WHO MAKES MORE IN STEM? AN ANALYSIS OF SEX AND AGE

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The following faculty members have examined the final copy of this thesis for form and content, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Masters of Arts with a major of Sociology.

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ABSTRACT

Science, technology, engineering, and mathematics (STEM) occupations have a growing presence in industry with increasing employment opportunities and offer some of the highest incomes in the labor market. Despite these benefits, women are underrepresented in these fields and experience a gendered wage gap. This study examined the role of sex and age along with education in regards to earnings in STEM. Using a sample of 7,636 full-time workers age 25 to 66 in various STEM jobs two theoretical approaches of human capital theory and gender schema theory were explored for these workers. The results indicate that men make more than women and older workers make more than younger workers; however, the younger cohort of women is making more comparable wages to younger cohorts of men than older women are making to older men. In all models, education resulted in the largest in earnings. Also, earnings of other minority groups of women are larger in reference to white non-Hispanic women in younger cohorts compared to older cohorts.

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CHAPTER 1

INTRODUCTION

In a modern economy that is constantly seeking new technological advances it is no surprise that science, technology, engineering, and mathematics (STEM) fields are the growing leaders in innovation and seeking educationally qualified individuals. STEM occupations offer some of the highest incomes in the labor market with individuals in each STEM group earning above the national average overall (Terrell, 2007). In the last decade, high school student interest in STEM majors and occupations has grown by more than 20 percent and an increase of approximately 1.25 million jobs in STEM fields are expected to be available in the United States by 2018 (Munce and Fraser, 2012). 312,500

Despite the financial benefits of a STEM occupation, fewer women express an interest in these fields than men during high school (Munce and Fraser, 2012) and fewer women persist in a STEM major during college (Griffith, 2010) or pursue a STEM career (Glass, Sassler, Levitte, and Michelmore, 2013). The tendency of women to filter out of STEM majors and occupations at various stages is often referred to as the “leaky pipeline” (Blickenstaff, 2005). Women are underrepresented and less likely to persist in STEM fields for different reasons and some of the “filtering out” occurs at young ages. Gender stereotypes regarding women’s performance in mathematics and young girls’ notion that STEM fields are for boys (Archer, Dewitt, Osborne, Dillon, Willis, and Wong, 2013) perpetuates the lack of female interest in these fields. Inadequate maternity leave policies, employer discrimination, and larger proportions of women in non-STEM professions also impact women’s representation, persistence, and wages in STEM majors and careers.

While much attention has been paid to researching women's representation in various STEM fields, reasons for staying or leaving their field, and their income in comparison to men; few studies have addressed both age and gender directly. Specifically, does an older woman in a STEM occupation earn more than a young man who is new to the field? Are older women making more than younger women? Are younger men and women with comparable qualifications earning the same in their STEM job? The goal of the current study is to examine differences in earnings between men and women of different ages in STEM occupations and to assess factors that may predict wage differentials and similarities between both older and younger men and women. The importance of STEM innovation has been gaining momentum and has led many employers to increase the potential pool of future STEM employees, including women and members of minority groups, by creating interest in STEM. Many initiatives have been taken to improve women's representation in these fields and their numbers are slowly growing. With the widespread attention on STEM and their efforts to diversify the workplace, younger cohorts of women may be enjoying higher wages in comparison to their male counterparts than do older women who faced a more traditional and discriminatory workplace.

It is important to address the role that human capital theory plays regarding income variations between men and women and the older and younger cohorts. Human capital is defined as the various activities that people do with the intent to increase future wages (Becker, 1962). Educational credentials and additional job training are two primary means of human capital that influence earnings. In the case of STEM fields, human capital in the form of educational attainment greatly impacts an individual's available opportunities and chance of mobility in the workplace. According to Becker (1993), "Education and training are the most important investments in human capital" (p. 17). STEM professions not only offer competitive wages but also offer many opportunities for additional job training programs (Carnevale, Smith, and Strohl, 2010) which are important for younger workers seeking mobility and older workers looking for job security (Elman and O'Rand, 2002).

Gender schema theory is also important to discuss in relation to women's representation, retention, and earnings in STEM workplaces. Bem (1981) states that, "A schema is a cognitive structure, a network of associations that organizes and guides an individual's perception" (p. 355). Gender schemas are created at a young age and reflect societal concepts of what it is to be masculine and feminine by shaping the perceptions and regulating the attitudes and behaviors of the self, and others, well into later life (Bem, 1981). According to Glass et al. (2013), women's lower retention rate in STEM fields is often attributable to feeling as though they do not belong or "fit in" at their workplace. In addressing why women in STEM professions are more likely to move out of their field in comparison to other professional women with regard to gender expectations, Glass et al. (2013) states that, "We suspect that the retention deficit in STEM may be due to the team organization of scientific work combined with the attitudes and expectations of coworkers and supervisors who hold more traditional beliefs about the competencies of women in these rapidly changing fields" (p. 24). Additionally, Glass et al. (2013) notes that women who are employed in a STEM job respond more negatively to increasing job satisfaction, age, and tenure than women in other professional fields and that having more educational attainment related to STEM increases the likelihood that a woman will leave her STEM field job.

Although women's presence is increasing in the scientific and technological sectors of the labor market, women continue to be underrepresented and the traditional gender schemas of these workplaces often create a wage gap between men and women. Traditional ideologies of gender in these workplaces may have a greater impact on wages for older women than younger women. The expanding STEM market and need for more employees has created more opportunities for young workers and particularly for women. Older workers tend to have higher wages than younger workers due to experience and training, seniority, and tenure; is this still the case with women who have chosen to stay in STEM fields? Or is it possible that a history of discrimination in these male dominated professions has resulted in lower wages for older cohorts of women in these fields?

CHAPTER 2

LITERATURE REVIEW

2.1 Gender

In recent decades, women have become increasingly represented in the workforce and have made substantial progress in attaining wages equal to men (United States Department of Labor: Bureau of Labor Statistics, 2014). Despite their many successes in the labor market, women continue to receive lower wages than men and remain a minority in STEM occupations regardless of comparable qualifications (Landivar, 2013). As the STEM industry continues to expand, the underrepresentation of women will become increasingly relevant with implications for the entire labor market. While human capital variables, such as level of education and job training, have a definite impact on the wage gap; gender roles and stereotypes, economic conditions, employer discrimination, and policy initiatives shape the opportunities available to women regarding their participation in STEM (Rosenfeld and Kalleberg, 1990).

In the United States, the lack of an adequate maternity leave policy greatly influences the wage gap in most workplaces. The expectation that women should be dedicated mothers collides with their workforce participation and often forces them to take time off and sacrifice future income or potential advancement (Cabeza, Johnson, and Tyner, 2011). Employers frequently overlook women for promotions due to perceived issues of family responsibilities. This tendency causes many women to seek careers, typically outside of STEM, that will allow them to balance work and family life more easily (Rosenfeld and Kalleberg, 1990). Even countries that have adopted more liberal maternity leave policies remain concerned about extended paid maternity leave and often attempt to steer women away from higher level job positions and income opportunities (Rosenfeld and Kalleberg, 1990). The "baby penalty" that women face in their career fields tends to keep them out of STEM oriented fields and in turn, from receiving higher wages. According to Mary Ann Mason, current professor and co-director of the Center of Economics and Family Security at the University of California at Berkeley, women might seek higher professional tiers, especially in academia, if there were "better child care (in many forms), effective dual-career policies, childbirth accommodations, and compliance with Title IX's prohibition on pregnancy discrimination" (Mason, 2014, p. 2). The discrimination surrounding work and family that women face in STEM workplaces not only impacts the likelihood of being promoted and securing higher incomes, but the possibility of additional job training as well (Gjerde, 2002). Similarly, the gender gap in income is perpetuated by men receiving more substantial returns to their human capital investments and benefit more financially in comparison to women from being married and having children (Rosenfeld and Kalleberg, 1990).

The gender wage gap in most professions has frequently been attributed to the "crowding" theory which states that women are compacted into relatively few college majors and occupations, thus granting higher wages to men. This seems to be the case with STEM as both men and women adhere to the cultural bias and stereotypes concerning the field, causing more women to crowd into non-STEM or STEM related positions, such as healthcare practitioners (Grönlund and Magnusson, 2013). The perception that women are not as adept at mathematics, do not have the same logic and reasoning skills, and will be less productive in comparison to men form the overarching stereotype that is the key factor contributing to women's underrepresentation and lower wages in STEM. Whether or not women accept these stereotypes as true, they deter women's interest in pursuing degrees and careers in STEM fields.

Phipps (2007) identifies the social construction of the gender dichotomy, which is further exaggerated in STEM occupations, as identifying men as "rational, individualistic, competitive, confident and technically skilled" and women as being "domestic, passive, and emotional" (p. 780-781). The social consensus that science, technology, engineering, and mathematics are fields for boys and men dramatically shapes young girls and women's involvement in these fields. Even at young ages girls identify STEM as being masculine. According to Archer et al. (2013), "Indeed, we might argue that science aspirations are 'unthinkable' for these girls due to their perceptions of science as not nurturing, not glamorous/girly and not 'practical' (being too 'clever' and academic)" (p. 187). Although young girls and boys tend to have similar scores in science and mathematics, girls generally think they will perform lower in these subjects (Leaper, Farkas, and Brown, 2012). While parental support strengthens girls' interest in math and science, support from peers and learning about feminism are perhaps more influential for young girls than parental support alone in choosing math and science subjects; and consequently STEM majors and careers (Leaper et al., 2012).

2.2 Education

Obtaining diplomas and degrees has become a de facto requirement for securing a meaningful occupation with a promising income for both men and women (Schultz, 1960). This trend is not new but is gaining momentum due to the modern labor market and the global expansion of higher education (Schofer and Meyer, 2005). Investments in higher education have been shown to provide a significant increase in future income over those without college experience despite potential earnings lost while in school (Welch, 1974). With education being an essential measure of human capital, it follows that, "investment in human capital accounts for most of the impressive rise in the real earnings per worker" (Schultz, 1961, p. 1). As of 2000, nearly 20 percent of the universal college-age cohort was pursuing higher education with even higher percentages in more developed areas (Schofer and Meyer, 2005). Additionally, women's enrollment rate in universities has surpassed the enrollment rate of men and women are also receiving more degrees than men (Averett and Burton, 1996; Goldin, Katz and Kuziemko, 2006). In addition to college students, the occupational rewards that accompany a degree are also on the minds of the high school cohort. For adolescents, the education system itself is paramount in shaping their goals towards higher education, occupations, and even their position within the socially stratified system (Klaczynski, 1991).

Global trends regarding the expansion of higher education have reinforced the view that education is the foundation for human capital. The growth of higher education has also created interplay between education and income expectations (Hunter and Leiper, 1993; Schofer and Meyer, 2005). Increases in educational requirements for various professions and the widening expectations for educational attainment have had transformative effects on the overall value of a degree and future incomes of both men and women (Vaisey, 2006). In the modern economy, STEM fields have become the occupations with the greatest potential for income stability and as such, degrees in those fields are on the rise. Hunter and Leiper (1993) found that individuals with more formal education and degrees tend to have higher earnings as employers often use educational credentials as an indicator of skills and productivity, when hiring personnel. The same individuals are often the first chosen for work-related education and training programs. As Carnevale, Smith, and Strohl (2010) point out, "Postsecondary education provides entry to the jobs offering the most employer-provided training, plus access to the most powerful, flexible workplace technology" (p. 1). STEM occupations typically provide the most training opportunities and as such, increased earnings potential and job security. For older workers, access to work-related education is becoming an important means of job security even in the presence of higher education, work experience, and seniority (Elman and O'Rand, 2002). Having more formal education has also been shown to increase overall life satisfaction independent of the benefits of income and occupation (Salinas-Jiménez, Artés, and Salinas-Jiménez, 2011).

The importance of educational capital for securing occupational attainment is perhaps best demonstrated by those who have lower levels of education. Sum, Khatiwada, McLaughlin, and Palma (2011) found that young men in the United States with little to no formal educational achievement fare the worst and tend to experience a lack of employment opportunities and lower wages. Additionally, for workers without a college degree in nonprofit sectors of employment fringe benefits, full-time hours and schedule flexibility are often unavailable resources (Haley-Lock, Berman and Timberlake, 2013).

The expansion of higher education across the globe has had many interesting effects on the institution itself and the overall value of a given degree. Research suggests that the increasing participation in higher education has led to many workers being over-qualified in various occupations (Vaisey, 2006). Technological change in the modern labor market has moderated this phenomenon and placed higher value on educational credentials, especially for STEM professions (Griliches, 1997). From 2003 to 2007 about 16 percent of bachelor's degrees were awarded in various STEM majors (The Business-Higher Education Forum, 2010). The growth of the STEM labor market and increasing employment opportunities in these fields has resulted in a need to foster STEM interest in younger cohorts. Younger cohorts of women are already more likely to be interested in STEM due to greater exposure to technology and the wide range of employment positions that accompany a STEM degree and the financial security of a STEM degree as well (Carnevale et al., 2010).

Even though interest among younger cohorts is growing, women continue to be underrepresented in STEM majors and careers and both high school and college have proven to be critical times for getting women involved in STEM majors. At the beginning of high school, almost 30 percent of students have an interest in STEM fields and over half of these students will lose interest by graduation (Munce and Fraser, 2012). Additionally, male student interest in STEM fields is nearly three times that of female student interest which furthers the representation gap (Munce and Fraser, 2012). As women face the stereotype of inadequate performance in math and not belonging in STEM majors, female engineering students are more likely to drop out than male students (Kronberger and Horwath, 2013). Similarly, female engineering students with good grades are often more likely to drop out due to the social discomfort of excelling in male dominated STEM fields (Kronberger and Horwath, 2013). The expansion of STEM and the increasing need for qualified personnel in these fields has lead researchers to focus on the educational system in its entirety. In order to increase future STEM employment among men and women, attention must be given to all levels of education from pre-school through college, more STEM-proficient teachers are needed, and interest in STEM majors and occupations must be fostered by teachers at all levels (The Business-Higher Education Forum, 2010).

2.3 Science, Technology, Engineering and Mathematics (STEM) Fields

Occupational fields in science, technology, engineering and mathematics (STEM) have become some of the most prestigious positions in the modern economy as these are the careers that supply most technological advances in our society (Graham and Smith, 2005). The global and governmental focus on STEM positions has increased student interest in these fields and the number of workers in these fields is expected to increase significantly in coming years. Student interest in STEM majors and occupations is reported to have increased by over 20 percent since 2004 and an estimated 1.25 million workers are expected to join the STEM workforce in the United States by 2018 (Munce and Fraser, 2012).

In order to attract new workers to STEM majors and careers, these fields offer many benefits such as low unemployment rates, higher wages, and increased access to work-related education (Bonous-Hammarth, 2000). Despite the benefits and increased interest in STEM occupations, women are still a minority in these fields (Smeding, 2012). Women remain the most underrepresented in computer science, the occupation expected to grow the most by 2015 with nearly two million jobs in cloud computing becoming available (Fox, Sonnert, and Nikiforova, 2011; Munce and Fraser, 2012), where they obtain less than one-quarter of degrees. Furthermore, female interest in the various STEM majors and occupations is less than 20 percent compared to nearly 40 percent for male students (Munce and Fraser, 2012). Although there is a growing presence of women in STEM workplaces, they account for less than 30 percent of STEM field occupations compared to nearly 50 percent of the female workforce in general (Broyles, 2009).

Women's underrepresentation in STEM occupations is not the only problem. Once in a STEM job, women are less likely to stay in that position in comparison to men (Glass et al., 2013). Additionally, Glass et al. (2013) found that women in STEM occupations are far less likely to stay in their job in comparison to women in other professional fields and most move out of STEM jobs in the first five years. According to Glass et al. (2013), "women in STEM fields do not react as positively to increasing job satisfaction, job tenure, and advancing age, suggesting that climate issues or lack of "fit" between worker and job persist for longer periods of time in STEM careers" (p. 744). Furthermore, women with higher educational credentials in STEM are more likely to leave their occupational STEM field in comparison to women with lower degrees

(Glass et al., 2013). The “lack of fit” that women in STEM refer to is usually a result of gender stereotypes that are perpetuated in the workplace (Glass et al., 2013).

Traditional ideologies about women in scientific fields, and the workplace in general, contribute to their underrepresentation and lower rates of persistence. The unbalanced gender setting of most STEM workplaces creates a social identity threat among women contributing to a lack of belongingness (Murphy, Steele, and Gross, 2007). Although STEM women are more inclined to leave their field, some persist and become successful. In the case of female student engineers, Smeding (2012) notes that they are less likely to hold traditional gender and math stereotypes than male engineering students. Similarly, in fields where women are significantly underrepresented, male students are more likely to see certain issues, such as the work and family conflict, as more difficult for women to navigate (Hartman and Hartman, 2008). In reaction to the traditional gender ideologies that women face in STEM workplaces, women often adopt coping strategies that “undo” their gender. Powell, Bagilhole, and Dainty (2009) found that female engineering students present themselves as neither traditionally feminine nor masculine but a combination of the two and often “act like one of the boys” and accept acts of gender discrimination in order to fit in. The need to “undo” one’s gender contributes to feelings of not fitting well within a STEM job and to women’s attrition in these fields in general.

Structural ideologies often grounded in gendered stereotypes about women’s productivity and math performance in comparison to men, translates into a gendered wage gap in STEM professions. In 1995 a woman’s pay in a STEM occupation was 81 percent of a man’s pay, as of 2003 a woman’s pay has decreased to 78.7 percent (Broyles, 2009). Additionally, women constitute about 20 percent of science and engineering occupations and earn about 20 percent less than men (Graham and Smith, 2005). For female chemists, about 17 percent of the wage gap can be explained by discrimination from employers and men's tendency to receive a greater financial return on experience in comparison to women (Broyles, 2009). According to Broyles (2009), "On the one hand, employers may discriminate due to personal prejudice against women. On the other hand, it may be that employers use group data on women to predict productivity of individual women –women are more likely to have shorter and more discontinuous work careers, therefore they are a more costly investment" (p. 224). The notion that women are less productive than men is not just held by employers in chemistry, but other STEM fields as well.

2.4 Age

The growth of science, technology, engineering, and mathematics fields has seen dramatic change in the last twenty years and so has the educational requirement of degrees in these fields. With this in mind, age has become an important factor for women in STEM occupations. The widely held notion that young scientists will be the most productive and produce the highest quality work has divided many STEM fields by age. Although older women who enjoy a successful career in their STEM workplace have seniority, job experience, and various occupational benefits such as promotions or tenure, younger cohorts of women are valuable for their education in modern innovation and technology. With the rise of STEM fields and the many initiatives taken to get women involved in these fields, younger cohorts of women have salaries similar to young men, at least early in their career field, in comparison to older cohorts (Morgan, 2008).

The increasing interest in STEM majors and careers has resulted in a high demand for young scientists and engineers, especially for women as they constitute the minority in these fields and are less likely to persist in STEM than men (Munce and Fraser, 2012). An important factor in increasing women's representation in STEM occupations is decreasing the dropout rate in college STEM majors. For younger women in STEM, having social support from other women has been shown to increase the likelihood of persistance in STEM majors and pursuing future occupations in STEM, a resource many older cohorts of women did not have (Morganson, Jones, and Major, 2010). Younger cohorts of women pursuing STEM majors also have more programs dedicated to increasing women's involvement in STEM than did older cohorts of women. For example, STEM Living/Learning programs which link residential life to academic life with additional access to faculty and a focus on career development, have been shown to improve women's intentions of pursuing future STEM employment (Szelényi, Denson, and Inkelas, 2013). Furthermore, younger cohorts have access to new scholarship and grant opportunities (Kalevitch, Maurer, Badger, Holdan, Iannelli, Sirinterlikci, Semich, and Bernauer, 2012) such as the Science, Mathematics & Research for Transformation (SMART) scholarship which provides STEM students with full tuition coverage, paid internships, mentoring, and employment placement opportunities (Science, Mathematics & Research for Transformation, 2014). Moreover, younger women tend to have a more liberal view of traditional gender roles and are more likely to choose a professional career than stay-at-home maternal pursuits and are more likely to plan on entering graduate school (Novack and Novack, 1996).

2.5 Income

Due to the global importance placed on earning college degrees, educational attainment has become a crucial component of human capital for securing higher wages for both men and women. The importance of a degree can be seen in the rising wage premium for college graduates in the last few decades (Grogger and Eide, 1995). Although all college graduates saw an increase in their college wage premium in past decades, the wage premium for white male graduates with one to five years of experience increased by nearly 45 percentage points while the wage premium for white women with similar experience increased by only 30 percentage points (Eide, 1997). According to Grogger and Eide (1995), the increase in wages for recent female graduates is exaggerated by math scores. In discussing the benefits of educational credentials for men, Joy (2000) states that, "Overall, the evidence suggests that men obtain more from a college degree, in terms of wages, job satisfaction, and job quality than do similarly qualified women" (p. 474). Additionally, men are more likely to have a wider selection of employment offers than women, which contributes to men's tendency to have higher wages as they have a greater selection of first jobs (Joy, 2000).

As mentioned, gender has a definite impact on income; however, in the case of expectations, men and women are more similar than they are different regarding extrinsic job rewards. Both men and women express similarity regarding extrinsic job values and both favor challenging work and decision making opportunities, although women continue to favor social rewards and men tend to favor leisure benefits (Marini, Fan, Finley and Beutel, 1996). In discussing the occupational prestige of men and women, the sex composition of the field can have a profound influence on prestige. Men in predominately female professions are afforded less prestige than women; this same finding is also true for women in predominately male professions in comparison to their "sex-typical" counterparts (Powell and Jacobs, 1984). As stated, STEM occupations offer competitive wages in the labor market but do so in a gendered fashion. According to Kilbourne, Farkas, Beron, Weir, and England (1994), women receive lower wages than men if the occupation they are in has a high percentage of female employees or is seen as requiring some type of nurturant skill. STEM professions are seen as requiring masculine skills and are male dominated fields and perpetuate a wage gap of their own by valuing masculine qualities over feminine qualities (Kilbourne et al., 1994).

Education and occupational prestige are not the only factors that can contribute to income differentials for men and women, marital status also plays a role. Marriage has become one of the most important statuses for obtaining higher incomes that can benefit both men and women (Ruel and Hauser, 2012). In comparison to those who are married, those who have never been married do not make as much in terms of earnings (Ruel and Hauser, 2012). According to Wilmoth and Koso (2002), "marriage provides institutionalized benefits that facilitate the accumulation of resources. As expected, individuals who do not participate in legal marriage (e.g., never married or cohabiting) have significantly lower wealth than those who are continuously married" (p. 265). Marriage not only increases wealth due to having two incomes, but provides work related benefits, higher rates of saving and expands the range of social networks of men and women (Wilmoth and Koso, 2002).

2.6 Race

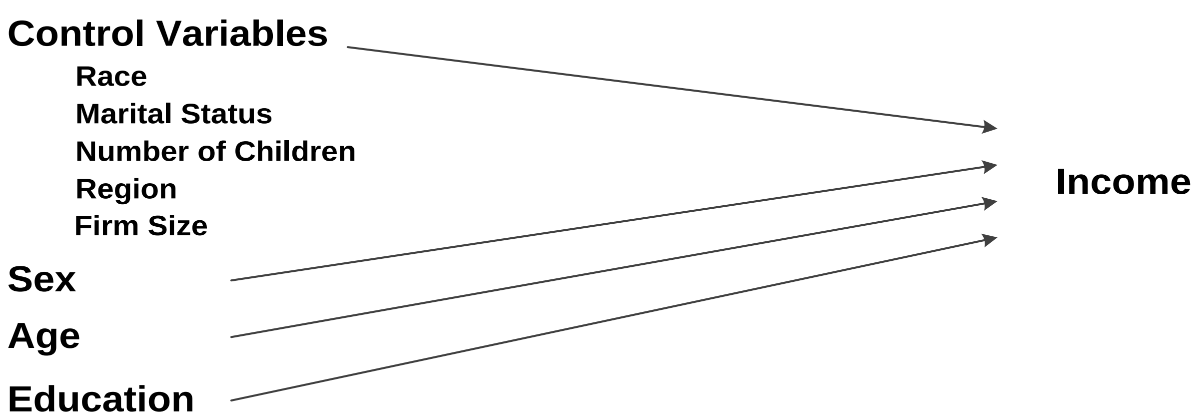
The stereotypical textbook image of the competent white male conducting research has not only kept many women out of STEM fields, but members of minority groups as well. The propensity of STEM careers to attract predominately white non-Hispanic persons is evident in their representation of STEM workers. As of 2009, nearly seventy percent of U.S. STEM field workers were white, fourteen percent were Asian, and Blacks comprised six percent of STEM workers as did Hispanics (Beede, Julian, Khan, Lehrman, McKittrick, Langdon, and Doms, 2011). Traditionally, women and minority groups have faced the problem of underrepresentation in STEM careers due to issues of access and retention in these fields (Wilburn, 1974). Although the racial distribution of STEM fields has widened in recent years, African Americans and Hispanics continue to be poorly represented in STEM workplaces.

The unequal racial distribution of STEM workplaces is often due to college major decisions and graduation rates. According to Dickson (2010), upon entering into college the college major decisions of minority groups are similar to those of white college graduates; however, the low level of African Americans and Hispanics in STEM careers is likely due to their lower graduation rate from college. In comparison to non-Hispanic whites and Asians, Hispanic and black students are less likely to complete college with a bachelor's degree or higher (Beede et al., 2011). As Gatchair (2013) notes, African Americans and Hispanics are not pursuing higher education in science and engineering at the same rate as whites and Asians, causing STEM workplaces to be stratified along unequal racial lines.

For female and minority students, the overall college experience can influence their persistence in a STEM major. Specifically, having higher grades in STEM courses and having a greater representation of female and minority graduate students increases the likelihood of many undergraduate female and minority students to stay in a STEM major (Griffith, 2010). How students come to view STEM fields and college majors also plays an important role. African American high school students interested in pursuing engineering report that their interest is not fostered at home, school, or in their community, but in their own interest to "build" or "fix" things (Denson, Avery, and Schell 2010). Prevailing notions about minority participation in STEM fields perpetuates their underrepresentation. According to Flores (2011), teachers of Latino students rarely encourage them to continue their education in STEM fields or seek careers in STEM. Similar to African American students, mentors of the same ethnicity for Latino students are oftentimes nonexistent (Flores, 2011).

Contrary to other minority groups, Asian Americans are more likely to enter STEM professions because these fields are associated with substantial financial returns than other occupations (Saad, Sue, Zane, and Cho, 2012). Similarly, Asian Americans have a greater appreciation for education, seeing it as an investment in future income, and as such enroll in postsecondary education in higher rates and have higher GPAs than other minority groups (Saad et al., 2012). In some cases, Asian Americans who received some education in other countries have been shown to have higher incomes (Saad et al., 2012), but the role of citizenship status has been shown to moderate income even in the presence of higher education, especially for women (Zhou and Lee, 2012).

2.7 Conceptual Model



The conceptual model illustrates how control variables of race, marital status, number of children, region and firm size along with sex, age, and education are expected to impact income. The current study will be focusing on these factors and how they specifically influence income. Using the above model as a guide, general research questions were created which informed bivariate hypotheses and multivariate hypotheses in models by sex and age as discussed below.

2.8 Research Questions/Hypotheses

The goal of this research design is to examine the following research questions:

1. Do women make comparable wages to men in a similar STEM occupation when they have the same qualifications?
2. How does age with regards to education and experience impact the earnings of men and women in STEM workplaces?
3. What factors contribute to having higher or lower wages between men and women?

Using the above research questions, hypotheses were created for four different models regarding age and gender in order to assess wage differentials in STEM occupations. The hypotheses for each model are discussed below:

2.8.1 Bivariate Hypotheses

1. Women will have lower mean incomes than men.
2. Older women will have higher mean incomes than younger women.
3. Older women will have lower mean incomes than older men.
4. Younger women will have lower mean incomes than younger men.
5. Age will be positively correlated with income for both men and women.
6. Education will be positively correlated with income for both men and women.
7. Asian/Pacific Islanders will have the highest mean income compared to other groups.
8. Married persons will have the highest mean income compared to other groups.
9. Number of children will be negatively correlated with income for men and women.
10. STEM workers in the South will have the lowest mean income compared to other regions.

11. Firm size will be positively correlated with income for men and women.

2.8.2 Multivariate Hypotheses

2.8.3 Full Model

1. Women will have lower mean income than men, net of other factors.
2. Older workers will have a higher mean income than younger workers, net of other factors.
3. Workers with more education will have a higher income, net of other factors.
4. Asian/Pacific Islanders will have the largest mean income compared to other groups, net of other factors.
5. Married persons will have the largest mean income compared to other groups, net of other factors.
6. Workers with more children will have a lower income, net of other factors.
7. Workers in the South will have the lowest mean income compared to other regions, net of other factors.
8. Workers in larger firms will have higher incomes, net of other factors.

2.8.4 Sex Model

9. There will be a greater difference in income by age for women than for men, net of other factors.
10. There will be a smaller difference in income by educational attainment for women for than men, net of other factors.
11. There will be a smaller difference in income by race for women than for men, net of other factors.

12. There will be a smaller difference in income by marital status for women than for men, net of other factors.
13. There will be a greater difference in income by number of children for women than for men, net of other factors.
14. There will be a smaller difference in income by region for women than for men, net of other factors.
15. There will be a smaller difference in income by firm size for women than for men, net of other factors.

2.8.5 Age Model

16. There will be a smaller difference in income by sex for the younger cohort than for the older cohort, net of other factors.
17. There will be a greater difference in income by educational attainment for the younger cohort than for the older cohort, net of other factors.
18. There will be a smaller difference in income by race for the younger cohort than for the older cohort, net of other factors.
19. There will be a smaller difference in income by marital status for the younger cohort than for the older cohort, net of other factors.
20. There will be a smaller difference in income by number of children for the younger cohort than for the older cohort, net of other factors.
21. There will be a greater difference in income by region for the younger cohort than for the older cohort, net of other factors.
22. There will be a smaller difference in income by firm size for the younger cohort than for the older cohort, net of other factors.

CHAPTER 3

METHODOLOGY

3.1 Data

The dataset used in the current study is the Current Population Survey (CPS) 2013 Annual Social and Economic (ASEC) Supplement which is conducted for the United States Bureau of Labor Statistics by the United States Bureau of the Census (United States Department of Labor: Bureau of Labor Statistics, 2013). The CPS is designed to gather monthly labor force data but also provides additional work and income related information such as work experience including employment status, occupation, benefits, and migration. The CPS also contains basic information for job training programs taking place under welfare reform programs. The target population of the CPS is the civilian noninstutitional population of the United States living in a household and members of the armed forces living in a civilian household on a military base or a household not located on a military base. A probability sampling method is used for selecting household units each month. Approximately 57,000 households are interviewed monthly from all fifty states and the District of Columbia and are present in the survey data for four consecutive months out of eight months and then again for another four months before being removed from the sample design. The CPS sample is comprised of independent samples gathered in each of the 792 individual sample areas and the District of Columbia with the sample in each state being specifically designed to reflect the demographic conditions and labor market conditions of each state. The CPS is a computerized questionnaire that is given as both telephone and personal interviews. Persons age 16 and older are eligible to participate in the CPS.

As the current study is focused on younger and older workers, the sample has been restricted to those between age 25, the age at which the typical college student has earned a Bachelor's degree (Lumina Foundation for Education Inc., 2013) and 66, the current full retirement age (Social Security Administration, 2014). The sample was also restricted to those who identified themselves as adult civilians, reported that they were in the labor force at the time of the survey, were employed full time at the time of the survey, and reported working full time last year. Additionally, the sample was restricted to exclude self-employed persons and unpaid family workers. The sample was further restricted to include respondents who reported not having any difficulties such as hearing, vision, remembering, physical difficulties, limited mobility, or physical care disabilities; those who do not have a disability that directly affects their work; and individuals who indicate their health to be excellent, very good, or good. The CPS provides supplemental weights, but a relative weight was created and employed in this analysis in order to maintain the generalizability of the sample size to the population. The relative weight was obtained by dividing the supplemental weight by its mean.

3.2 Variables

3.2.1 Dependent Variable

3.2.1.1 Total Wage and Salary Earnings

The dependent variable in this analysis is individual income in the form of total wage and salary earnings annually reported for 2012. Total wage and salary earnings is an interval-level variable reported in dollar amounts. For use in this analysis, wage and salary income was limited to the range of $20,000 to $250,000 which eliminated 5,015 cases below $20,000 and 506 cases above $250,000.

3.2.2 Independent Variables

3.2.2.1 Sex

Sex is coded in the CPS as male and female with response categories as 1 for male and 2 for female. For use in this analysis, sex was recoded into a binary variable with response categories for females as 1 and males as 0.

3.2.2.2 Age

In the CPS age is recorded in years of the respondent. The sample was restricted to individuals age 25 to 66. As the CPS asks respondents about their wage and salary income for the previous year, one year was subtracted from each respondent's age to match the respondent's age to the same year reported for income. Age was recoded into younger persons, age 25 to 39, and older persons, age 40 to 66. Response categories were 0 for younger persons and 1 for older persons. Older workers are defined as age 40 and older based on the Age Discrimination in Employment Act of 1967 which prohibits age discrimination starting at age 40 (U.S. Equal Employment Opportunity Commission, 2014).

3.2.2.3 Occupation

As the current study explores STEM occupations specifically, the occupational variable was limited to eighty-seven classifications consisting of management occupations, computer and mathematical occupations, architecture and engineering occupations including sales engineers; life, physical, and social science occupations, healthcare practitioners and technical occupations. Management occupations are limited to computer, information systems, engineering, natural sciences, medical, and health services managers. It is important to note that healthcare practitioners and technical occupations are STEM-related occupations and are included in this analysis to increase the ratio of females in the sample.

3.2.2.4 Educational Attainment

Educational attainment, measured in terms of the highest grade completed or degrees earned by the respondent, was initially coded as a fifteen ordinal-level variable with the lowest category of completion at no schooling or preschool with a response category of 2, followed by first through fourth grade coded as 10 and the highest category of completion at a doctorate degree with a response category of 125. In the CPS, educational attainment was then recoded into a fifteen ordinal-level variable, which is used for further recoding in the current study in which the lowest category is no school completed coded as 1 through a doctorate degree coded as 18. Due to a small number of respondents in the lower categories of completion, educational attainment was recoded into five response categories so that respondents who completed high school or less were the lowest category coded as 1, followed by those who completed some college with no degree coded as 2, obtained an Associate or Bachelor’s degree coded as 3, those with a Master’s degree coded as 4, and those who obtained a professional or Doctorate degree remained the highest category coded as 5.

3.3.3 **Control Variables**

3.3.3.1 Race

Initially, race was a twenty-two nominal-level variable. Due to the large number of categories and small numbers of respondents in several categories, race was recoded for use in this analysis into a five nominal-level variable consisting of white only with a response category of 1, black only coded as 2, American Indian or Alaskan native only coded as 3, Asian and Hawaiian/Pacific Islander coded as 4, and multiracial persons coded as 5.

A second variable measuring Hispanic ethnicity, originally coded as a six nominal-level with 0 coded as not Hispanic and five categories of Hispanic ethnicity, 100 Mexican, 200 Puerto Rican, 300 Cuban, 400 other Spanish, and 410 Central/South American. This variable was recoded into two categories, 1 Hispanic and 0 no Hispanic ethnicity.

A third variable was created combining the recoded race variable and the recoded Hispanic ethnicity variable into a six nominal-level variable consisting of 1 Hispanic, 2 white only, 3 black only, 4 American Indian or Alaskan native only, 5 Asian and Hawaiian/Pacific Islander, and 6 multiracial persons. To assess differences among the six levels of race/ethnicity for income a post-hoc Scheffé analysis (p=.05) was performed. The results indicated that there was not a significant difference between Hispanic, black, American Indian or Alaskan native or multiracial persons and race was further recoded into three categories indicating 1 white, 2 Asian and Hawaiian/Pacific Islander, and 3 other minority groups. Three separate binary variables were created for white, Asian and Hawaiian/Pacific Islander, and other minority groups for further use in this analysis with response categories of 0 and 1.

3.3.3.2 Marital Status

Marital status is used as a control variable in this analysis. Marital status is a nominal-level variable that provides information for 1 married persons with a spouse present, 2 married persons with the spouse absent, as well as 3 separated, 4 divorced, 5 widowed, and 6 never married or single persons. For use in this analysis, marital status was recoded into a three-level nominal variable for 1 married, 2 previously married, and 3 never married or single. The category of married includes respondents who are married with a spouse present and married with a spouse absent. Previously married includes respondents who are separated, divorced, and widowed. Never married includes respondents who report never having been married or are single. Married, previously married, and never married variables were then recoded into three separate binary variables with response categories of 0 and 1 to be used in the regression analysis.

3.3.3.3 Number of Children

The number of children under 18 years of age who are single and never married and related to the householder either by birth, marriage, or adoption was originally coded in the CPS with nine categories, 0 zero children present, 1 one child, 2 two children, 3 three children, and so forth to 9 nine or more children. Due to the small number of respondents who reported having more than three children, the number of children was recoded into a four-nominal level variable keeping the first three categories of 0 zero children present, 1 one child, 2 two children, and a final category of 3 three or more children. 172 respondents originally having four or more children were allocated into the category of three or more children. Binary variables were created for each category with response categories of 0 and 1to be used in the regression analysis.

3.3.3.4 Region

Region is also used as a control variable in this analysis and was recoded from the initial variable representing nine divisions across the United States into four separate regions consisting of 1 northeast, 2 Midwest, 3 south, and 4 west. The previous regions were created in accordance with the nine CPS divisions of the United States. Alaska and Hawaii are included in the region designated as "west". Four separate binary variables with response categories of 0 and 1 were created for each of the four regions for later use in the analysis.

3.3.3.5 Firm Size

Additionally, firm size also serves as a control variable in this analysis. Firm size is coded in the CPS as a six-ordinal level variable indicating the number of employees in the firm with categories ranging from under 11 employees coded as 1, 11 to 49 employees coded as 4, 50 to 99 employees coded as 6, 101 to 499 employees coded as 7, 501 to 999 employees coded as 8, and 1,000 or more employees coded as 9. Firm size is not recoded any further in this analysis.

CHAPTER 4

RESULTS

4.1 Univariate Results

4.1.1 Dependent Variable

Table 1 presents the results for the dependent variable of total wage and salary earnings. Mean wage and salary income for the entire sample (n=7,636) was $77,439.71 (SD=$40,830.90) with a median income of $69,987.99 and more cases present in the lower income category. Total wage and salary income is non-normally distributed with a skewness of 1.448 (SE=0.028) and a kurtosis of 2.761 (SE=0.056). The mean wage and salary income for all men (n=4,071) was $87,328.05 and the mean wage and salary income for all women (n=3,565) was $66,379.61. As expected, wage and salary income for older men (n=2,260) was the highest at $95,552.62, followed by younger men (n=1,811) with a mean wage and salary income of $77,064.37, then older women (n=2,020) at $69,604.98 and younger women (n=1,545) with the lowest mean wage and salary income of $62,162.64.

4.1.2 Independent Variables

In the full sample, there are slightly more men (53.8%) in comparison to women (46.2%), see Table 2. In the categories of younger workers age 25 to 39 and older workers age 40 to 66, slightly more workers are older (56.4%) than are younger workers (43.6%), see Table 2. Most respondents have at least an Associate degree or Bachelor’s degree (M=3.17, SD=.965) with a median of 3.00. Educational attainment is somewhat normally distributed with a skewness of -0.103 (SE=0.028) and a kurtosis of 0.333 (SE=0.056), see Table 1.

4.1.3 Control Variables

The vast majority of individuals in the full sample reported being White non-Latino (69.3%). The second largest group in the sample was other minority groups which account for 17.2%. Asian/Pacific Islanders are the smallest group in the full sample (13.5%), see Table 2.

The full sample includes an age range of 25 to 66 years. As such, most individuals are married (68.8%) followed by those who have never been married or are currently single (17.9%) and few have been previously married (13.3%), see Table 2. Given the lower ages in the younger cohort, it is not surprising that those who have never been married or are currently single would comprise nearly twenty percent of the sample.

Nearly half of the total sample reported not having any children (47.9%). The mean number of children is .93 (SD=1.038) with a median of 1.00, however the mode for individuals who do have children is two children, see Table 1. Number of children is non-normally distributed with a skewness of .644 (SE=.028) and kurtosis of -.943 (SE=0.056).

For the total sample, the largest percentage of respondents reported being in the South (35.9%), followed by the West (22.9%), the Midwest (21.8%) and the Northeast region had the lowest percentage of respondents (19.4%), see Table 2. These results are expected given that the region designated as South covers the largest number of states followed by the West, Midwest, and Northeast regions.

The mean firm size is 4.91 (SD=1.573) which would suggest that most people work for STEM firms have 101 to 499 employees; however, the median value indicates that over half of the respondents work in STEM firms which have one thousand or more employees which accounts for the lower mean value, see Table 1. Firm size is non-normally distributed with a skewness of -1.172 (SE=0.028) and a kurtosis of 0.012 (SE=0.056).

4.2 Bivariate Results

4.2.1 T-Test (Tables 3 and 4)

Table 3 shows the results of a t-test which was run to evaluate the hypothesis that wage and salary earnings are likely to vary by sex. Men do report higher total wage and salary earnings compared to women. The difference was statistically significant, $t(7{,}550.149) = 22.759$, $p<.001$. A Cohen's *d* was performed (0.46) which determined that the difference was meaningful. The findings suggest that there is a relationship between sex and total wage and salary earnings.

Table 4 shows the results of a t-test which was conducted to assess the hypothesis that wage and salary earnings are likely to vary by age, specifically those who are younger versus older. Older persons do report higher total wage and salary earnings compared to younger persons. The difference was statistically significant, $t(7{,}596.726) = -14.521$, $p<.001$. A Cohen's *d* was performed (0.30) which determined that the difference was meaningful. The findings suggest that there is a relationship between age cohort and total wage and salary earnings.

4.2.2 Correlation (Table 5)

Table 5 shows the results of a Pearson R Correlation test which was run to determine the correlations between the dependent variable of total wage and salary earnings and independent variables of educational attainment, number of children, and firm size. The results show three possible relationships with earnings which are described as follows. Educational attainment was found to have a moderate positive relationship with total wage and salary earnings and is statistically significant (r=.364, *p*<.001). As educational attainment increases, income also increases. Number of children in the household was found to have a weak positive relationship on total wage and salary earnings and is statistically significant (r=.111, *p*<.001). As the number of children increases, income also increases. Firm size was found to have a weak positive relationship on total wage and salary earnings and is statistically significant (r=.103, *p*<.001). As the firm size increases, income increases as well.

4.2.3 One-Way Analysis of Variance (Tables 6, 7, and 8)

A one-way analysis of variance was run to determine the relationship between total wage and salary earnings and race (see Table 6). A significant difference was found between the mean earnings between groups, $F(2) = 87.680$, $p<.001$. A Scheffé post-hoc analysis showed that there was a difference between White, Asian/Pacific Islander, and other minority respondents. Asian/Pacific Islanders had the highest mean total wage and salary earnings (M=$87,628.33, SD=$42,896.70) and other minority groups had the lowest mean total wage and salary earnings (M=$65,892.11, SD=$33,170.17).

A one-way analysis of variance was run to determine the relationship between total wage and salary earnings and marital status (see Table 7). A significant difference was found between the mean earnings between groups, $F(2) = 110.499$, $p<.001$. A Scheffé post-hoc analysis showed that there was a difference between those who are married, were previously married, and those who have never been married. Married persons had the highest mean total wage and salary earnings (M=$81,970.86, SD=$42,304.06) and those who have never been married had the lowest mean total wage and salary earnings (M=$65,458.46, SD=$33,795.75).

A one-way analysis of variance was run to determine the relationship between total wage and salary earnings and region (See Table 8). A significant difference was found between the mean earnings between groups, $F(3) = 66.180$, $p<.001$. A Scheffé post-hoc analysis showed that there was a difference between those in the Northeast, Midwest, and South; the Midwest and West; and the South and West. Persons in the West had the highest mean total wage and salary earnings (M=$86,669.99, SD=$43,123.80) and those in the South had the lowest mean total wage and salary earnings (M=$71,496.17, SD=$38,615.94).

4.4 Multivariate Analysis

An Ordinary Least Squares (OLS) multiple regression analysis was conducted to evaluate how well the variables of age, sex, educational attainment, race, marital status, number of children in the household, region, and firm size predict total wage and salary earnings for both the full sample and for men and women of younger and older ages in the sample. Modified Chow tests were performed on statistically significant coefficients for the comparative OLS regression models.

4.4.1 Tests for Assumptions

The test for normality concluded that the dependent variable of total wage and salary earnings was non-normally distributed; however, there are over 7,000 cases and tests of the residuals indicated that this was not a problem. The variance inflation factor was less than 1.5 in all cases and the tolerance measures for all variables ranged from .768 to .995. None of the independent variables were correlated over 0.70 with any other independent variable which is an acceptable level of multicollinearity for this study. Scatterplots were examined and some evidence of heteroscedasticity was found; however changes did not seem to be warranted. Tests for outliers were conducted. Outliers were examined using standardized residuals and 123 outliers were found and were above 3.0 standard deviations, none were below -3.0 standard deviations. The maximum found in the Mahalonobis distance test was 31, but the maximum for Cook's distance test was less than 1. Outliers were less than 1% of the total sample and therefore no outliers were removed.

4.4.2 Full Model

Table 9 presents the results of the OLS multiple regression that was examined for the full sample. The full model accounted for just over a quarter of the variance in total wage and salary earnings (adjusted R^2=.261, p<.001). In the analysis of the full model, being female resulted in an average of $18,071 ($p$<.001) less annually in total wage and salary earnings in reference to men net of other factors. Older workers, those aged 40 to 66, earned an average of $13,876 ($p$<.001) more in comparison to younger workers, those aged 25 to 39. For each increase in educational attainment, an increase of $14,659 ($p$<.001) annually in total wage and salary earnings can be seen. In comparison to white non-Hispanics, Asian/Pacific Islanders earned an average of $277 less annually, but this difference was not statistically significant. Other minority groups earned an average of $6,481 ($p$<.001) less annually compared to white non-Hispanic workers. Previously married workers earned an average of $3,213 ($p$<.01) less in comparison to married workers and never married/single workers earned an average of $7,122 ($p$<.001) less than married workers. For each additional increase in the number of children in the household, an increase in total wage and salary earning of $2,663 ($p$<.001) annually can be seen. In comparison to the South, workers in the Midwest earned an average of $534 less annually, but this difference was not statistically significant. Workers in the Northeast earned an average of $7,363 ($p$<.001) more than those in the South and those in the West earned an average of

$11,762 ($p$<.001) more. For each increase in firm size, total wage and salary earnings increased by $2,243 ($p$<.001) annually.

Comparing the standardized betas of the full model, educational attainment had the greatest effect on total wage and salary earnings with a standardized beta of 0.347. With a standardized beta of -0.221, sex also seems to have a noticeable effect on total wage and salary earnings in comparison to other variables. Age has a smaller standardized beta of 0.169. The smallest standardized beta is -0.002 for the Asian/Pacific Islander dummy variable. The variable of other minority groups has a slightly larger standardized beta of -0.060. Being previously married has the largest effect of the marital status variables with a standardized beta of -0.207; the standardized beta for identifying as never married/single is -0.067. Number of children also has a small standardized beta value at 0.068. Regarding region, the western region has the largest standardized beta with a value of 0.121, followed by the northeast region with a standardized beta of 0.071, and the Midwest region -0.005. The standardized beta for firm size is 0.086.

4.4.3 Sex Model

Table 10 presents the results of the second model OLS multiple regression which was examined separately for female and male workers. This model accounts for almost 25 percent of the variance in total wage and salary earnings for female workers (adjusted R^2=.240, p<.001). Older female workers earned an average of $9,641 ($p$<.001) more annually in their total wage and salary earnings in comparison to younger female workers. For each increase in educational attainment, an increase of $14,989 ($p$<.001) in total wage and salary earnings can be seen for female workers net of other factors. In comparison to white non-Hispanic female workers, Asian/Pacific Islander female workers earned an average of $4,390 ($p$<.01) more annually and female workers of other minority groups earned an average of $1,848 less annually in comparison to white non-Hispanic female workers, but this result was not statistically significant. Previously married female workers earned an average of $1,877 less than married female workers, but this difference was not significant. Never married/single female workers earned an average of $5,742 ($p$<.001) less annually than married female workers. For each additional increase in the number of children in the household, an increase in total wage and salary earnings of $556 annually can be seen; however this result is not statistically significant for women. In comparison to the South, women in the Midwest earned an average of $633 less annually, but this difference is not significant. Female workers in the northeast earned an average of $7,411 ($p$<.001) more annually than female workers in the South and female workers in the west earned an average of $10,146 ($p$<.001) more annually compared to those in the South. Each unit increase in firm size has been shown to increase total wage and salary earnings by $2,618 ($p$<.001) for female workers net of other factors.

Comparing the standardized betas of the model for women, educational attainment had the greatest effect on total wage and salary earnings with a standardized beta of 0.409. With a standardized beta of 0.141, age seems to have a more subtle effect on total wage and salary earnings in comparison to education. The standardized beta for firm size is 0.121. By region, the western region has the largest standardized beta at 0.120, followed by the northeast with a standardized beta of 0.087, and the Midwest has the smallest standardized beta at -0.008. Regarding marital status, the standardized beta for never married/single is the largest with at -0.065, followed by previously married with a standardized beta of -0.021. By race, Asian/Pacific Islanders have the largest standardized beta with a value of 0.041 followed by other minority groups with a standardized beta of -0.022. The standardized beta for number of children is 0.017.

The model accounts for slightly less of the variance for male workers (adjusted R^2=.210, $p < .001$). Age gives men an average increase in total wage and salary earnings of $16,621 ($p$<.001) more annually compared to younger workers. For each increase in educational attainment significantly, male workers earned $14,270 ($p$<.001) more annually net of other factors. Compared to white non-Hispanic male workers, Asian/Pacific Islander male workers earned an average of $3,174 less annually; however this difference was not statistically significant. Male workers of other minority groups earned an average of $10,984 ($p$<.001) less annually than non-Hispanic white male workers. Previously married men earned an average of $3,679 less annually in comparison to married men, but this difference was not significant. In comparison to married men, never married/single men, earned an average of $8,364 less annually ($p$<.001). For each additional increase in the number of children in the household, an increase in total wage and salary earnings of $3,971 ($p$<.001) annually can be seen for men. In comparison to the men in the South, men in the Midwest earned an average of $104 less annually, but this difference is not significant. Male workers in the northeast earned an average of $7,449 ($p$<.001) more annually than male workers in the South and male workers in the west earned an average of $12,947 ($p$<.001) more annually compared to male workers in the South. Each unit increase in firm size has been shown to increase total wage and salary earnings by $1,909 ($p$<.001) for men net of other factors.

Comparing the standardized betas of the model for men, educational attainment had the greatest effect on total wage and salary earnings with a standardized beta of 0.325. With a standardized beta of 0.188, age seems to have a smaller effect on total wage and salary earnings in comparison to education. By region, the western region has the largest standardized beta at 0.128, followed by the northeast with a standardized beta of 0.067, and the Midwest has the smallest standardized beta at -0.001. The standardized beta for number of children is 0.096. By race, other minority groups have the largest standardized beta at -0.089, followed by Asian/Pacific Islanders with a standardized beta of -0.026. Regarding marital status, the standardized beta for never married/single is the largest with at -0.073, followed by previously married with a standardized beta of -0.024. The standardized beta for firm size is 0.069.

Modified Chow tests were performed on statistically significant coefficients for the male and female models. In comparison to younger workers, older male workers earned $16,621more and older female workers earned $9,641 more than younger workers. The modified Chow tests showed that these coefficients were statistically significantly different. In this case, being older and being male results in larger total wage and salary earnings annually. For each increase in educational attainment level, men gained $14,270 and women gained $14,989. The modified Chow test showed that these coefficients were not statistically different. The mean income for never married/single men is $8,364 less than married men and the mean income for never married/single women is $5,742 less than married women; however, the modified Chow test indicated that these coefficients were not statistically different. The mean income for men in the northeast is $7,449 more than for men in the South and the mean income for women in the northeast is $7,411 more than for women in the South. The modified Chow test showed that these coefficients were not statistically different. The mean income for men in the west is $12,947 more than for men in the South and the mean income for women in the west is $10,146 more than for women in the South; however, the modified Chow showed that these coefficients were not statistically different. For each increase in firm size, men gained $1,909 and women gained $2,618. The modified Chow test indicated that these coefficients were not statistically different.

4.4.4 Age model

Table 11 presents the results of the third model OLS multiple regression which was examined for younger and older workers. The age model accounts for almost 19 percent of the variance in total wage and salary earnings for younger workers, those age 25 to 39 (adjusted R^2=.188, p<.001). Younger female workers earned an average of $13,354 ($p$<.001) less annually than younger male workers. For each increase in educational attainment, an increase of $10,744 ($p$<.001) in total wage and salary earnings can be seen for younger workers net of other factors. In comparison to younger white non-Hispanics, younger Asian/Pacific Islanders earned an average of $4,389 ($p$<.01) more annually while younger workers of other minority groups earned an average of $3,892 ($p$<.01) less annually than younger white non-Hispanic workers. Younger, previously married workers earned an average of $1,371 less annually than younger married workers, but this difference was not significant. Younger, never married/single workers earned an average of $6,739 ($p$<.001) less annually than younger married workers. For each additional increase in the number of children in the household, an increase in total wage and salary earnings of $3,261 ($p$<.001) annually was observed for younger workers. In comparison to the younger workers in the South, younger workers in the Midwest earned an average of $1,247 more annually, but this difference was not significant. Younger workers in the northeast earned an average of $7,233 ($p$<.001) more annually in comparison to younger workers in the South, and younger workers in the west earned an average of $12,913 ($p$<.001) more annually compared to younger workers in the South. Each unit increase in firm size has been shown to increase total wage and salary earnings for younger workers by $2,033 ($p$<.001) annually net of other factors.

Comparing the standardized betas of the model for younger workers, educational attainment had the greatest effect on total wage and salary earnings with a standardized beta of

0.283. With a standardized beta of -0.185, sex has a smaller effect on total wage and salary earnings in comparison education. By region, the western region has the largest standardized beta at 0.154, followed the northeast with a standardized beta of 0.077, and the Midwest at 0.014. The standardized beta for number of children is 0.094. The standardized beta for firm size is 0.090. Regarding marital status, the standardized beta for never married/single is the largest with at -0.085, followed by previously married with a standardized beta of -0.010. By race, Asian/Pacific Islanders have the largest standardized beta with a value of 0.047 followed by other minority groups with a standardized beta of -0.042.

The model accounts for 10 percent more of the variance in total wage and salary earnings for older workers, those aged 40 to 66, than for younger workers (adjusted R^2=.284, p<.001). Older female workers earned an average of $21,224 ($p$<.001) less annually than older male workers. For each increase in educational attainment, an increase of $17,340 ($p$<.001) annually in total wage and salary earnings can be seen for older workers net of other factors. In comparison to older white non-Hispanic workers, older Asian/Pacific Islanders earned an average of $3,533 less; however, this difference was not statistically significant. Older workers of other minority groups earned an average of $8,241 ($p$<.001) less than older white non-Hispanic workers. Older workers who have been previously married earned an average of $4,011($p$<.01) less than married older workers, and never married/single older workers earned an average of $7,387($p$<.001). For each additional increase in the number of children in the household, an increase in total wage and salary earnings of $1,831 ($p$<.01) annually was observed for older workers. In comparison to the South, older workers in the Midwest earned an average of $1,590 less annually, but this difference was not significant. Older workers in the northeast earned an average of $7,595 ($p$<.001) more annually than older workers in the South, and older workers in the west earned an average of $10,718 ($p<.001$) more annually compared to older workers in the South. Each unit increase in firm size has been shown to increase total wage and salary earnings for older workers by $2,464 ($p<.001$) annually net of other factors.

Comparing the standardized betas of the model for older workers, educational attainment had the greatest effect on total wage and salary earnings with a standardized beta of 0.391. With a standardized beta of -0.244, sex seems to have a smaller effect on total wage and salary earnings in comparison to education. By region, the western region has the largest standardized beta at 0.102, followed by the northeast with a standardized beta of 0.071, and the Midwest had the smallest standardized beta at -0.015. The standardized beta for firm size is 0.089. By race, other minority groups have the largest standardized beta with a beta value of -0.070 followed by Asian/Pacific Islanders with a standardized beta of -0.025. Regarding marital status, the standardized beta for never married/single is the largest with at -0.050, followed by previously married with a standardized beta of -0.035. The standardized beta for number of children is 0.044.

Modified Chow tests were performed on statistically significant coefficients for the younger and older cohort models. The mean income for younger female workers is $13,354 less than for younger male workers and the mean income for older female workers is $21,224 less than for older male workers. The modified Chow test showed that that these coefficients were statistically significantly different. In this case, older women have more of a wage gap than do younger women in STEM occupations. For each increase in educational attainment level, younger workers gained $10,744 and older workers gained $17,340. The modified Chow test showed that these coefficients were statistically significantly different. Therefore, older workers receive more of a return in the form of higher total wage and salary earnings for more education than younger workers do. The mean income for younger workers in other minority groups is $3,892 less than the mean total wage and salary earnings of younger white workers and the mean income for older workers in other minority groups is $8,241 less than the mean total wage and salary earnings of older white workers. The modified Chow test showed that these coefficients were statistically significantly different. The mean income for never married/single younger workers is $6,739 less than married younger workers and the mean income for never married/single older workers is $7,388 less than married older workers; however, the modified Chow test indicated that these coefficients were not statistically different. For each increase in the number of children, younger workers gained $3,261 and older workers gained $1,830. The modified Chow test showed that these coefficients were not statistically different. The mean income for younger workers in the northeast is $7,233 more than for younger workers in the South and the mean income for older workers in the northeast is $7,595 more than for older workers in the South. The modified Chow test showed that these coefficients were not statistically different. The mean income for younger workers in the west is $12,913 more than for younger workers in the South and the mean income for older workers in the west is $10,718 more than for older workers in the South; however, the modified Chow showed that these coefficients were not statistically different. For each increase in firm size, younger workers gained $2,033 and older workers gained $2,464. The modified Chow test indicated that these coefficients were not statistically different.

CHAPTER 5

DISCUSSION

This study examined the influence of sex and age on the total wage and salary earnings of individuals working in science, technology, engineering, and mathematics (STEM) occupations and the relationship that both sex and age may have with individual factors such as educational attainment, race, marital status and number of children, as well as occupational factors such as region and firm size on total wage and salary earnings. Using a sample of full-time workers in STEM occupations age 25 to 66 extracted from the Current Population Survey 2013 Annual Social and Economic Supplement, explanations for income differentials based on human capital theory and gender schema theory were used for both the full sample and for men and women and younger and older workers. The research results found interesting differences in the total wage and salary earnings by sex and age. Support was found for the hypothesis that there would be a greater difference in the model by age for women than for men and the hypothesis that there would be a smaller difference by sex in the model for the younger cohort than for the older cohort.

5.1 Bivariates

In the last few decades, a woman’s pay in a STEM occupation has been decreasing gradually in reference to men (Broyles, 2009). In agreement with labor market trends regarding women’s earnings in comparison to men’s, the results of this study support previous research and the hypothesis that women would have smaller incomes than men. The tendency of women to make less than men follows them well into later life as older women continue to make less than older men which supports the third bivariate hypothesis. The hypothesis that age would be positively correlated with income for both men and women was also supported. Similarly, the hypothesis older women would have higher mean incomes than younger women was supported as was the hypothesis that younger women would have lower mean incomes than younger men. According to human capital theory, education is one of the most important aspects of human capital (Becker, 1993) and as Schultz (1961) noted, human capital investment results in the most noticeable increase in future earnings. For investing in education and obtaining more credentials and degrees, both men and women have higher incomes which supports the sixth bivariate hypothesis.

Previous research has identified Asian Americans as having higher incomes in STEM professions as they often enter these jobs for financial gains (Saad et al., 2012), have a greater appreciation for and seeking more education than whites and members of other minority groups (Saad et al., 2012). In comparison to white non-Latino/a workers and workers of other minority groups, workers who identify as Asian/Pacific Islander have the highest average annual earnings in the current study in support of the hypothesis.

Ruel and Hauser (2012) stated that "Marriage is the most important family-formation status for wealth accumulation" (p. 1,158). A finding which was also supported in this analysis as married persons have greater earnings than previously married persons and never married/single persons. This may also be due to the male dominated tendency of STEM workplaces and men receiving a greater financial return for being married (Rosenfeld and Kalleberg, 1990). The hypothesis that workers with more children would have lower incomes was not supported as an increase in the number of children also causes an increase in annual earnings. This finding can also be attributed to the male dominated nature of STEM fields and that men have larger incomes for not only being married, but having children as well.

The results of this study support the hypothesis that the STEM workers in the South would have the lowest annual incomes compared to STEM workers in other regions. As the regions designed as Northeast and West encompass the technologically driven east and west coasts respectively, smaller incomes in the South and Midwest are somewhat expected. Similarly, larger STEM firms have higher annual earnings for both men and women in comparison to smaller firms which supports the last bivariate hypothesis.

5.2 Full Model

Gender schema theory offers an important insight as to why women remain a minority in scientific and technological occupations by identifying that perceptions of gender, what it means to be masculine and feminine, guide our perceptions of ourselves and others around us. Since STEM occupations tend to be male dominated fields that value “masculine” qualities (Kilbourne et al., 1994), it was hypothesized that women would make less annually compared to men. In support of the hypothesis, the full model indicates that women did make less in comparison to men. By age, the hypothesis that the older cohort of STEM workers would make more annually in terms of earnings was supported as they do make more on average, net of other factors.

As human capital theory would suggest, educational attainment accounts for the most substantial increase in earnings in the full model in comparison to other factors. STEM careers offer some of the highest incomes in the labor market and also have more requirements for additional educational attainment. Carnevale et al. (2010) noted that postsecondary education is a valuable asset for entry into jobs that provide more training and technology, such as STEM jobs. The hypothesis that workers with more education would have higher incomes was supported.

In comparison to white STEM workers, members of other minority groups make significantly less on average. In the full model, the hypothesis that Asian/Pacific Islanders would have the largest mean income compared to other groups was not supported. In the full model, married workers continue to have larger total wage and salary earnings than previously married and never married or single workers which supports the hypothesis. The hypothesis that workers with more children would have a lower mean income was not supported as income increases with the number of children.

In the full model by region, workers in the South have substantially lower earnings compared to workers in the northeast and western regions which supports hypothesis 7. The higher cost of living in the northeast and western coastal regions may also be a contributing factor to the increased wages of workers in these areas compared to workers in the South. Similarly, larger STEM firms also provide more earnings in the full model compared to smaller companies which supports the hypothesis.

5.3 Sex Model

The most salient finding of the sex model is the discrepancy in the wages of men and women regarding age. As originally hypothesized and indicated in other analyses, older cohorts do tend to make more than younger cohorts and older men tend to make the most, net of other factors (see Table 10). The underrepresentation of women in STEM fields and the value placed on the perceived masculine qualities of logic and reason discredits female employees and results in unequal wages (Kilbourne et al., 1994). As previous literature has suggested, women receive lower wages than men even when equally qualified due to perceptions of productivity and skill and lack of adequate policy (Cabeza et al., 2011; Gjerde, 2002; Landivar, 2013; Mason, 2014;

Rosenfeld and Kalleberg, 1990). The expectation of women to be devoted mothers and require extended time off from work certainly influences their financial opportunities. Another contributing factor to the gendered wage gap in STEM professions involves education. Despite women's increasing presence in higher education and their current trend of receiving more degrees than men (Averett and Burton, 1996; Goldin et al., 2006), men receive greater financial returns for investing in education than women (Rosenfeld and Kalleberg, 1990). Taken together, these factors create a cycle in which women do not feel as though they belong and are more inclined to leave (Glass et al., 2013).

5.4 Age Model

A similar finding appeared in the model by age. Women continue to make less in terms of earnings; however, older women make less in comparison to older men than younger women make in comparison to younger men, net of other factors (see Table 11). This finding is particularly interesting because it identifies that there is a gendered wage gap in STEM professions, but the extent of this gap may be lessening over time as younger cohorts of women are making more in reference to men. In this case, perhaps STEM fields are not only leading innovation in science and technology, but in more equal wage practices as well. As Morgan (2008) indicated, younger cohorts of women have earnings closer to men early in their career field. By age, increases in educational attainment also result in higher wages for both younger and older cohorts of STEM workers, net of other factors (see Table 11). Contrary to the initial hypothesis, older cohorts benefit more from additional education than younger cohorts do. This may be attributable to the fact that older workers have had more time than younger workers to acquire more education either through college or work-training programs.

The equalizing of wages for younger cohorts not only appeared by gender but by race for other minority groups as well (see Table 11). While the greatest share of STEM jobs are held by white non-Hispanic workers who tend to make more in STEM than other minority workers, wages of other minority groups are becoming more comparable to those of white workers in younger cohorts, net of other factors. The initiatives taken to incorporate more women into STEM and improve their wages may have also increased the participation and wages of other minority workers in younger cohorts. In this case, despite issues of access and retention causing members of other minority groups to be poorly represented and receive lower wages overall in STEM fields (Wilburn, 1974), income prospects for younger minority workers seem to be improving in these occupations.

CHAPTER 6

CONCLUSION

6.1 Limitations

There are three main limitations to the current study. The first issue involves the use of the CPS dataset which only offers cross-sectional data and as such, the cross-sectional nature of this design. Although this study showed that younger cohorts of women are earning more in comparison to their male counterparts than do older cohorts of women, this study cannot assess whether or not this will be the case for younger cohorts further into their careers. It is possible that as women age in their STEM job, a greater wage gap will appear with respect to men of similar ages.

Secondly, the CPS dataset does not offer a measure of work training or certifications. As STEM jobs offer more opportunities for additional work training and certifications in various related STEM sectors, having more or less of these credentials can influence income for both men and women. This could also explain why older cohorts tend to make more in comparison to younger cohorts of STEM workers. Having a measure of additional work experience attributes could possibly have explained more of the variance in incomes between men and women, and the younger and older cohorts.

Lastly, the CPS dataset does not offer another important measure, that being time in the labor force. Given the comparison by sex and age, time in the labor force or how long workers have been in their current job can greatly impact their wages. This is also particularly important for women. How much broken time have women experienced in their job due to family responsibilities such as maternity leave? As men tend to experience less broken time in the labor force, this measure may have explained more of the difference in earnings between men and women, and the older and younger cohorts.

6.2 Future Research

This study has shown that younger cohorts of women have incomes similar to younger cohorts of men in the beginning years of their STEM career, but will this newfound equality last into later years of employment? Future research studies examining income differentials of men and women in STEM occupations will need to take more of a longitudinal approach to see if differences remain stable or change over time.

Future research studies may also want to include measures of work training and certifications and time in the labor force. Taken together, these two measures have the potential to have profound effects on earnings in STEM occupations and can perhaps offer more of an explanation as to why men make more and women make less. If information such as additional work training and credentials are included in the analysis it will be important to see if men or women have more and what occupations tend to offer these benefits. Additionally, the amount of unbroken time in the labor force can possibly explain more of the income discrepancy for older cohorts of women compared to older cohorts of men. The growing prevalence of work and family policies adopted by larger firms may also explain why younger cohorts of women experience less of a wage gap.

Although it was beyond of the scope of the current analysis, future studies may want to break down the general category of STEM occupations to address each category separately. For example, would the current findings be the same for women in science as they would be for women in engineering? Previous research has indicated that women lag behind in representation in computer science fields; how might income be different by age for men and women in these occupations? Analyzing STEM profession in this way may offer interesting insight into the wage gap in these fields such as where women are making the least and where women tend to make the most in comparison to men.

6.3 Implications

The results of this study have profound implications for younger cohorts of women, especially those considering majors and careers in STEM. As STEM firms have been growing and creating more jobs in the labor market, the need for employees and diversification has created opportunities for women not only in terms of representation, but wages as well. In these innovative fields, the gender gap in income appears to be lessening for younger cohorts in these positions. In this case, as the representation of women increases and they experience more equal wages compared to men, this has the potential to drive the already expanding nature of the STEM market. Although STEM occupations offer women more equitable wages compared to men than other occupations, a wage gap remains for women in these innovative fields. From 1995 to 2003, the earnings ratio of women to men in the general labor market increased (Johnson, 2013); however, in STEM occupations the earnings ratio of women to men decreased (Broyles, 2010). The findings of this study suggest that trend may have reversed.

As wages seem to be equalizing for younger cohorts of women, it is important to address how STEM fields have been able to manage this change. What policies do STEM jobs have that facilitate this transformation? Some larger STEM firms have adopted more work and family policies that encourage women's representation and retention. For example, Microsoft offers employees maternity leave, child-care leave, reduction of work time for child-care, nursing leave for family members, and volunteer leave for various activities (Microsoft, 2014). In addition to leave policies, Microsoft also offers a working parents community called the Parents Employee Resource Group in which parents working at Microsoft share ideas and strategies about family time management but also shape future work and family policies at the company to help and encourage parents (Microsoft, 2014).

Before younger cohorts can enjoy more equal wages in these occupations even though men continue to have higher wages than women and older workers make more than younger workers, it is important to get young women interested and involved in STEM. In all models of the current study, educational attainment resulted in the most substantial increase in total wage and salary earnings. As such, continued attention will need to be given to all levels of the educational process to not only foster interest in STEM among women and minority groups, but to also increase future income prospects for these groups as well. STEM Living/Learning programs may be a way to increase women's involvement and persistence in STEM as these environments give women in STEM necessary resources and encouragement towards pursuing STEM careers (Szelényi, Denson, and Inkelas, 2013).

Regarding the influence of sex and age on total wage and salary earnings of those in STEM occupations, these two factors were found to have a significant impact on earnings. In the current study, of the total thirty-three hypotheses including the bivariate and full model hypotheses, twenty-one hypotheses were supported. The main hypothesis that was not supported in all analyses was that the number of children would be negatively correlated with income. In fact, for each additional child, the income for both men and women increases although this finding was not statistically significant in all models. The hypothesis that there would be a greater difference in the model by age for women than for men was supported and the hypothesis that there would be a smaller difference by sex in the model for the younger cohort than for the older cohort was supported. Additionally, members of other minority groups of women in the younger cohort are experiencing more equitable wages compared to men than women in the older cohort. This might suggest that discrimination is also decreasing in these fields. As stated, the standardized coefficient for educational attainment was the largest across all models in the study indicating that education has a profound influence on earnings for both men and women and the older and younger cohorts as well. What the findings of this study suggest is that the considerable growth of STEM industries has created a need for employees regardless of sex or race and this need for employees to fill a rising number of positions may be increasing the wage equality in these occupations. As these industries expand, the need to increase women's participation will become increasingly important as these jobs control more and more of the available positions in the labor market.

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APPENDIX

APPENDICES

Table 1:

Univariate Analysis Descriptives

Variables	N	Median	Mean	S.D.	Range
Wage and Salary Earnings	7,636	$69,987.99	$77,439.71	$40,830.90	$20,000-$250,000
Educational Attainment	7,636	3.00	3.17	0.97	1-5
Number of Children	7,636	1.00	0.93	1.038	0-3
Firm Size	7,636	6.00	4.91	1.573	1-6

Table 2:

Univariate Analysis Frequencies

Variables	N	Percent
Sex		
Men	4,108	53.8%
Women	3,528	46.2%
Total	*7,636*	*100%*
Age		
Younger	3,328	43.6%
Older	4,308	56.4%
Total	*7,636*	*100%*
Race/Ethnicity		
White non-Latino	5,295	69.3%
Other Minority Groups	1,312	17.2%
Asian/Pacific Islander	1,030	13.5%
Total	*7,636*	*100%*
Marital Status		
Married	5,252	68.8%
Never Married	1,370	17.9%
Previously Married	1,014	13.3%
Total	*7,636*	*100%*
Region		
South	2,741	35.9%
West	1,749	22.9%
Midwest	1,667	21.8%
Northeast	1,479	19.4%
Total	*7,636*	*100%*

Table 3:
T Test for Group Differences by Sex

	Sex					
	Male (n=4,108)		Female (n=3,528)		T-test	Cohen's *d*
Dependent Variable	Mean	Std. Dev	Mean	Std. Dev		
Total Wage and Salary Earnings	$86,806.60	43,873.904	$66,533.03	33,857.269	22.759***	0.46

Note: ***p≤.001; **p≤.01; *p≤.05

Table 4:
T Test for Group Differences by Age

	Age					
	Younger (n=3,328)		Older (n=4,308)		T-test	Cohen's *d*
Dependent Variable	Mean	Std. Dev	Mean	Std. Dev		
Total Wage and Salary Earnings	$69,998.61	35,937.844	$83,187.01	43,380.221	-14.521***	0.30

Note: ***p≤.001; **p≤.01; *p≤.05

Table 5:
Pearson R Correlations for Total Wage and Salary Earnings

	Total Wage and Salary Earnings	Educational Attainment	Number of Children	Firm Size
Total Wage and Salary Earnings	1			
Educational Attainment	0.364***	1		
Number of Children	0.111***	0.009	1	
Firm Size	0.103***	0.022	0.007	1

Note: ***p≤.001; **p≤.01; *p≤.05

Table 6:
One Way Analysis of Variance by Total Wage and Salary Earnings and Race

	White (n=5,295)		**Asian/Pacific Islander (n=1,030)**		**Other Minority Groups (n=1,312)**		F
	Mean	*Std. Dev*	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*	
Total Wage and Salary Earnings	$78,318.98	41,479.350	$87,628.33	$42,896.70	$65,892.11	33,170.172	87.680***

Note: ***p≤.001; **p≤.01; *p≤.05

Table 7:

One Way Analysis of Variance by Total Wage and Salary Earnings and Marital Status

	Married (n=5,252)		**Previously Married (n=1,014)**		**Never Married (n=1,370)**		F
	Mean	*Std. Dev*	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*	
Total Wage and Salary Earnings	$81,970.86	42,304.055	$70,161.41	37,304.297	$65,458.46	33,795.747	110.499***

Note: ***p≤.001; **p≤.01; *p≤.05

Table 8:

One Way Analysis of Variance by Total Wage and Salary Earnings and Region

	Northeast (n=1,479)		**Midwest (n=1,667)**		**South (n=2,741)**		**West (n=1,749)**		F
	Mean	*Std. Dev*	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*	*Mean*	*Std. Dev*	
Total Wage and Salary Earnings	$82,727.27	42,766.142	$72,878.20	37,686.059	$71,469.17	38,615.942	$86,669.99	43,123.796	66.180 ***

Note: ***p≤.001; **p≤.01; *p≤.05

Table 9
Ordinary Least Squares Regression for Total Wage and Salary Earnings

Variables	**Full Model**		
	B	*SE B*	β
Constant	$16,771.741***	2154.132	
Independent Variables[1]			
Sex	-$18,070.92	816.880	-0.221 ***
Age	$13,876.49	846.624	0.169 ***
Educational Attainment	$14,658.96	427.069	0.347 ***
Control Variables[2]			
Asian/Pacific Islander	-$277.48	1244.232	-0.002
Other Minority Groups	-$6,481.03	1115.316	-0.060 ***
Previously Married	-$3,213.31	1252.951	-0.207 **
Never Married/Single	-$7,122.41	1199.870	-0.067 ***
Number of Children	$2,662.95	425.832	0.068 ***
Midwest	-$534.09	1105.886	-0.005
Northeast	$7,362.57	1142.022	0.071 ***
West	$11,761.57	1090.132	0.121 ***
Firm Size	$2,243.30	255.911	0.086 ***
R^2 Adjusted	0.261		
F	226.06 ***		
N	7,636		

[1] Sex: male=0, female=1; Age: younger=0, older=1; Educational attainment is five level ordinal variable
[2] Race binaries using white non-Hispanic as reference group; Marital status binaries using married as reference group; Number of children is four level interval variable; Region binaries using South as reference group; Firm size is six level ordinal variable
***p≤.001; **p≤.01; *p≤.05

Table 10

Ordinary Least Squares Regression for Total Wage and Salary Earnings By Sex

Variables	Female			Male			
	B	*SE B*	β	*B*	*SE B*	β	Chow z[3]
Constant	-$1,458.399	2673.658		$17,851.169 ***	3181.028		
Independent Variables[1]							
Age	$9,641.06	1054.446	0.141 ***	$16,621.15	1289.021	0.188 ***	^
Educational Attainment	$14,989.48	553.935	0.409 ***	$14,269.52	625.108	0.325 ***	
Control Variables[2]							
Asian/Pacific Islander	$4,390.20	166.749	0.041 **	-$3,173.72	1782.764	-0.026	
Other Minority Groups	-$1,848.34	1322.918	-0.022	-$10,984.07	1771.777	-0.089 ***	
Previously Married	-$1,876.93	1360.173	-0.021	-$3,678.99	2232.459	-0.024	
Never Married/Single	-$5,741.57	1458.579	-0.065 ***	-$8,364.13	1857.659	-0.073 ***	
Number of Children	$555.83	530.323	0.017	$3,970.60	649.955	0.096 ***	
Midwest	-$632.68	1337.013	-0.008	-$103.72	1716.335	-0.001	
Northeast	$7,410.76	1405.209	0.087 ***	$7,448.50	1741.364	0.067 ***	
West	$10,146.12	1408.985	0.120 ***	$12,947.34	1602.113	0.128 ***	
Firm Size	$2,617.86	319.628	0.121 ***	$1,909.27	385.240	0.069 ***	
R^2 Adjusted	0.240			0.210			
F	102.043 ***			100.149 ***			
N	3,528			4,108			

[1] Age: younger=0, older=1; Educational attainment is five level ordinal variable

[2] Race binaries using white non-Hispanic as reference group; Marital status binaries using married as reference group; Number of children is four level interval variable; Region binaries using South as reference group; Firm size is six level ordinal variable

[3] Modified Chow z calculated between female and male; ^ z > 1.96 or < -1.96

***p≤.001; **p≤.01; *p≤.05

Table 11

Ordinary Least Squares Regression for Total Wage and Salary Earnings By Age

Variables by Model Segment	**Younger**			**Older**			
	B	*SE B*	β	*B*	*SE B*	β	Chow z[3]
Constant	$25,601.249 ***	3014.397		$24,653.199 ***	2834.394		
Independent Variables[1]							
Sex	-$13,354.30	1137.918	-0.185 ***	-$21,224.34	1150.365	-0.244 ***	^
Educational Attainment	$10,744.13	617.749	0.283 ***	$17,340.21	584.120	0.391 ***	^
Control Variables[2]							
Asian/Pacific Islander	$4,389.15	1567.158	0.047 **	-$3,533.01	1943.288	-0.025	
Other Minority Groups	-$3,892.34	1531.548	-0.042 **	-$8,241.10	1578.388	-0.070 ***	^
Previously Married	-$1,370.58	2153.453	-0.010	-$4,010.87	1561.366	-0.035 **	
Never Married/Single	-$6,738.81	1478.107	-0.085 ***	-$7,387.57	2015.284	-0.050 ***	
Number of Children	$3,261.29	632.426	0.094 ***	$1,830.06	577.480	0.044 **	
Midwest	$1,246.64	1551.109	0.014	-$1,590.15	1538.274	-0.015	
Northeast	$7,233.30	1641.576	0.077 ***	$7,595.31	1561.071	0.071 ***	
West	$12,912.90	1489.133	0.154 ***	$10,717.70	1547.862	0.102 ***	
Firm Size	$2,033.29	356.048	0.090 ***	$2,464.07	358.100	0.089 ***	
R^2 Adjusted	0.188			0.284			
F	71.008 ***			156.509 ***			
N	3,328			4,308			

[1] Age: younger=0, older=1; Educational attainment is five level ordinal variable

[2] Race binaries using white non-Hispanic as reference group; Marital status binaries using married as reference group; Number of children is four level interval variable; Region binaries using South as reference group; Firm size is six level ordinal variable

[3] Modified Chow z calculated between female and male; ^ z > 1.96 or < -1.96

***p≤.001; **p≤.01; *p≤.05