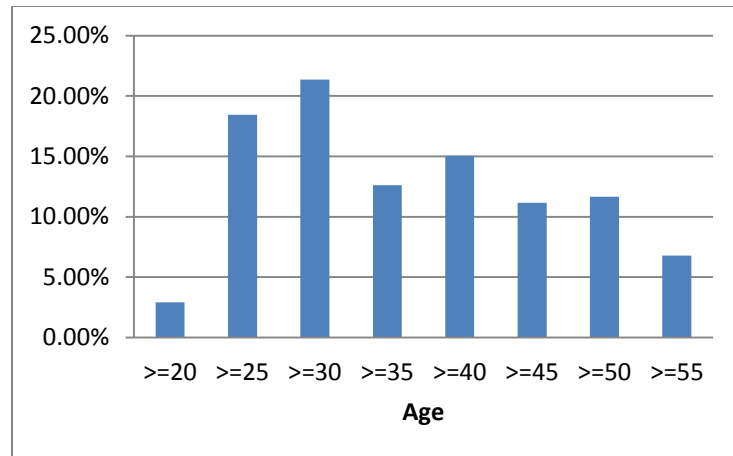


Figure 9 - Female project managers age distribution

Of the total female project managers working in the construction industry, 61 percent are married and 39 percent are single (Figure 10). Mothers make up 56 percent of female project managers in the construction industry (Figure 11).

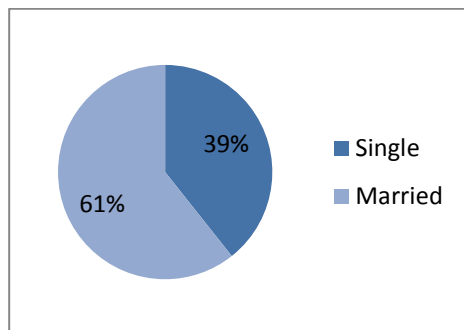


Figure 10 - Women's percentage by marital status

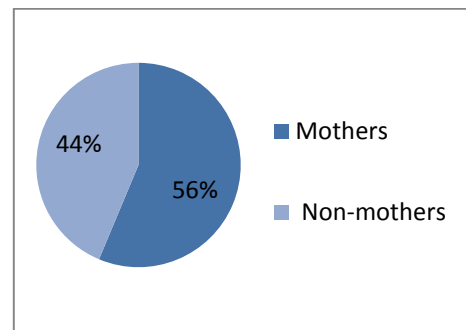


Figure 11 - Women's percentage by motherhood

Among the mothers, 43 percent have one or more of their children living in their household. 57 percent of mothers live without their children (Figure12). Figure 13 shows distribution of children in the household of female project managers. 57 percent of female project managers don't have children at all or don't have any of their children living in their household. 23 percent of female project managers have one child, 17 percent have 2 and 3 percent have 3 children living currently in their households (Figure13).

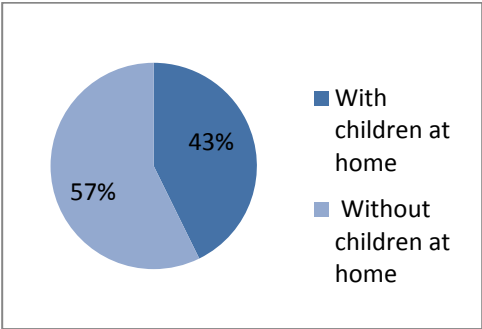


Figure 12 - Women's percentage by having children at home

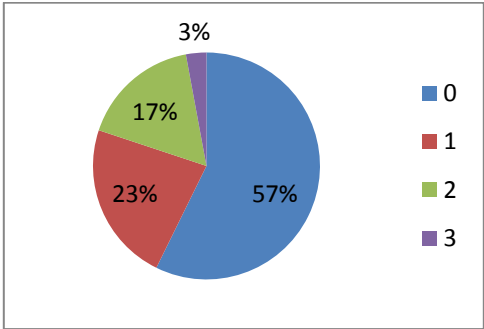


Figure 13- Women's percentage by the number of children at home

58 percent of mothers were employed as a full-time employee in a construction company when they gave birth (Figure 14). Four-fifths of women returned to their previous positions after child birth, while one-fifth had a change in their positions (Figure 15).

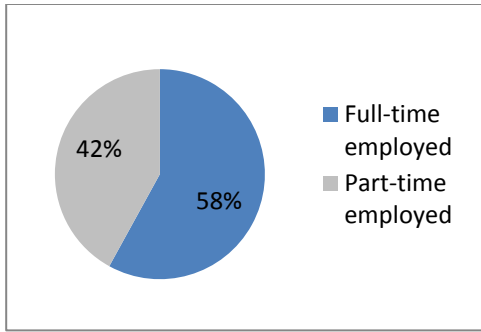


Figure 14 - Women's percentage by full-time employment

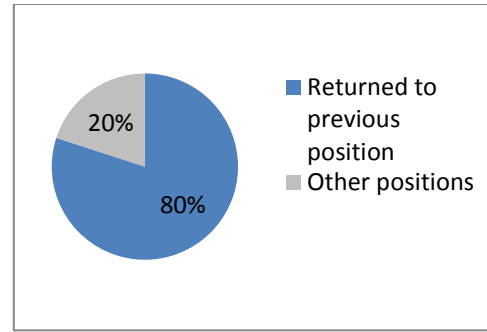


Figure 15 - Women's percentage by returning to the previous position

60 percent of women who gave birth took a maternity leave for less than three months. 12 percent were away from work for more than one year (Figure 16). 70 percent of mothers came back to work with the same amount of annual salary. Among the mothers who had a change in their annual salary, 22 percent got higher salary and 8 percent got lower salary than before child birth (Figure 17).

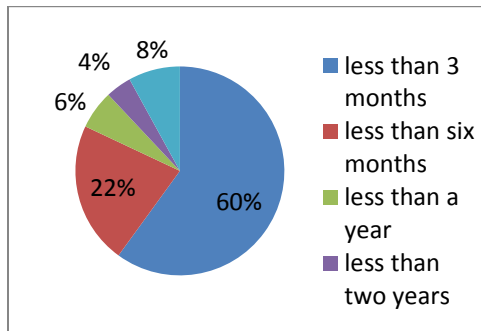


Figure 16 - Women's percentage by length of maternity leave

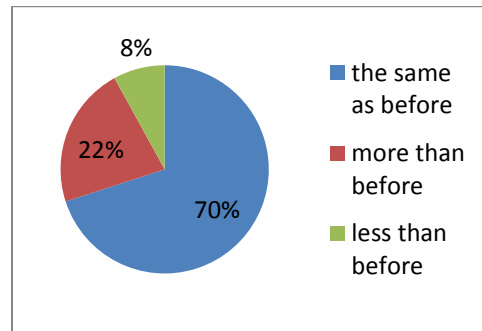


Figure 17- Women's percentage by changes in salary after maternity leave

4.2 Statistical Analysis

In order to test the hypotheses of the study, the data's normality of distribution was tested using JMP's normal probability plot (q-q plot) and Shapiro-Wilk W test. JMP is a statistical software developed by Statistical Analysis System Institute. After confirming the normality of the data, each independent variable was put into a correlation regression model to test the relation between independent variables and dependent variable. This step was done using linear regression analysis for continuous variables and one-way ANOVA for categorical variables.

Further, interactions between any two independent variables that were found to have significant relationship with salary were tested, using Multiple Regression model for continuous variables and Two-way ANOVA for categorical variables.

Finally, Stepwise regression was performed on the variables that were found to be predictors of salary and the interaction effects of the predictor variables that were significant. The variables that did not have strong prediction power were removed through the analysis steps. Further, the analysis provided a model in its last step that only includes the strongest predictive variables, known as the "best fit model".

4.2.1. Experience

Research Null Hypothesis 1- There is no significant relationship between salary and years of construction experience in the construction industry for women.

From figure 18, it can be noticed that there is a positive trend line between women’s salaries and years of construction experience.

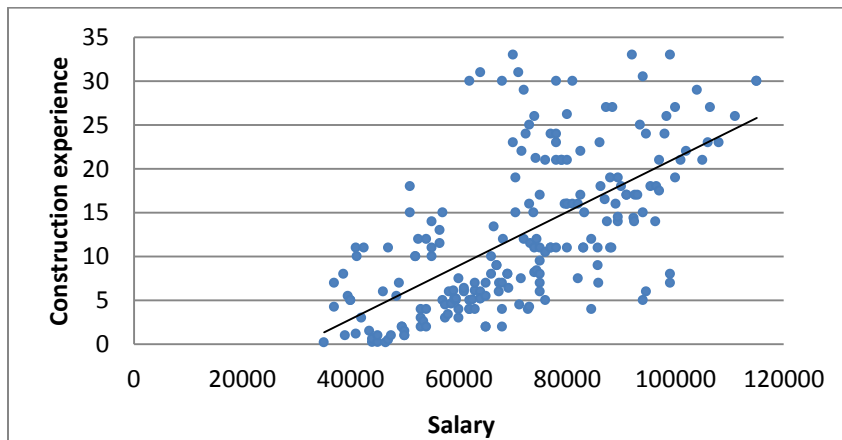


Figure 18- Female project managers’ salary and years of experience scatter plot

Table 4 - Bivariate fit of Salary by Experience

Salary by Experience	
Linear fit	Salary = 54792.146 + 1336.5178*Experience
RSquare	0.40927
Mean of Response	71467.48
Number of Observations	206
P value	<.0001

Here p-value, for hypothesis 1 is $0.00 < 0.05$ at 95% confidence (Table 4).

Therefore, the null hypothesis that there is no significant relationship between salary and years of construction experience in the construction industry for women can be rejected.

Inference

From the results of statistical analysis, it can be inferred that experience and salary are related and experience influences salary. RSquare is 0.40 which means that 40 percent of variability in salary can be accounted for by experience values. Linear fit provides an equation to predict salary based on experience. The positive slope of the line indicates a positive relationship between salary and experience. Finally, the very small p-value shows that experience is a statistically significant predictor of women's salary.

Interaction effects tests

It was found that there is an interaction between age and experience, also there is an interaction between experience and marital status. There is no interaction between experience and having children at home (The tables of all interaction effects tests with complimentary description can be found in Appendix E).

Stepwise regression model

The model results reveal that experience is the strongest predictor and has the greatest impact on salary.

4.2.2. Age

Research Null Hypothesis 2- There is no significant relationship between salary and age in the construction industry for women.

From figure 19, it can be noticed that there is a positive trend line between women's salaries and their age.

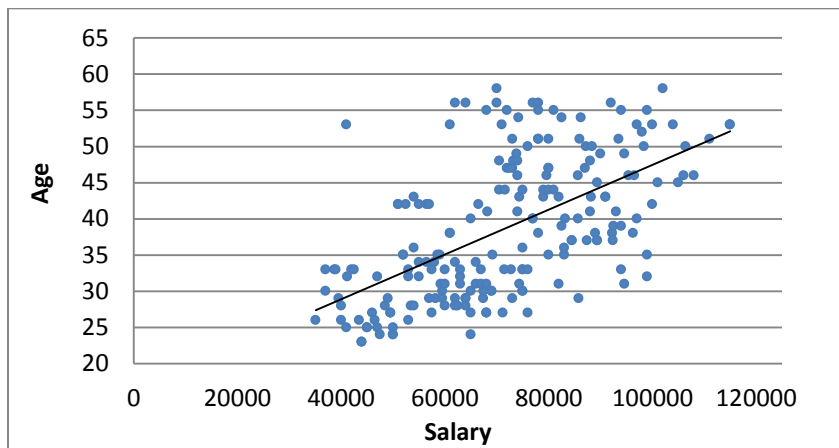


Figure 19 - Female project managers' salary and age scatter plot

Table 5 - Bivariate fit of Salary by Age

Salary by Age	
Linear fit	Salary = 28700.047 + 1107.2126*Age
RSquare	0.34228
Mean of Response	71467.48
Number of Observations	206
P value	<.0001

Here p-value, for hypothesis 2 is $0.00 < 0.05$ at 95% confidence (Table 5). Therefore, the null hypothesis that there is no significant relationship between salary and age in the construction industry for women can be rejected.

Inference

From the results of statistical analysis, it can be inferred that age and salary are related and age influences salary. The RSquare is 0.34 which means that 34 percent of variability in salary can be accounted for by age values. Linear fit provides an equation to predict salary based on age. The positive slope of the line indicates a positive relationship between salary and age. Finally, the very small p-value shows that age is a statistically significant predictor of women's salary.

Interaction effects tests

It was found that there is an interaction between age and experience. It was found that there is no interaction between age and marital status and there is no interaction between age and having children at home (The tables of all interaction effects tests with complimentary description can be found in Appendix E).

Stepwise regression model

The model results reveal that age is the fifth strongest predictor of salary. The interaction effect between experience and age was found as the second strongest predictor of salary.

4.2.3. *Marital status*

Research Null Hypothesis 3- There is no significant relationship between salary and marital status in the construction industry for women.

From figure 20, it can be noticed that single women’s mean salary is higher than married women’s mean salary by almost \$7,600.

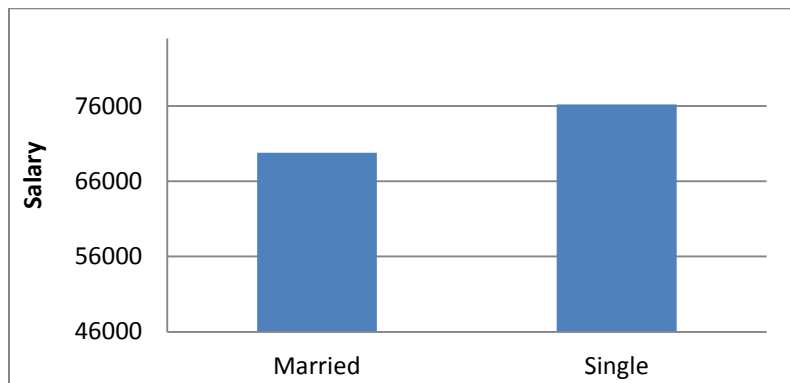


Figure 20 – Women’s salary means by marital status

Table 6 - Oneway Analysis of Salary by Marital status

Salary by Marital status				
Summary of fit		Analysis of variance		
Rsquare	0.04273	Level	Number	Mean
Mean of Response	71467.48	Married	125	68458.4
Number of observations	206	Single	81	76111.1
P value	0.0029			

Here p-value, for hypothesis 3 is $0.002 < 0.05$ at 95% confidence (Table 6). Therefore, the null hypothesis that there is no significant relationship between salary and marital status in the construction industry for women can be rejected.

Inference

From the results of statistical analysis, it can be inferred that marital status and salary are related and marital status influences salary. The p-value indicates that there is a statistically significant difference between the means, such that single women's mean salary is significantly higher than married women.

Interaction effects tests

It was found that marital status has an interaction with experience. Marital status did not have interactions with other variables (The tables of all interaction effects tests with complimentary description can be found in Appendix E).

Stepwise regression model

Stepwise regression model identifies marital status as one of the strongest predictors of salary and includes it in the "best fit model". Marital status is the fourth strongest predictor of women's salary.

4.2.4. Motherhood

Research Null Hypothesis 4- There is no significant relationship between salary and motherhood in the construction industry for women.

From figure 21, it can be seen that the mean salary of women who are mothers is lower than who are not mothers by almost \$3,100.

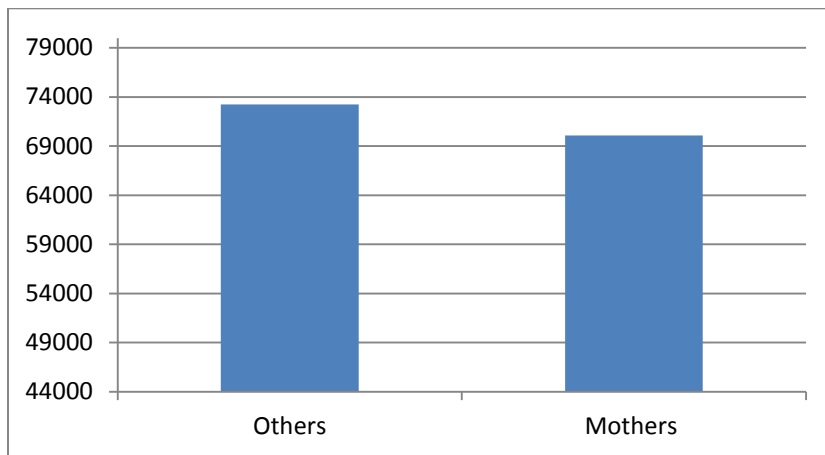


Figure 21 - Women's salary means by motherhood

Table 7 - Oneway Analysis of Salary by Motherhood

Salary by Motherhood				
Summary of fit		Analysis of variance		
Rsquare	0.007436	Level	Number	Mean
Mean of Response	71467.48	Mothers	116	70094.0
Number of observations	206	Others	90	73237.8
P value	0.2178			

Here p-value, for hypothesis 4 is $0.21 > 0.05$ at 95% confidence (Table 7). Therefore, the null hypothesis that there is no significant relationship between salary and marital status in the construction industry for women cannot be rejected.

Inference

Mothers earn less annual salary than non-mothers. Their average salary is less than non-mothers' average salary by \$3,100. This amount of money may be considered more significant for young female project managers that earn below the average salary, \$71,467. However, the p-value indicates that there is no statistically significant difference between the means and motherhood cannot be considered as a strong predictor of women's salaries.

Motherhood was not tested for interactions with other variables and was excluded from the stepwise regression model, due to its insignificant relationship with salary.

4.2.5. *Having children at home*

Research Null Hypothesis 5- There is no significant relationship between women’s salary and having their children living at home in the construction industry.

From figure 22, it can be seen that the mean salary of mothers with children at home is lower than those women with no child at home by almost \$11,400.

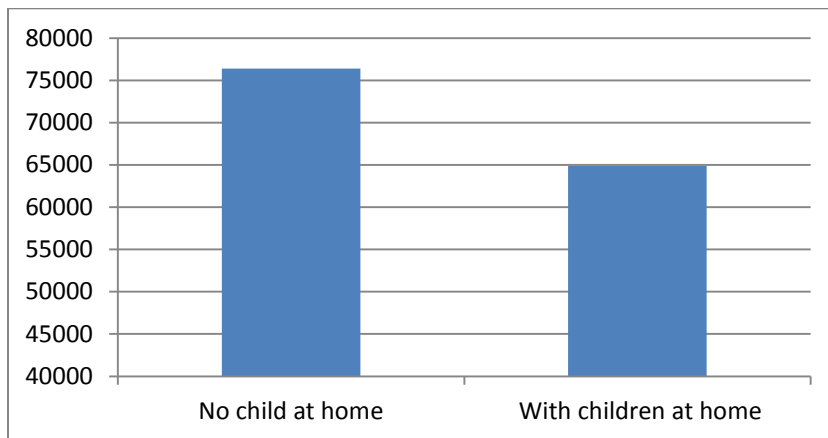


Figure 22 - Women’s salary means by having children at home

Table 8 - Oneway Analysis of Salary by Having children at home

Salary by having child				
Summary of fit		Analysis of variance		
Rsquare	0.098603	Level	Number	Mean
Mean of Response	71467.48	No child at home	1118	76371.2
Number of observations	206	With children at home	88	64892.0
P value	<.0001			

Here p-value, for hypothesis 5 is $0.00 < 0.05$ at 95% confidence (Table 8). Therefore, the null hypothesis that there is no significant relationship between women's salary and having their children living at home in the construction industry can be rejected.

Inference

From the results of statistical analysis, it can be inferred that having children living at home and salary are related and it influences salary. The RSquare is 0.098 which means that 10 percent of variability in the salary can be accounted for by having children at home. Finally, the p-value indicates that there is a statistically significant difference between the means such that the mean salary of mothers with their children at home is significantly lower than others.

Interaction effects tests

Having children at home did not have interactions with any of the variables (The tables of all interaction effects tests with complimentary description can be found in Appendix E).

Stepwise regression model

The model results reveal that having children at home is the third strongest predictor of salary and has significant negative impact on salary.

4.2.6. *Number of children living at home*

Research Null Hypothesis 6- There is no significant relationship between salary and number of children living at home in the construction industry for women.

In order to run the statistical tests for this hypothesis, women with different number of children are categorized in 4 groups:

Group 1: No children living at home

Group2: 1 child living at home

Group 3: 2 children living at home

Group 4: 3 children living at home

From figure 23, it can be noticed that the means, for mothers with different numbers of children at home, decreases from group 1(having no child at home) to group 2 (having 1 child at home) , and becomes almost invariable from group 2 through group 4 (having 3 children at home) .

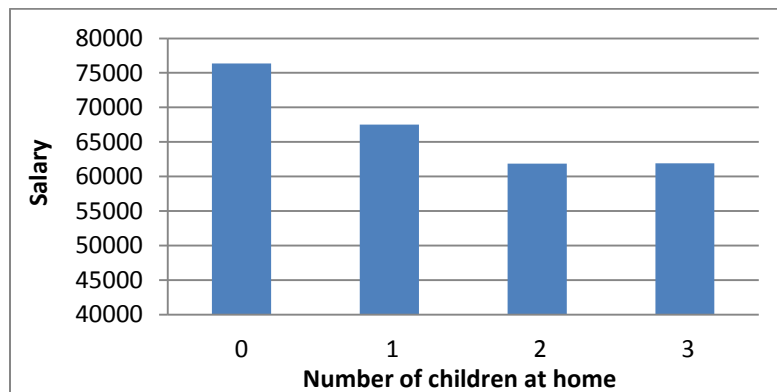


Figure 23 - Women's salary means by the number of children at home

Table 9 - Oneway Analysis of Salary by the Number of having children at home

Salary by having child				
Summary of fit		Analysis of variance		
Rsquare	0.03294	Level	Number	Mean
Mean of Response	64892	1 child at home	47	67514
Number of observations	88	2 children at home	35	61880
		3 children at home	6	61916
P value		0.2408		

Here p-value, for hypothesis 6 is $0.24 > 0.05$ at 95% confidence (Table 9). Therefore, the null hypothesis that there is no significant relationship between salary and number of having children at home in the construction industry for women cannot be rejected.

Table 10 - Analysis of Variance for each pair

Level	-Level	p-value
Having no children	Having 1 child	0.0033
Having no children	Having 2 children	<.0001
Having no children	Having 3 children	0.041
Having 1 child	Having 2 children	0.1447
Having 2 children	Having 3 children	0.6942
Having 1 child	Having 3 children	0.4579

Inference

From the results of statistical analysis, it can be inferred that there is a significant difference between mean salary of group1 (having no children) and the other groups (having one or more than one children), such that mean salary of group 1 is significantly higher than group 2, group3, and group 4. There is no significant difference between the mean salaries of group 2 (one child at home) compared to group 3 (two children at home) and group 4 (three children at home). There is no significant difference between the mean salaries of group 3 compared to group 4 (Table 10). Women with no child at home have significantly higher salaries than women with one or more children at home, but the salary does not change significantly as the number of children at home increases or decreases.

The number of children at home was not tested for interactions with other variables and was excluded from the stepwise regression model, due to its insignificant relationship with salary.

4.3 Summary of Results

Table 11 indicated the variables that were found to have significant relationship with salary. Table 12 indicates the variables that have interaction with each other.

Table 11 - Summary results of independent variables

Null Hypotheses	Dependent Variable	Independent Variable	Result
There is no significant relationship between the dependent variable and the independent variable.	Salary	Experience	Rejected
		Age	Rejected
		Marital status	Rejected
		Motherhood	Accepted
		Having children at home	Rejected
		Number of children at home	Accepted

Table 12 - Summary results of interaction effects tests

Null Hypotheses	Variable	Result
There is no interaction between the two variables.	Experience*Age	Rejected
	Experience* Marital status	Rejected
	Experience* Having children at home	Accepted
	Age*Marital status	Accepted
	Age* Having children at home	Accepted
	Marital status * Having children at home	Accepted

Table 13 - Variables that stepwise regression was performed on

Variables that were found to be significant
Age
Experience
Age and Experience interaction
Having children at home
Marital status
Experience and Marital status interaction

Stepwise regression was performed on the variables that were found to be predictors of salary and the interaction effects of the predictor variables that were significant (Table 13). Further, the variables that did not have strong prediction power were removed through the analysis steps (Table 14).

Table 14 - Stepwise regression model results

Stepwise regression model		Source	DF	P-value
Summary of Fit		Experience	1	<.0001
RSquare	0.5132	Age and Experience interaction	1	<.0001
		Having children at home	1	0.007
Mean of Response	71467.48	Marital status	1	0.009
Number of observations	206	Age	1	0.033

Inference

Age, experience, marital status, having children at home, and the interaction between age and experience were found to be the “best fit model”. This model has an RSquare of 0.51 which means 51percent of the variability in salary can be accounted for by the variables included in this model. The interaction effect between experience and marital status is not included in the “best fit model” since it was found not to have very strong prediction power. Experience has the strongest prediction power. The interaction effect between experience and age is the second strongest predictor of salary. Having children at home is the third strongest predictor and marital status is the fourth strongest predictor. Age has the least prediction power compared to the others.

4.4 Content Analysis

Female project managers were asked to briefly describe their job responsibilities. Out of the 206 responses, 102 women responded to this question. There were a number of words that were more commonly used than others in their descriptions. These words can be used to provide a practical description of the project management position for women.

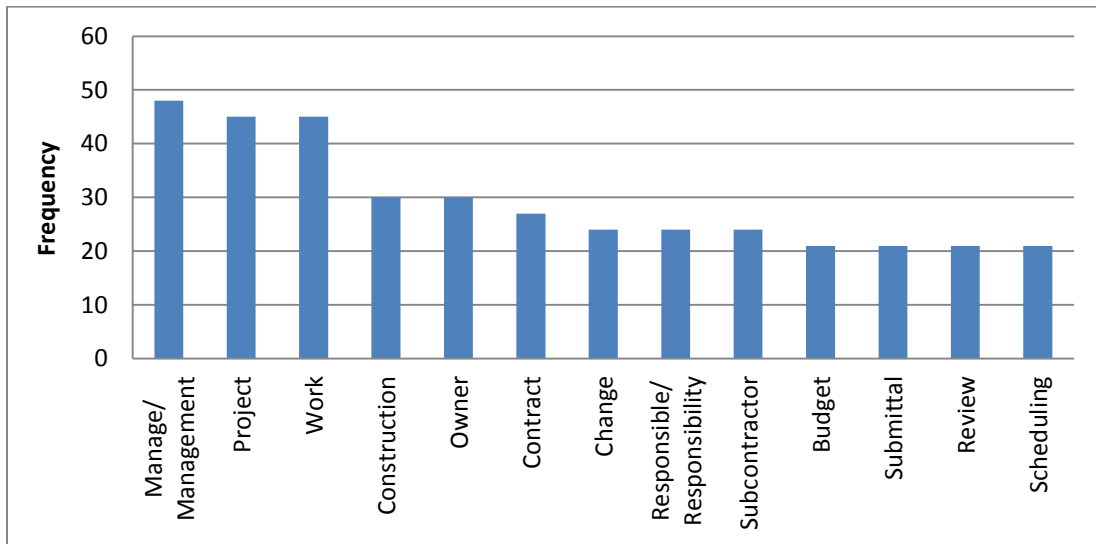


Figure 24 - The words with a frequency more than 20

Manage, construction, owner, contract, change, subcontractor, budget, submittal, and scheduling are some of the words that were most frequently mentioned in the responses (Figure 24). The content analysis suggests that female project managers' general responsibility would be to manage the construction work and project. This includes reviewing the contract, submittals, and applying the required changes in the

budget and schedules. The people they are supposed to communicate with the most are the owner and subcontractors.

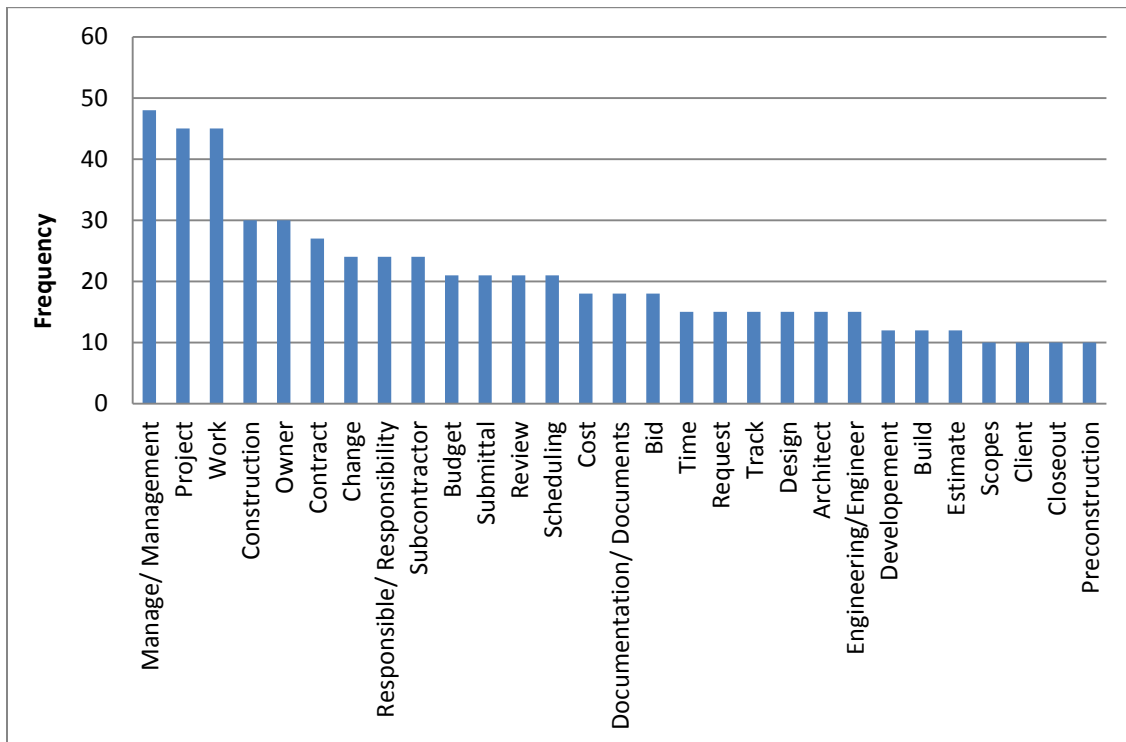


Figure 25 - The words with a frequency more than 10

Cost, document, bid, track, design, architect, engineer, estimate, client, closeout, and preconstruction are some of the other words that had considerable frequencies in the responses (Figure 25). The content analysis suggests that female project managers are responsible for tracking the time and cost of the projects. Estimating and preconstruction services are also among their responsibilities. Other than the owner and subcontractors, they are responsible for communicating with the architects, engineers, and clients.

The content analysis provides a homogeneous description of women's responsibilities as project managers in construction. The description built upon the content analysis only includes words mentioned in this study. Project managers' responsibilities are not restricted to these criteria.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study objectives were to investigate the predictors of female project managers' salary in the construction industry and to analyze their impact on women's salaries. To do so, it was necessary to pick variables that were likely to have a relationship with salary. Through a comprehensive literature review, six variables were selected as potential predictors of female project managers' salary: age, experience, marital status, motherhood, having children at home, and number of children at home. Descriptive analysis and statistical analysis were both used to investigate whether these variables have an impact on salary and which variables are the strongest predictors of salary.

According to the descriptive analysis, the following conclusions are made:

1. Nearly half of the respondents have less than 10 years of experience and there are few with more than 25 years of construction experience. This would suggest that the female population in construction does not include many senior-level project managers.
2. Nearly half of the respondents are younger than 35 years old and less than one-fifth is above 50 years old. This would suggest that the female population in construction has primarily younger project managers.
3. Age and experience distributions suggest that project management has recently become a more popular choice of career for women.

4. Regarding motherhood, it was found that the majority of female project managers are mothers, but the majority of these women don't have any children living in their household. Four-fifths of these women returned to their previous positions after child birth, while one-fifth had a change in their positions.
5. Sixty percent of mother respondents took a maternity leave less than three months. Only twelve percent of them returned to work after more than one year. This would suggest that construction tends toward being an inflexible and not friendly environment for mothers.
6. Seventy percent of mother respondents got the same annual salary after maternity leave; Twenty percent of them had greater annual salary than before child birth. This would suggest that female project managers have a twenty percent chance of getting higher salaries when reentering the work force after maternity leave.
7. Female project managers' major responsibilities include reviewing the contract, submittals, and applying the required changes in the budget and schedules. The people they are supposed to communicate with the most are the owner and subcontractors.

According to the statistical analysis, the following conclusions are made:

1. Experience has a positive effect on salary distribution. Female project managers with more construction experience earn more than those with less construction experience. Construction experience can explain a considerable portion of variability in female project managers' salaries in the construction industry.

2. Age has a positive effect on salary distribution. Older female project managers earn more than younger female project managers. Age can explain a considerable portion of variability in female project managers' salaries in the construction industry.
3. Marital status has a negative effect on salary distribution. Single female project managers earn more than married female project managers. Marital status explains a smaller portion of variability in female project managers' salaries compared to experience and having children at home.
4. Mother female project managers earn lower salaries than non-mothers. However, motherhood does not have a very strong statistically prediction power compared to other significant variables.
5. Having children at home has a negative effect on salary distribution. Female project managers who have one or more of their children living with them earn less than other female project managers. Having children at home explain a considerable portion of variability in female project managers' salaries in the construction industry.
6. As the number of children at home increases, there is no change in its effect on female project managers' salaries in the construction industry.
7. Years of construction experience and having children at home were found to be the strongest predictors; followed by marital status and age. Being a mother and the number of children at home did not have a significant relationship with women's salary.

The outlook for women has become brighter and better in the construction industry. Most of the women have the chance to return to their previous full-time position after child birth, and some can even get a higher position with more salary. However, women who wish to pursue management careers in the construction industry need to be aware that having a family is likely to have negative impact on their salary.

A comprehensive literature review reveals that marital status and motherhood interrupt full-time employment and decrease experience. It also reveals that women tend to get involved in low-paying jobs that are easier to cope with family issues versus high-paying jobs that are not flexible. Future studies, however, need to answer whether married women and mothers are less experienced and less productive, and why there is a wage penalty for these women. Women who do not choose mother-friendly jobs over high-paying ones need to be aware of the salary predictors and consider the factors that have a negative impact on their earnings.

For female project managers in the construction industry, being married is accompanied with a wage penalty. Being a mother does not have a significant negative impact on their salary by itself, but having children living in the household is likely to decrease their salary. In other words, having children at home is accompanied with a wage penalty for women.

Construction is a challenging industry that requires both genders' contributions. It needs and benefits from women's qualities and abilities. The construction industry benefits from the team work of men and women and women's different point of views.

The wage penalty for married women with children at home, however, may discourage young women from seeking an education or career in this industry. They may become attracted to careers with more flexible and mother-friendly characteristics.

Public policy makers, construction companies, and family members are responsible for decreasing the degree to which women endure the negative impacts of family issues on their salary. One significant approach would be to redefine family roles and responsibilities. Parenting responsibilities are not distributed equally among both genders. Except for child birth, other responsibilities can be shared equally between fathers and mothers. Both parents are expected to earn income for family expenses, yet only mothers are expected to bear most of the child rearing sacrifices. Public policy and education can have the biggest contribution in redefining family members' roles and expectations.

One parallel approach to eliminate wage penalties for women would be to study the jobs that are known as "male" jobs and see what is rewarded in these jobs that has a negative impact on females. The male oriented job model in construction companies associates motherhood with less commitment and reprimands mothers without any proof of less productivity. Construction companies need to restructure their positions into more flexible, female and mother-friendly positions.

5.2 Recommendations for Future Studies

- It is recommended to conduct a comparative study to investigate the impact of age, experience, marital status, and having children at home on male project managers' salaries in the construction industry. Future studies can investigate if these variables contribute to gender based salary differentials in the construction industry.
- This study can be replicated in another ten years in order to find if age, experience, marital status, and having children at home still have a similar impacts on women's salary.
- Further investigations can be done in the future studies by including children's age and length of maternity leave in the variables to determine their impact on women's salary.
- The method used in this study to collect data was snowball sampling. Snowball sampling is a nonprobability sampling method that does not involve random selection. While the methods of analysis in this research were valid and acceptable, a random selection method could potentially show divergence in the results due to the inherent relationships between survey respondents in snowball sampling.

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APPENDIX A

COLLEGE OF ARCHITECTURE
Office of the Dean

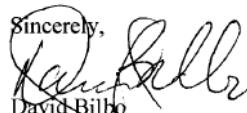


It would be greatly appreciated if you would participate in a study to identify and analyze the impacts of construction experience, marital status, and number of children at home on the salaries of professional female employees in the construction industry. The information obtained from the attached survey will guide our analysis of female managers' salaries in the construction industry. A high number of survey responses will improve the accuracy and reliability of the study. Your responses to the survey could lead to improvements in the salaries and positions of female employees in the construction industry.

The study sample is determined by snowball sampling and your contact information was obtained through another study participant. As such, other study participants may know of your participation. However, your survey data will be confidential and released only in summary form. No identifiers linking you or your company to this study will be included in any report that might be published. Your participation is voluntary and you may decide to withdraw at any time.

Please take a few minutes and fill in the survey as completely as possible (The survey link is at the top of this e-mail). If you would like a copy of the study results, please indicate this on the last survey question. If you require additional information or have questions, please contact Amineh Kamranzadeh at the number listed below.

Let me take this opportunity to thank you in advance for providing information that is vital to conduct this study. The time and effort you take to provide the requested information are essential to ensure an accurate and complete study of the salaries of professional females in the construction industry.

Sincerely,

David Bilbo
Principle Investigator
Clark Professor of Construction Science
Faculty Advisor
Texas A&M University
dbilbo@archone.tamu.edu


Amineh Kamranzadeh
Co-Investigator
Graduate Student
Texas A&M University
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APPENDIX B

The purpose of this study is to identify and analyze the impacts of construction experience, marital status, and number of children at home on the salary of professional female employees in the construction industry.

Maintaining confidentiality of information collected from research participants is the researcher highest priority, meaning that only the researcher can identify the responses of individual subjects. No identifiers linking you or your company to this study will be included in any report that might be published. Information about you and related to this study will be kept confidential to the extent permitted or required by law. Participation in this survey is completely voluntarily and participants may withdraw at any time.

1. Name

(Last Name, First Name)

2. Age

3. What is your job title?

4. What is your highest level of education?

- Highschool
 Some college
 Associate
 Bachelors
 Masters
 Higher

5. How much is your annual salary? (Base salary only)

6. How long have you been working in the construction industry?

Years Months

.

7. What is your marital status?

- Single
 Married
 Divorced

8. Do you have children?

- Yes
- No

9. How many of your children currently live in your household?

10. Were you employed as a full-time employee in a construction company when you gave birth?

- Yes
- No

11. How long were you away from work after child birth?

Years Months

12. After your maternity leave, did you return to your prior position?

- Yes
- No, I returned to a part-time employment.

part-time employment hours per week

13. After your maternity leave, was your annual salary

- the same as before childbirth
- greater than before childbirth
- less than before childbirth

greater/less than before childbirth by \$

14. Briefly describe your job responsibilities.

APPENDIX C

INFORMATION SHEET PREDICTORS OF FEMALE PROJECT MANAGERS' SALARY IN CONSTRUCTION INDUSTRY

Introduction

You are invited to take part in a research study being conducted by Amineh Kamranzadeh, a researcher from Texas A&M University. The information in this form is provided to help you decide whether or not to take part.

The purpose of this study is to identify and analyze the effects of construction experience, marital status, and number of children at home on salary of professional female employees in construction companies.

What will I be asked to do?

If you agree to participate in this study, you will be asked to **fill in the survey that is attached to this document**. This study will take about 5 minutes.

What are the risks involved in this study?

The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life.

What are the possible benefits of this study?

You will receive no direct benefit from participating in this study; however, it could lead in improvement in salaries or positions of female employees in construction industry.

Do I have to participate?

No. Your participation is voluntary. You may decide not to participate or to withdraw at any time without your current or future relations with Texas A&M University being affected. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have. If you decide to participate, you do not have to answer anything you do not want to.

How Many People Will Be Asked To Be In This Study?

250 people will be invited to participate in this study.

Will I Be Paid To Be In This Study?

You will not be paid for being in this study.

Who will know about my participation in this research study?

The study sample is determined by snowball sampling and your contact information was obtained through another study participant. As such, other participants may know of your participation. However, your survey data will be confidential and released only in summary form. No identifiers linking you or your company to this study will be included in any report that might be published. Information about you will be stored in locked file cabinet; computer files protected with a password.

People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections

Texas A&M University IRB Approval IRB Protocol # 2012-0331	From: 07/24/12	To: 07/15/13 Authorized by: KM
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(OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly. Information about you and related to this study will be kept confidential to the extent permitted or required by law.

Whom do I contact with questions about the research?

If you have questions regarding this study, you may contact Amineh Kamranzadeh at 949-280-0608 or email to amineh@tamu.edu.

Whom do I contact about my rights as a research participant?

This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, you can contact these offices at (979)458-4067 or irb@tamu.edu.

Participation

Please be sure you have read the above information, asked questions and received answers to your satisfaction. If you would like to be in the study, please fill in the survey through the link provided to you.

Texas A&M University IRB Approval IRB Protocol # 2012-0331	From: 07/24/12	To: 07/15/13 Authorized by: KM
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APPENDIX D

TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH - OFFICE OF RESEARCH COMPLIANCE AND BIOSAFETY

1186 TAMU, General Services Complex
College Station, TX 77843-1186
750 Agronomy Road, #3501

979.458.1467
FAX 979.862.3176
<http://researchcompliance.tamu.edu>

Human Subjects Protection Program

Institutional Review Board

APPROVAL DATE: 24-Jul-2012

MEMORANDUM

TO: BILBO, DAVID L

FROM: Office of Research Compliance
Institutional Review Board

SUBJECT: Initial Review

Protocol Number: 2012-0331

Title: Predictors of Female Project Managers' Salary in Construction Industry
- Master's Thesis

Review Category: Expedited

Approval Period: 24-Jul-2012 **To** 15-Jul-2013

Approval determination was based on the following Code of Federal Regulations:

Eligible for Expedite Approval (45 CFR 46.110): Identification of the subjects or their responses (or the remaining procedures involving identification of subjects or their responses) will NOT reasonably place them at risk of criminal or civil liability or be damaging to their financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections will be implemented so that risks related to invasion of privacy and breach of confidentiality are no greater than minimal.

Criteria for Approval has been met (45 CFR 46.111) - The criteria for approval listed in 45 CFR 46.111 have been met (or if previously met, have not changed).

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation or quality assurance methodologies.

(Note: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b) (3). This listing refers only to research that is not exempt.)

Provisions:

Comments: Approved waiver of documentation of consent.

This research project has been approved. As principal investigator, you assume the following responsibilities

1. **Continuing Review:** The protocol must be renewed each year in order to continue with the research project. A Continuing Review along with required documents must be submitted 45 days before the end of the approval period. Failure to do so may result in processing delays and/or non-renewal.
2. **Completion Report:** Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the IRB Office.
3. **Adverse Events:** Adverse events must be reported to the IRB Office immediately.

4. **Amendments:** Changes to the protocol must be requested by submitting an Amendment to the IRB Office for review. The Amendment must be approved by the IRB before being implemented.
5. **Informed Consent:** Information must be presented to enable persons to voluntarily decide whether or not to participate in the research project unless otherwise waived as noted above.

This electronic document provides notification of the review results by the Institutional Review Board.

APPENDIX E

Interaction effects test 1 - Testing the presence of an interaction between age and experience

Multiple Regression- Effects Test		
Source	DF	P-value
Age	1	0.0135
Experience	1	<.0001
Age*Experience	1	<.0001

Here p-value is $0.00 < 0.05$ at 95percent confidence, which means that there is an interaction between age and experience.

Interaction effects test 2 - Testing the presence of an interaction between marital status and experience

Interaction effects test 3 - Testing the presence of an interaction between having children at home and experience

Multiple Regression- Effects Test		
Source	DF	P-value
Experience	1	<.0001
Marital status	1	0.0023
Having children at home	1	0.0133
Experience* Marital status	1	0.0387
Experience* Having children at home	1	0.3955

Test 2 - Here p-value is $0.038 < 0.05$ at 95percent confidence, which means that there is an interaction between marital status and experience.

Test 3 - Here p-value is $0.39 > 0.05$ at 95percent confidence, which means that there is no interaction between having children at home and experience.

Interaction effects test 4 - Testing the presence of an interaction between marital status and age

Interaction effects test 5 - Testing the presence of an interaction between having children at home and age

Multiple Regression- Effects Test		
Source	DF	P-value
Age	1	<.0001
Marital status	1	0.0035
Having children at home	1	<.0009
Age*Marital status	1	0.2253
Age* Having children at home	1	0.0746

Test 4 - Here p-value is $0.22 > 0.05$ at 95percent confidence, which means that there is no interaction between marital status and age.

Test 5 - Here p-value is $0.074 > 0.05$ at 95percent confidence, which means that there is no interaction between having children at home and age.

Interaction effects test 5 - Testing the presence of an interaction between having children at home and marital status

ANOVA- Effects Test		
Source	DF	P-value
Marital status	1	0.1217
Having children at home	1	<.0007
Marital status * Having children at home	1	0.7441

Here p-value is $0.74 > 0.05$ at 95% confidence, which means that there is no interaction between having children at home and marital status.

Summary results

Null Hypotheses	Variable	Result
There is no interaction between the two variables.	Experience*Age	Rejected
	Experience* Marital status	Rejected
	Experience* Having children at home	Accepted
	Age*Marital status	Accepted
	Age* Having children at home	Accepted
	Marital status * Having children at home	Accepted