January 2016

The Effects Of Employment On Births

Dara Leigh Morehouse

THE EFFECTS OF EMPLOYMENT ON BIRTHS

By

Dara Leigh Morehouse

A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Master of Science

Grand Forks, North Dakota

December
2016

This thesis, submitted by Dara Morehouse in partial fulfillment of the requirements for the Degree of Masters of Science from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

David Flynn

Patrick O'Neill

Chih Ming Pan

This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

Grant McGimpsey
Dean of the School of Graduate Studies

December 2016
Date

PERMISSION

Title	The Effects of Employment on Births
Department	Economics and Finance
Degree	Masters of Applied Economics

In presenting this thesis in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive coping for scholarly purposes may be granted by the professor who supervised my thesis work or, in his absence, by the Chairperson of the department or the dean of the School of Graduate Studies. It is understood that any coping or publication or other use of this thesis or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my thesis.

Dara Morehouse
November 16, 2016

TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

LIST OF TABLES

Table Page

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to my parents and the members of my advisory Committee for their guidance and support during my time at the University of North Dakota.

ABSTRACT

This study examines whether there exist consequences to the types of employment that affect family life and structure, specifically if being self-employed affects births when compared to other forms of employment. I hypothesize that self-employed individuals will have fewer children compared to other forms of employment. I include both the female and the male's form of employment to determine the joint effects of employment status on births. Example of why this may be is the typical self-employed individual may be too busy operating their business to assist in raising children. There may also be financial motives with self-employed individuals needing to sink significant capital resources into the business and therefore unable to afford the costs of having and raising children. In this study, I control for demographic variables such as education attainment, race, native born, earnings, and marital status and focus my discussion on educational attainment and earnings. I specifically look at the Upper Midwest region; because of this my results may differ from other geographical areas that are studied. I find my results are inconclusive because they find inconsistent results. The regression results indicate wage-employed individuals are less likely to have begot a baby in the past twelve months. However, when looking at the crude birth rates self-employment yields fewer children compared to wage-employment.

INTRODUCTION

This study examines the relationship between employment and births in the last twelve months. I hypothesize that self-employed individuals will have lower births in the past year because of the time commitment and cost of operating a business. Self-employed individuals can face several additional challenges when balancing family and work life. These individuals make contributions to raising a family and operating a business, which makes it difficult to find time to accomplish all the tasks that need to be done.

Previous research focused on the effects of self-employment on births and fertility was conducted with data from the early 1990s and earlier. Some studies found self-employed individuals tend to have more children to insure the family business stays within the family (Broussard, Chami, and Hess 2013). Other studies found a difference between older and younger self-employed individuals. Individuals who become self-employed after graduating college (zero to five years of work experience) are more likely to have fewer children and are not married, while individuals who have more than five years of work experience become self-employed are more likely to have more children and to be married (Wadhwa, Aggarwal, Holly, and Salkever 2009 and Naseleit 2014).

Aughinbaugh and Sun (2016) found women who work more hours have fewer children compared to women who work fewer hours. They also find women

who are college educated are also more likely to have fewer children and have them at a later stage in life. Racin and Bachrach (2015) find women who perceive themselves as being employed in both the short-term and long-term are more likely to have fewer children compared to women who see themselves as being married. Racin and Bachrach (2015) do not indicate if the women who see themselves getting married are employed or unemployed. Allen and Curington (2014) find men and women have different motivations to become self-employed with men being more motivated by pecuniary concerns and women being motivated by family concerns.

I seek to contribute to this literature in this study using data collected from the American Community Survey (ACS) conducted by the United States' Census. I look specifically at the years 2008 through 2014 and the states Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, and South Dakota. The ACS provides information on employment status and whether or not a woman had a baby in the past twelve months. It also collects information on educational attainment, marital status, income, insurance coverage and much more. The ACS surveys households, not just individuals; because of this I am able to examine both the male and females' employment status on births.

The outline of this paper is as follows. In the Literature Review, section I present findings of previous studies conducted on employments and births. I also express concerns with these studies. In the next section, Data, I explain where the data was collected and how it is used in this study. Additionally, I provide summary statistics, explanations of the variables used, and describe concerns about the data. The following section, Methodology, I describe the methods used to conduct this

study by explaining the different logistics regression. I also express my concerns with multicollinearity and endogeneity issues. In the Results section, I explain the logistic regression results that examine the relationship between employment status and births. I also compare my results to the results of the studies in the Literature Review section. In the Conclusion section, I summarize that results, talk about the additional issues related to employment status and births, and discuss the contribution of this study.

LITERATURE REVIEW

Most of the studies conducted about businesses and employee demographics focus on the technical aspects of the businesses, such as profits, payroll, number of employees, how long the business has been in operation, etc . Ahmad (2006); Jamin, Krizan, Luque (2014); Fairlie and Robb (2008) are some examples of these studies. There are a few studies that examine the personal life of the owner and employees, this study contributes to these studies by determining if there are consequences to employment that affect family life and structure, specifically if being self-employed or wage-employed affects the likelihood of begetting a baby in the past twelve months.

The Kauffman Foundation, partnered with the Global Engineering and Entrepreneurship project at Duke University, surveyed 549 company founders in a variety of industries. The survey found older entrepreneurs are more likely to be married and have children when they start their own business and young entrepreneurs, recently out of college with less then five years of work experience, are less likely to be married or have children when starting their first business. This could be caused by the fact that the younger entrepreneurs are at an earlier stage in their lives compared to the older entrepreneurs and have not had the time to get married or have children.

This survey is affected by a response bias; approximately 40 percent of their surveys were answered (549 responses). Not all of the surveys were conducted the same way, some of the companies received phone calls, while others did not. Their survey is also affected by a survivor bias, since they were only able to survey the companies that survived (Wadhwa, Aggarwal, Holly, and Salkever 2009). This study does not mention if there is a difference in the marriage rate and number of children when looking at entrepreneurs who started young but are now at a later stage in their lives.

Broussard, Chami, and Hess (2013) saw a similar trend in their research, they found that their sample of older self-employed individuals were more likely to have more children compared to the younger self-employed individuals. They suggest older self-employed individuals have more children due to the notion that they are creating their own workforce and to insure the business is still operational once the current owners are no longer able to manage the business.

Broussard et al. (2013) also conclude there is a slightly higher demand for sons among the self-employed who are over 40 years old at the time of the 1990 U.S. Census, which could also lead to the higher number of children among the older respondents. However, the slightly higher demand for sons is not seen in the younger respondents. One issue for them is farmers are considered self-employed in their study, which could misrepresent their results and lead to a higher number of children for self-employed individuals. Their results indicate self-employed individuals in larger cities and in the entertainment industry have less children compared to wage-employed individuals.

Naseleit (2014) split his data into two groups, younger women between the ages of 18 and 29 and older women aged 30 to 45. He found self-employment for the younger group of women had a negative impact on fertility, while there was a positive impact for older self-employed group of women. His results indicate younger, self-employed women are more likely to postpone childbirth compared to younger, waged-employed women.

Other results indicate the presence of a partner and other household members, such as children, increases the likelihood of having two or more children. Childcare availability and the total fertility rate of the country also affect the likelihood of having two or more children. This study also finds weak evidence that may suggest if both partners are self-employed, such as running a family business together; there is a slight increase in family size to raise the chances for a suitable successor, a similar finding to Broussard et al. (2013).

Naseleit (2014) only includes women that participate in the labor force for at least 20 hours per week and have two or more children. He defines self-employment as all self-employed women, except those working in family businesses and those pursuing self-employment as freelance professional/liberal professions (medical doctors or lawyers). These restraints could alter his findings. He uses data from the European Social Survey, and differences in European labor markets could lead to different results compared to Americans. This could cause differences in the results between his study and this one (Landsburg 2006).

Aughinbaugh and Sun (2016) used data from the National Longitudinal Survey of Youth 1979 (NLSY79) to research fertility patterns of women up to age 46.

They discovered women who work longer hours are more likely to have children at an older age, have fewer children, and are less likely to have children compared to women who work fewer hours. They also found college-educated women are less likely to have children. However, they are more likely to have their first child at older ages, if they do have children, compared to non-college-educated women.

Racin and Bachrach (2015) research fertility expectations through a cognitive-social model using the NLSY79. They discovered women who see themselves in the workforce in both the short- and long-run expect a lower fertility rate compared to women who see themselves getting married. Younger women are more likely to have expectations of fertility similar to their families' structures, meaning a young woman who grew up in a larger family would expect to have a larger family, and if a young woman was raised in a small family expects to have a small family.

However, these fertility expectations become more accurate when a woman goes through a life transition such as, getting married or having their first child. They find other life transitions such as, cohabitation and completion of education, do not have as much of an influence on predictive accuracy of fertility expectations compared to marriage and having their first child.

Studies have also found there is a difference in why men and women become self-employed. Allen and Curington's (2014) paper focuses solely on figuring out if there are different motives for men and women to become self-employed. They find women are more motivated by family concerns and by the opinions of their family, friends, and peers. Men are more influenced to become self-employed by concrete or

personal pecuniary factors, such as good government support/assistance and bankers/other investors helping new firms get started.

They also find that women face greater demands on their time because of employment, housework, and childcare. With the greater demands of their time women look for ways that will better optimize their time. Self-employed women in this study had a higher average number of children at home compared to self-employed men, however this was only slightly significant. Self-employment gives better time allocation to women because it gives them the flexibility to take care of the children, do housework, and still be employed.

Noseleit (2014) specifically looked at female self-employment and the effects it has on having children. He found that women have a higher likelihood of becoming self-employed when additional children are present in the household. These results agree with Allen and Curington (2014). However, Noseleit also finds women's self-employment status reveals, on average, self-employment does not increase fertility.

Broussard et al. (2012) and Allen and Curington (2014) both use data collected in the early 1990s. For example, the 40 year olds in their data sets were born in the 1950s and have different life experiences compared to a 40 year old that was born in the early 1970s. Aughinbaugh and Sun (2016) and Rackin and Bachrach (2015) use data on people born between 1957 and 1964. These results more than likely will differ from data collected during a different time period, because social norms and business trends change over time.

Different generations were raised differently and have different views on what is important in life. For example, women of older generations were expected to stay home and raise children and do the housework; nowadays it's more acceptable for women to be in the workforce. In the 1950s, only 19 percent of mothers with small children were in the workforce; by 2008 more than 60 percent of mothers with kids under the age of six were in the workforce (Pappas 2013).

Rackin and Bachrach (2015) indicate that cohabitation is becoming more acceptable in society, which could have a larger impact on predictive accuracy of fertility expectations. The authors found when women hit a life course milestone the predictive accuracy of fertility expectations increased and they consider cohabitation a life course milestone.

DATA

I use the American Community Survey (ACS) conducted by the United States' Census Bureau. The ACS collects information about jobs and occupations, educational attainment, veterans, marital status, and much more on a yearly basis about the people and households of the United States. The survey randomly selects around 3.5 million addresses a year to participate in the survey. The ACS is conducted to determine how more than $400 billion dollars of federal funding is spent on infrastructure and services each year (About the Survey).

My study focuses specifically on Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, and South Dakota from 2008 to 2014. The years 2008 through 2014 were selected because the Great Recession had already commenced; therefore families were able to adjust for changes in their incomes. These states were chosen based on the U.S. Census Region and Division, West North Central Midwest. Montana is included because it is a neighboring state to North Dakota and since the Bakken oil formation crosses the North Dakota-Montana border; I include Montana to make sure the effects of the increase in oil activity on births were captured (See Appendix "Oil Boom" for more information).

I created dummy variables for each state. Table 1 explains how each of these dummy variables was created. The state dummy variables were used primarily to control for state effects.

Table 1: State Dummy Variables

Iowa	Dummy variable equal to 1 if the ACS's ST variable is equal to 19, and 0 otherwise
Kansas	Dummy variable equal to 1 if the ACS's ST variable is equal to 20, and 0 otherwise
Minnesota	Dummy variable equal to 1 if the ACS's ST variable is equal to 27, and 0 otherwise
Missouri	Dummy variable equal to 1 if the ACS's ST variable is equal to 29, and 0 otherwise
Montana	Dummy variable equal to 1 if the ACS's ST variable is equal to 30, and 0 otherwise
Nebraska	Dummy variable equal to 1 if the ACS's ST variable is equal to 31, and 0 otherwise
North Dakota	Dummy variable equal to 1 if the ACS's ST variable is equal to 38, and 0 otherwise
South Dakota	Dummy variable equal to 1 if the ACS's ST variable is equal to 46, and 0 otherwise

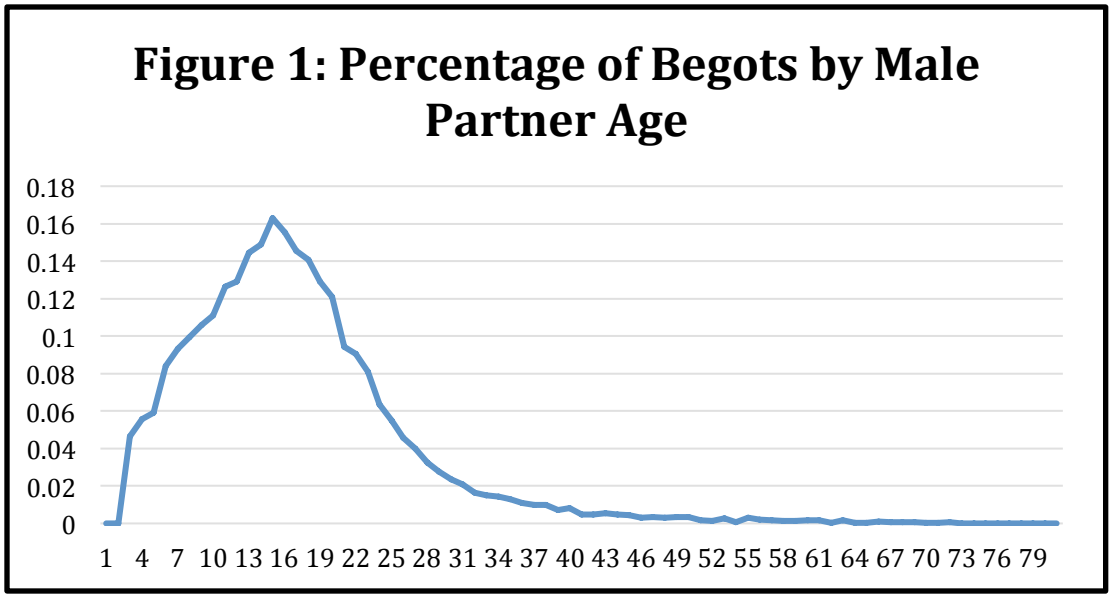
My primary focus examines the relationship between births and employment of both the females and the males. The ACS provides information for each individual within a household, which provides information needed to determine the employment of the couples and single females that have had a baby in the last twelve months. I can also determine education, age, wages, race, and average hours worked per week for each couple.

The birth variable only applies to women between the ages 15 and 50. The ACS is using the ages 15 to 50 as the childbearing years for females; therefore only females between the ages 15 and 50 were surveyed to see if they had a baby in the past twelve months. Depending on the data collected and what study you read the childbearing ages could vary. Since more women are delaying having children, the childbearing age is increasing to include older women (Aughinbaugh and Sun 2016).

The ACS records whether or not a woman in childbearing years had a baby in the last twelve months. Since females in childbearing years are the only ones surveyed on whether or not they had a baby in the last twelve months, I excluded all other females not in childbearing years from the dataset. I also had to figure out a way to measure household effects to include partners.

In order to determine the effects, I separated all the females that had a baby in the last twelve months and formed a new dataset. Once this dataset was formed, I merged it back into the main dataset by matching the serial numbers of each household, the year, and the state. Once these unique identifiers matched I determined what households had a baby in the past twelve months. I did this because I am testing the effects of employment of both partners begetting a baby in the past twelve months.

I excluded everyone under the age of 15, women above 50, and males above 55. I chose these ages for women based on ACS's definition of childbearing years. For the males, I selected 15 for the bottom range to have the same cutoff for both males and females; I chose 55 because when looking at the different percentages of begots by male ages there is a sharper decline in begots between ages 54 (0.8 percent) and 55 (0.4 percent) compared to other ages. Figure 1 shows the percentage of begots by the male partners' ages. Another reason why I excluded males above the age of 55 is because I am more interested in traditional types of families.



The data set included teenagers having babies and still living with their parents or other family members. Since these individuals have different constraints, such as finishing high school, compared to adult women having a baby in the past twelve months, I decided to only concentrate on the head of the household and their spouse or unmarried partner, but this is clearly a potential constraint.

I am only interested in the births and the employment of the head of household and their spouse or unmarried partner, because of this I excluded all of the other observations in each household. The dataset provides a relationship variable to determine the relationships of each individual with the head of household within each household. This variable helped me determine what observations I needed to exclude. These observations include children, parents, roommates, etc.

I also excluded any individual that claimed self-employment while claiming income from both self-employment and wage-employment. The reason I deleted these individuals is because they may not represent true self-employment. I did not delete the individual that claimed wage-employment when reporting income from both self-employment and wage-employment. The self-employment income could be a supplemental income earned from independent consulting companies such as Mary Kay, Scentcy, Pampered Chef, Thirty One, etc.

These steps were taken to keep only the observations needed in the data; however, I still had to get the partners on the same line of observation in the dataset. I want the partners on the same line of observation in the dataset to be able to test the effects of both the females' and the males' employment on births. In order to do this, I separated the males and females.

Once separated, I found the data included same-sex couples (See Appendix "Same-sex Female Couples" for more information). I excluded the female same-sex couples because they could have different constraints compared to heterosexual couples, especially when it comes to having a baby. They represent less than 0.004 percent of my data. However, same-sex couples could possibly represent a larger portion of the data if I were to study a different geographic area. I also deleted the male same-sex couples because the data that is collected for the ACS does not provide a way to determine if there was a baby introduced to the couple within the last twelve months or if one of the partners begot a baby in the last twelve months.

Once I excluded the same-sex couples I merged the male dataset into the female dataset by matching the serial numbers of each household, year, and state.

After merging the two datasets, I excluded the single males because there is not a way to determine if they had begot a baby in the last twelve months. This newly formed dataset has single females and heterosexual partners.

The heterosexual partners are on one line of observations letting me determine how employment and demographic variables of both the female and male affects begets. In order to get both heterosexual partners on the same line of observation, I had to rename the male variables. I renamed the male variables by adding *p_* in front of all the male variables.

After this dataset was compiled, I created dummy variables to help determine employment status of both the females and the males. Table 2 displays these newly created dummy variables. In these dummy variables the female's employment status is listed first.

Table 2 – Employment Dummy Variables

Selfself	Dummy variable equal to 1 if both the female and the male are self-employed, and 0 otherwise
Empemp	Dummy variable equal to 1 if both the female and the male are wage-employed, and 0 otherwise
Nopaynopay	Dummy variable equal to 1 if both the female and the male are working but not receiving a wage, and 0 otherwise
Selfemp	Dummy variable equal to 1 if the female is self-employed and the male is wage-employed, and 0 otherwise
Empself	Dummy variable equal to 1 if the female is wage-employed and the male is self-employed, and 0 otherwise
Nopayself	Dummy variable equal to 1 if the female is working but not receiving a wage and the male is self-employed, and 0 otherwise
Selfnopay	Dummy variable equal to 1 if the female is self-employed and the male is working but not receiving a wage, and 0 otherwise
Empnopay	Dummy variable equal to 1 if the female is wage-employed and the male is working but not receiving a wage, and 0 otherwise
Nopayemp	Dummy variable equal to 1 if the female is working but not receiving a wage and the male is wage-employed, and 0 otherwise

Table 3 shows the breakdown of each new dummy variable and the number of couples within each group. As you can see most of my observations are either self-employed or waged-employed. No pay employment represents 0.6% of the couples, and will be an excluded dummy variable in my analysis.

Table 3 – Employment Breakdown

Male Female	Self-employed	Waged-employed	No Pay
Self-employed	3,597	7,414	37
Waged-employed	15,176	126,602	208
No Pay	313	241	34

Additional explanatory variables that can affect the births and begets for females and males include their income in the past twelve months, race, native born, and educational attainment. Race, native born, and educational attainment are all dummy variables in this study. Table 4 explains how each demographic dummy variable was created using the variables from the ACS.

The data has 400,956 observations of people, which include single females and heterosexual couples between the ages 15 and 55. Couples account for approximately 67 percent of the dataset, leaving approximately 33 percent of single females. A majority of the people in the study, both female and male, have at least a high school diploma, GED or alternative credentials; born in the United States; white; waged-employed; have insurance coverage; and are married. Around seven percent of the females had a baby in the past twelve months. The mean age for females is 37 years old and for males its 39 years old. Males in this data are also

more likely to work longer hours per week. On average males work 45 hours per week while females work around 37 hours per week. The male group on average earns a higher wage compared to the female group.

Table 4 – Demographic Dummy Variables

White	Dummy variable equal to 1 if ACS's RAC1P variable is equal to 1, and 0 otherwise
Black	Dummy variable equal to 1 if ACS's RAC1P variable is equal to 2, and 0 otherwise
Otherrace	Dummy variable equal to 1 if ACS's RAC1P variable is equal to 3-9, and 0 otherwise
Native	Dummy variable equal to 1 if the ACS's NATIVITY variable is equal to 1, and 0 otherwise
Somehischl	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 1-14, and 0 otherwise (ACS's SCHL variable 1-14 represents individuals ranging from no educational attainment to having an 11th grade educational attainment level)
Diploma	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 15-16, and 0 otherwise (ACS's SCHL variable 1-15 represents individuals ranging from 12th grade educational attainment to having a diploma, GED, or other alternative credientials)
Somecol	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 18 and 19, and 0 otherwise (ACS's SCHL variable 18 and 19 represent individuals who have attended college but did not receive a degree)
Assoc	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 20, and 0 otherwise (ACS's SCHL variable 20 represents individuals who have attained an associate's degree)
Bach	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 21, and 0 otherwise (ACS's SCHL variable 21 represents individuals who have attained a bachelor's degree)
Master	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 22, and 0 otherwise (ACS's SCHL variable 22 represents individuals who have attained a master's degree)
Profdeg	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 23, and 0 otherwise (ACS's SCHL variable 23 represents individuals who have attained a professional degree beyond a bachelor's degree)
Doctorate	Dummy variable equal to 1 if the ACS's SCHL variable is equal to 24, and 0 otherwise (ACS's SCHL variable 24 represents individuals who have attained a doctorate degree)

Table 5 provides summary statistics of the variables used in this study. The columns report the total number of respondents, means, and standard deviations. Details of the variables are available in the Appendix.

Table 5 – Summary Statistics

	Females			Males		
	Total	Mean	Std	Total	Mean	Std
Female	231,135	-	-	-	-	-
Males	-	-	-	169,821	-	-
Self-Employment	14,265	0.062	0.24	21,217	0.12	0.33
Wage-Employment	197,937	0.86	0.35	145,106	0.85	0.35
Unemployment	666	0.003	0.05	199	0.001	0.03
No pay	752	.003	.06	305	0.002	0.04
No school - 11th Grade	1,068	.004	.07	12,201	0.07	0.26
High School Diploma	41,422	.18	.39	48,433	0.29	0.45
Some College	18,358	.08	.27	39,615	0.23	0.42
Associates Degree	30,815	0.13	0.34	19,597	0.12	0.32
Bachelor Degree	56,174	0.24	0.43	34,679	0.20	0.40
Master's Degree	18,088	0.08	0.27	10,234	0.06	0.24
Professional Degree	3,371	0.015	0.12	3,166	0.02	0.14
Doctorate Degree	1,875	0.008	0.09	1,896	0.01	0.11
Insurance Coverage	201,500	0.87	0.33	149,926	0.88	0.32
Married	159,267	0.69	0.46	147,733	0.87	0.34
Never Married	41,512	0.18	0.38	14,975	0.09	0.28
Divorced	24,141	0.10	0.31	6,428	0.04	0.19
Widowed	1,995	0.009	0.09	163	0.001	0.03
Native	218,243	0.94	0.23	160,316	0.94	0.23
Foreign	12,892	0.06	0.23	9,505	0.06	0.23
White	207,626	0.90	0.30	156,187	0.92	0.46
Black	9,507	0.04	0.20	4,768	0.03	0.14
Other Race	14,002	0.06	0.24	8,866	0.05	0.19
Birth Last 12 Months	15,962	0.07	0.25	-	-	-
Age	-	37.25	8.61	-	39.3	8.7
Hours Worked/Week	-	37.33	11.2	-	45.07	11.0
Wages/Salary Income past 12 Months ($)	-	26,458	29,827	-	47,980	50,441
Self-employment Income past 12 Months ($)	-	995	7,930	-	4,545	23,690
Total Income in past 12 Months ($)	-	27,453	30,190	-	52,526	52,645

Figure 2 shows the number of births per year for 2008 through 2014 from the data collected. The overall trend in Figure 2 is downward sloping, meaning there are fewer children being born in 2014 compared to 2008 in this dataset. Table 6 shows the number of births per year.

Table 6 – Births per Year

2008	2,336
2009	2,299
2010	2,289
2011	2,238
2012	2,174
2013	2,169
2014	2,170

There is only a slight decrease in births between years 2012 and 2013; it is the smallest decrease in births between the years 2008 and 2014. Years 2013 and 2014 are the only years where there is an increase in births from the pervious year. This increase in births could be caused by the randomization for the collection of the data, a change in policies, or a change in the overall trend of births.

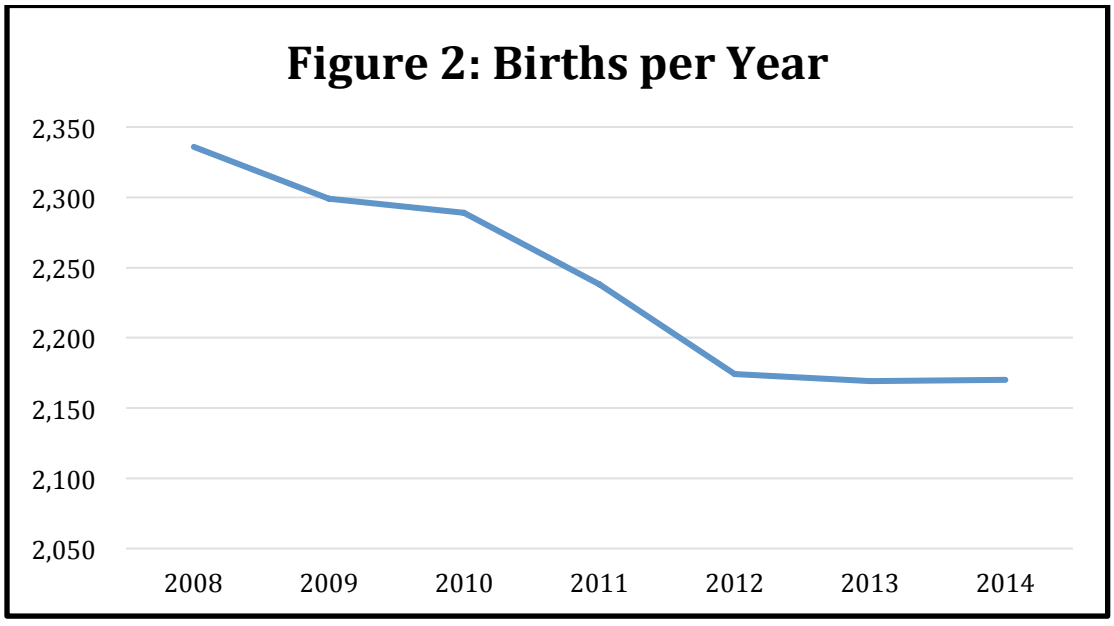


Figure 3 shows the number of births per state. Missouri had the most births between 2008 and 2009, while North Dakota had the lowest amount of births. Missouri also has the largest population and North Dakota has the lowest population during these years. When comparing the number of births per state and the population of each state, the number of births and the size of the population correspond except for Montana and South Dakota. Montana has a larger population than South Dakota between the years 2008 and 2014, but has a lower number of births compared to South Dakota (Population in the U.S.). This also could be cause by the randomization of the data collected in this study.

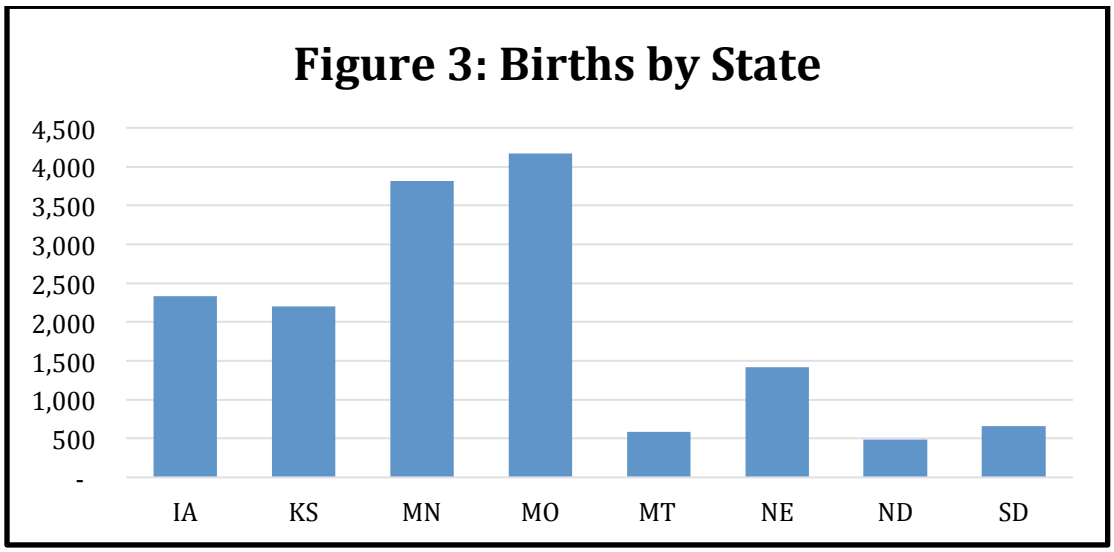
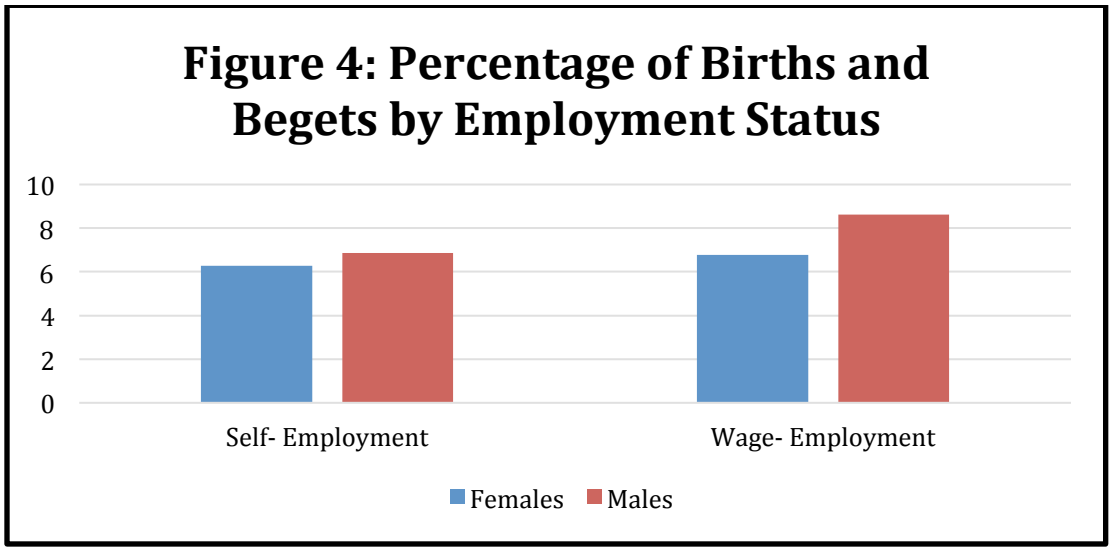


Figure 4 shows the percentage of births and begets by the employment status of both the female and the male, respectively. The percentage of births and begets by the employment status was calculated by taking the total number of births and begets per employment status and group (female and male) and dividing it by the total number of people in each employment status by the group then multiplying it by 100. For example, the percentage of births for self-employed females was

calculated as follows:

$$Percentage\ of\ births\ for\ self-employed\ female = \frac{Total\ number\ of\ births\ for\ self-employed\ females}{Total\ number\ of\ self-employed\ females} \cdot 100 \quad (3)$$



According to this figure both females and males that are self-employed have a lower percentage of births and begets compared to wage-employed females and males. Only 6.3 percent of self-employed females had a baby in the past twelve months and 6.8 percent of wage-employed females had a baby in the past twelve months. Only 6.9 percent of self-employed males begot a baby in the past twelve months and 8.2 percent of wage-employed males begot a baby in the past twelve months. I excluded individuals claiming no pay, unemployed, and those who did not report an employment status because of the limited observations within these groups.

Table 7 shows the different crude birth rates for self-employed and wage-employed women. The average crude birth rate in the United States for 2014 was 62.9 (Birth Data). The crude birth rate formula is:

$$Crude\ Birth\ Rate = \frac{Total\ Births}{Total\ Number\ of\ Women\ per\ Employment\ Status} \cdot 1{,}000 \qquad (4)$$

Table 7 – Crude Birth Rates of Females

Self-employed	65
Wage-employed	69
This table only reports the crude birth rate for females of self-employment and wage-employment.	

Table 7 indicates women who are self-employed have a lower crude birth rate compared to wage-employed females. The crude birth rate of both partners and the different employment statuses shown in table 8 has similar results compared to table 7. When both partners are self-employed they have a lower crude birth/beget rate compared to when both partners are wage-employed. The crude birth/beget rate in table 8 indicates even with one partner being self-employed the crude birth/beget rate for the partners is going to be lower compared to when both the partners are wage-employed. Table 8 shows a self-employed female with a wage-employed male have a higher crude birth/beget rate compared to a wage-employed female with a self-employed male. This finding agrees with Noseleit's (2014) findings of women are more likely to choose self-employment when additional children are present.

Table 8 – Crude Birth/Beget Rates of Both Partners

	Males		
Females		Wage-employed	Self-employed
	Wage-employed	86	68
	Self-employed	83	61
The crude births rates in this table are calculated for the types of employment of both the female and male combined.			

There are limitations that occur within this dataset. The first major limitation has to do with tracking begetting for men, especially with the legalization of gay marriage. This dataset is able to determine if heterosexual couples have different number of births compared to female same-sex partnership, but it is not able to determine if there is a difference for male same-sex partnership.

The dataset does not provide a suitable variable that determines how many children are within a household; which creates another limitation. Children who are already present within a household and children who have had a baby of their own could both act as constraints for having more children.

The next limitation consists of how the baby was conceived; there is not a variable that captures this effect. If the baby was conceived naturally there might not have been as much planning or costs involved compared to in vitro fertilization (IVF) and adoptions. IVF and adoptions are very costly and can take years to achieve. Adoption of a child would also be something to study further. Since not all kids that are adopted are newborns, there could be different affects that happen when a newborn is introduced to a family compared to an older child.

Another aspect the data does not capture is whether or not there were multiple babies at birth, such as twins. It only accounts for the fact the female had at least one baby in the last twelve months. Having multiple children with one pregnancy may reduce the number of pregnancies. Another thing to remember is not all of these babies born in the last twelve months stay with their birth mothers, some might be given up for adoption or the woman could have been a surrogate

mom for a couple unable to have children on their own, which causes problems with the data.

METHODOLOGY

To test the effects of self-employment on births, I regress births (*fert*), a dummy variable equal to one if a female has had a baby in the last twelve months, 0 otherwise, on other dummy variables about the employment of females and control variables for demographics that may have an affect on births. The general form for the model is specified as follows:

$$fert_i = \beta_0 + \beta_1 \cdot self_i + \beta_2 \cdot employ_i + \beta_3 \cdot unemp_i + \beta_4 \cdot nopay_i + \beta_5 \cdot X_i + \varepsilon_i \qquad (1)$$

where $fert_i$ represents whether the respondent *i* had a baby in the past twelve months or not, $self_i$ represents when the female is self-employed, $employ_i$ represents when the female is waged-employed, $unemp_i$ represents when the female is unemployed, and $nopay_i$ represents when the female is working but not receiving a wage.

X_i represent the demographics of the respondent *i.* More specifically, the earnings of the females in the past twelve months (*earnings*), the log of the respondents ages (*agelog*), dummy variables on race (*white* and *otherrace*), a dummy variable to determine if the respondent is native born (*native*), dummy variables on educational attainment (*diploma*, *somecol, assoc, bach, master, profdeg,* and *doctorate*), a dummy variable to determine if the respondent is married (*married*), a dummy variable to determine if the respondent has never been married

(*nevmar*), and a dummy variable to determine if the respondent has been widowed, divorced, or separated (*wds*).

I had to run two different regressions to determine the different effect of being married, widowed, divorced, separated, and never married because of multicollinearity between the dummy variables *married, nevmar,* and *wds*. The first regression included the dummy variables married (*married*) and never married (*nevmar*). The second regression included the dummy variables married (*married*) and widowed, divorced, and separated (*wds*).

To test the effects of self-employment of both partners on births, I regress births (*fert*) on dummy variables about the employment of both the female and the male (*selfself, empemp, selfemp*, *empself, selfnopay, empnopay, nopaynopay, nopayself,* and *nopayemp*) and control variables for demographics that may have an affect on the births and begets of females and males. The general form for the model is specified as follows:

$$fert_i = \beta_0 + \beta_1 \cdot selfself_i + \beta_2 \cdot empemp_i + \beta_3 \cdot empself_i + \beta_4 \cdot selfemp_i + \beta_5 \cdot selfnopay_i +$$

$$\beta_6 \cdot empnopay_i + \beta_7 \cdot nopaynopay_i + \beta_8 \cdot nopayself_i + \beta_9 \cdot nopaysemp_i + \beta_{10} \cdot X_i + \varepsilon_i \quad (2)$$

where $fert_i$ represents whether household respondent *i* had a baby in the past twelve months or not, $selfself_i$ represents when both the female and male are self-employed, $empemp_i$ represents when both the female and male are wage-employed, $empself_i$ represent when the female is wage-employed and the male is self-employed, $selfemp_i$ represent when the female is self-employed and the male is wage-employed, $selfnopay_i$ represents when the female is self-employed and the male is working but not receiving a wage, $empnopay_i$ represents when the female is

wage-employed and the male is working but not receiving a wage, $nopaynopay_i$ represents when both the female and the male are working but not receiving a wage, $nopayself_i$ represents when the female is working but not receiving a wage and the male is self-employed, and $nopayemp_i$ represents when the female is working but not receiving a wage and the male is wage-employed.

X_i represent the demographics of the respondent *i.* More specifically, the earnings of the respondents in the past twelve months (*earnings* and *p_earnings*), the log of the respondents ages (*agelog* and *p_agelog*) dummy variables on race (*white*, *otherrace, p_white,* and *p_otherrace*), a dummy variable to determine if the respondents are both native born (*native2*), and dummy variables on educational attainment (*diploma*, *somecol, assoc, bach, master, profdeg, doctorate, p_diploma, p_somecol, p_assoc, p_bach, p_master, p_profdeg,* and *p_doctorate)*.

Since the dependent variable, $fert_i$, is a bivariate variable I used logistic regressions in this study. I estimated a number of regressions of births on explanatory variables. This dataset is prone to multicollinearity and endogeneity problems due to the fact that two respondents are represented on one line of observation.

Since both the female and the male of a partnership are represented on one line of observation, some of their variables, such as age and educational attainment, can be highly correlated to each other; which cause multicollinearity, an issue I had to carefully monitor.

Controlling for multicollinearity forced me to exclude the average number of hours worked per week for both the females and the males. The average number of

hours worked per week is correlated with the employment status of the respondents. I created the dummy variable *native2* to control for the correlations between *native* and *p_native*. *Native2* is a dummy variable that is equal to one when both the female and the male are natives to the United States, and zero otherwise. I did not include unemployment in the partner regression because of multicollinearity; because of this I included no pay employment. There are very few respondents that claimed unemployment in this study; which may be an issue for the analysis.

One way I controlled for endogeneity was regressing age on educational attainment and wages. I took the residuals and created new variables as substitutes for educational attainment and wages. I also used the log of age in the regressions to account for the nonlinear relationship between age, births, and begets.

Other problems with the data set includes not knowing the total number of children within each household, not being able to track expectations of fertility, and not knowing from which state or foreign country each individual within the study migrated. Individuals that were raised outside of the Midwest and moved to the Midwest could have different values compared to people from the Midwest. However, these individuals could have moved to the Midwest because their values are similar to the perceived values of Midwesterners, or for job opportunities. These create potential missing factors in my analysis.

RESULTS

Table 9 presents results from the logistic regression estimating the effects of employment status on the respondent's likelihood of births along with other variables. Table 9 represents results for females only; males are not included in these regressions, because I want to include single females in the study and the only way to do that was by excluding the males. The explanatory variables of interest are presented in column one and the results of the regressions are reported in the column labeled (1). The table provides the coefficient estimates, their levels of significance, and their standard errors. Table 12 in the Appendix shows full logistic regression results including year and state effects. Table 9 shows the results of employment status, earnings, and educational attainment. I focus my discussion on these three areas because 1) employment status is the main variable I am concerned with 2) earnings create an opportunity cost for women and 3) my educational attainment results differ from other studies, which could be caused by the geographical area that is being studied.

Table 9 – Regression Results for Females

Dependent Variable - Fert	(1)
Self-employment	-0.0023429 (0.0018603)
Wage-employment	-0.0105856*** (0.001638)
Unemployed	-0.0186727*** (0.0042628)
No pay	0.0000645 (0.0059763)
Earnings	-1.59e-07*** (1.74e-08)
High School Diploma	-0.0013329 (0.0011331)
Some college	0.0022458 (0.0015352)
Associate's Degree	0.0040178** (0.0012893)
Bachelor's Degree	0.0082228*** (0.0010893)
Master's Degree	0.0210079*** (0.0019477)
Professional Degree	0.0195517*** (0.0195517)
Doctorate	0.037348*** (0.0062345)

After controlling for factors such as wage, race, educational attainment, native born, and marital status the estimated coefficient indicates self-employed women having had a baby in the past twelve months is less likely, however it is not statistically significant. The probability of having had a baby in the past twelve months is negative with wage-employment; it is statistically significant at the 0.01 level, indicating wage-employed females are about 1.1 percent less likely to have had a baby in the last twelve months compared to females who do not report

employment. Unemployed females are 1.9 percent less likely to have had a baby in the last twelve months, statistically significant at the 0.01 level. The results for females working, but not receiving a wage are not statistically significant.

Females' wages display a negative relationship with births. Females are about 0.2 percent less likely to have had a baby in the past twelve months for every additional ten thousand dollars they earn. This agrees with other studies, indicating there is an opportunity cost for women when it comes to having children and working.

The educational attainment variables have different effects on births. When females only have a high school diploma, GED, or the equivalent credentials, the results indicates they are less likely to have had a baby in the last twelve months compared to women with less then a high school level of educational attainment, not statistically significant. There is a higher likelihood of having a baby in the past twelve months if the female has earned an associate's degree; it is statistically significant at the 0.05 level. Women with an associate's degree are 0.4 percent more likely to have had a baby in the past twelve months compared to women with less then a high school level of educational attainment. A female with a bachelor's degree, in this study, has a positive effect on the likelihood of having had a baby in the past twelve months, statistically significant at the 0.01 level. They are 0.8 percent more likely to have had a baby in the past twelve months compared to women with less then a high school level of educational attainment.

Women, in this study, with a master's degree, professional degree, and a doctorate all exhibit a positive likelihood with having had a baby in the past twelve

months, all statistically significant at the 0.01 level. Women with these degrees are 2.1 percent, 2.0 percent, and 3.7 percent more likely to have had a baby in the past twelve months compared to women with less then a high school level of educational attainment, respectively. This is surprising since studies have found females with higher education are more likely to have fewer children (Aughinbaugh and Sun 2016). Sampling errors or the geographical area I'm studying could cause these results, or maybe it is a product of time period sampled.

Table 10 presents results from the logistic regression estimating the effects of employment status on the respondent's likelihood of births along with other variables. Table 10 represents results for both females and males. The explanatory variables of interest are presented in column one and the results of the regressions are reported in columns labeled (1). Table 13 in the Appendix shows full logistic regression results including year and state effects.

After controlling for factors such as wage, race, educational attainment, and native born the estimated coefficients on both the female and male being self-employed is not statistically significant. When both the female and the male are wage-employed they are 1.0 percent less likely to have had or begot a baby in the past twelve months compared to when partner is unemployed or did not report their employment status, statistically significant at the 0.01 level. If the female is wage-employed and the male is working but not receiving a wage they are 2.4 percent less likely to have had or begot a baby in the past twelve months and the result is statistically significant at the 0.05 level.

Other results observed in Table 10 include that females' wage again has a negative impact on having had a baby in the past twelve months, statistically significant at the 0.01 level. For each additional ten thousand dollars the female makes they are 0.2 percent less likely to have had a baby in the past twelve months. The males wages have a positive impact on begetting a baby in the past twelve months, statistically significant at the 0.01 level. For each additional ten thousand dollars the male makes they are 0.7 percent more likely to have begot a baby in the past twelve months. It is not surprising that females' and males' wages have the opposite effect on having had a baby in the past twelve months. According to Hundley (2000) self-employed female earnings decrease with marriage, family size, and hours of housework, while male earnings are positively associated with the same variables. There are similar relationships when applied to male and females of organizational earnings. Other empirical studies have found a negative correlation between income and the number of children within a household (Dettling and Kearney 2013).

Table 10 – Regression Results for Couples

Dependent Variable - Fert	(1)
Both self-employed	0.0051453 (0.0045591)
Female self-employed, male wage-employed	0.0034828 (0.0030556)
Female self-employed, male no pay	0.0759963 (0.0576701)
Both wage-employed	-0.0100399*** (0.002037)
Female wage-employed, male self-employed	-0.0029031 (0.0024362)
Female wage-employed, male no pay	-0.0238763** (0.009502)
Both no pay	0.045799 (0.0513608)
Female no pay, male self-employed	-0.0064046 (0.0141218)
Female no pay, male wage-employed	0.0175726 (0.0146948)
Female earnings	-1.81e-07*** (2.29e-08)
Male earnings	6.80e-08*** (1.07e-08)
Female diploma	-0.0104368*** (0.0022172)
Male diploma	-0.0046224** (0.0020752)
Female some college	-0.0091403*** (0.0022676)
Male some college	-0.0003142 (0.0022045)
Female associate's degree	0.0004169 (0.0026551)
Male associate's degree	0.0038611 (0.0025709)
Female bachelor's degree	0.0077975** (0.0027169)
Male bachelor's degree	0.0038683 (0.0024436)
Female master's degree	0.02127*** (0.0037809)

Male master's degree	0.0142595*** (0.0034735)
Female professional degree	0.0160476** (0.0056571)
Male professional degree	0.0196926*** (0.0052535)
Female doctorate degree	0.0409867*** (0.0087112)
Male doctorate degree	-0.0139869** (0.0059888)

The likelihood of having had or begetting a baby in the past twelve months decreases when either the female or the males has an education level of high school diploma, GED, or alternative credential, statistically significant at the 0.01 and 0.05 levels, respectively. When the female has a high school diploma, GED, or alternative credential they are 1.0 percent less likely to have had or begot a baby in the past twelve months and when the male has the same education level they are 0.5 percent less likely to had or begot a baby in the past twelve months.

When the female has some college experience but not a degree the likelihood of having had a baby in the past twelve months is negative, statistically significant at the 0.01 level. These females are 1.0 percent less likely to have had a baby in the past twelve months. When the female has a bachelor's degree it is statistically significant at the 0.05 level. She is 0.8 percent more likely to have had a baby in the past twelve months compared to other females with less then a high school level of educational attainment. If the female has a master's degree she is 2.1 percent more likely to have had a baby in the past twelve months, statistically significant at the 0.01 level. When the male has a master's degree he is 1.4 percent more likely to have

begot a baby in the past twelve months, statistically significant at the 0.01 level. When the female and the male have professional degrees they are 1.6 percent and 2.0 percent more likely to have had or begot a baby in the past twelve months, respectively. These probabilities are statistically significant at the 0.05 and 0.01 levels, respectively. If the female has a doctorate she is 4.1 percent more likely to have had a baby in the past twelve months, statically significant at the 0.01 level. When the male has a doctorate degree, he is 1.4 percent more likely to have begot a baby in the past twelve months, statistically significant at the 0.05 level.

This is interesting since studies indicate college-educated women are less likely to have children compared to non-college-educated women (Aughinbaugh and Sun 2016), which contradicts the regression results from table 7. The geological area I am studying could cause these results.

CONCLUSION

This study aimed to shed light on the relationship between employment (both females and males) and births. Exploring this relationship is important to see if old patterns persist within a changing economy.

My results indicate wage-employed females are less likely to have had a baby in the past twelve months compared to individuals who do not report employment and females who are working but not receiving a wage. When looking at self-employed females the results are not statistically significant. The crude birth rate indicates self-employed individuals are less likely to have had a baby in the past twelve months. The results also finds female and male earnings have different effects on begetting a baby in the past twelve months. Women's earnings have a negative effect on having a baby in the past twelve months, while male earnings have a positive effect. Other studies have found similar results. An opportunity cost could be present for women when deciding to have children.

Other interesting results include the educational attainment variables. People with a bachelor's, master's, professional, and doctorate degrees are more likely to have had or begot a baby in the past twelve months, while people with a high school diploma, GED, or alternative credentials are less likely to have had a or begot baby in the past twelve months. This is surprising since most studies have

found college-educated women are less likely to have children compared not non-college-educated women (Aughinbaugh and Sun, 2016).

My results may have a geographical area bias. These results only represent people within the Midwest, not the United States as a whole. Different geographical areas within the United States could produce different results. People who reside in the Midwest may have different values compared to someone who lives elsewhere, which could cause different results.

I find the evidence is not strong enough to conclude self-employed individuals have a significantly different number of children compared to other forms of employment. When looking at the female only regression, self-employed females are less likely to have had a baby in the past twelve months. However, when looking at the partner regression self-employed partners are more likely to have begot a baby in the past twelve months. Nonetheless, neither are statistically significant.

There are a few limitations with this study as stated earlier in the paper. One of the main limitations is not knowing the total number of children in each household. Additional children can act as a constraint when it comes to having another child. It would also be helpful to have panel data on the families. With panel data we would be able to track the fertility of the family and get a better understanding of how employment status affects fertility.

Other limitations are not being able to track expectations of fertility and not knowing which state or foreign country each individual within the study migrated from. Being able to track fertility expectations would be interesting to determine if

the expectations were similar to the actual fertility achieved. People in different regions and countries have different values, knowing where the individuals migrated from would be interesting to study if they moved to the new region because of the values of the regions or to determine if they keep the values of the last geographical area they came from.

Additional limitations have to do with adoption and in vitro fertilization compared to natural conception or having multiple births with one pregnancy. Due to the way the data is collected we are not able to determine if there were multiple births with the pregnancies.

There is still other research that can be explored and should be explored. One has to do with the effects of the introduction of the Affordable Care Act has on births. Insurance could decrease the cost of having children, which could increase births. Once a way is developed to track begetting by males, research can be conducted on the differences between male and female fertility. Research comparing the difference between homosexual and heterosexual fertility preference could also be conducted.

This study contributes the overall research about births and how types of employment can affect it, especially within the Midwest. It examines the effects of owning a business and being wage-employed on the personal lives of individuals. It also considers the effects both the female and the male have on births compared to just looking at the females like most studies.

APPENDIX

APPENDIX

Table 11 - Description of variables used in the analysis

Fert	Dummy variable equal to 1 if the respondent had a baby in the past twelve months, and 0 otherwise (only for females)
Self	Dummy variable equal to 1 if the respondent is self-employed, and 0 otherwise
Employ	Dummy variable equal to 1 if the respondent is wage-employed, and 0 otherwise
Unemp	Dummy variable equal to 1 if the respondent is unemployed, and 0 otherwise
Nopay	Dummy variable equal to 1 if the respondent is working but not receiving a wage, and 0 otherwise
Selfself	Dummy variable equal to 1 if both the female and the male are self-employed, and 0 otherwise
Empemp	Dummy variable equal to 1 if both the female and the male are wage-employed, and 0 otherwise
Selfemp	Dummy variable equal to 1 if the female is self-employed and the male is wage-employed, and 0 otherwise
Empself	Dummy variable equal to 1 if the female is wage-employed and the male is self-employed, and 0 otherwise
Selfnopay	Dummy variable equal to 1 if the female is self-employed and the male is working but not receiving a wage, and 0 otherwise
Empnopay	Dummy variable equal to 1 if the female is wage-employed and the male is working but not receiving a wage, and 0 otherwise
Nopaynopay	Dummy variable equal to 1 if the both the female and the male are working but not receiving a wage, and 0 otherwise
Nopayself	Dummy variable equal to 1 if the female is working but not receiving a wage and the male is self-employed, and 0 otherwise
Nopayemp	Dummy variable equal to 1 if the female is working but not receiving a wage and the male is wage-employed, and 0 otherwise
Native	Dummy variable equal to 1 if the respondent is born in the United States, and 0 otherwise

Native2	Dummy variable equal to 1 if both the female and the male are born in the United States, and 0 otherwise
White	Dummy variable equal to 1 if the race of the respondent is white, and 0 otherwise
Otherrace	Dummy variable equal to 1 if the race of the respondent is not white or black, and 0 otherwise
Diploma	Dummy variable equal to 1 if the educational attainment of the respondent is high school diploma, GED, or alternative credentials, and 0 otherwise
Somecol	Dummy variable equal to 1 if the respondent went to some college but did not receive a degree, and 0 otherwise
Assoc	Dummy variable equal to 1 if the respondent has an associate degree, and 0 otherwise
Bach	Dummy variable equal to 1 if the respondent has a bachelor's degree, and 0 otherwise
Master	Dummy variable equal to 1 if the respondent has a master's degree, and 0 otherwise
Profdeg	Dummy variable equal to 1 if the respondent has a professional degree, and 0 otherwise
Doctorate	Dummy variable equal to 1 if the respondent has a doctorate degree, and 0 otherwise
Married	Dummy variable equal to 1 if the respondent is married, and 0 otherwise
Nevmar	Dummy variable equal to 1 if the respondent has never been married, and 0 otherwise
Wds	Dummy variable equal to 1 if the respondent is widowed, divorced, or separated, and 0 otherwise
Wagp	Wages or salary income of the respondent in the past twelve months
Semp	Self-employment income of the respondent in the past twelve months
Earnings	Wagp and semp added together. Total wage or salary income reported by the respondent in the past twelve months
Wkhp	Usual number of hours worked in the past week of the respondent in the past twelve months

Table 12 –Regression Results for Females (All Variables)

Dependent Variable - Fert	(1)	(2)
Self-employment	-0.0023429 (0.0018603)	-0.0028486 (0.001836)
Wage-employment	-0.0105856*** (0.001638)	-0.0108494*** (0.0016423)
Unemployed	-0.0186727*** (0.0042628)	-0.0185818*** (0.0042467)
No pay	0.0000645 (0.0059763)	0.0002848 (0.0059089)
Earnings	-1.59e-07*** (1.74e-08)	-1.69e-07*** (1.75e-08)
White	-0.0190189*** (0.0024175)	-0.021025*** (0.0024992)
Other Race (excluding black)	-0.0125965*** (0.0016805)	-0.0137657*** (0.0016308)
Native born	-0.0104808*** (0.0018674)	-0.0095396*** (0.0018416)
High School Diploma	-0.0013329 (0.0011331)	0.0012079 (0.0011311)
Some college	0.0022458 (0.0015352)	0.002218 (0.0015289)
Associate's Degree	0.0040178** (0.0012893)	0.0029793** (0.0012694)
Bachelor's Degree	0.0082228*** (0.0010893)	0.0076971*** (0.0010817)
Master's Degree	0.0210079*** (0.0019477)	0.020923*** (0.0019438)
Professional Degree	0.0195517*** (0.0195517)	0.0186996*** (0.0039708)
Doctorate	0.037348*** (0.0062345)	0.0366393*** (0.006178)
Married	0.0264574*** (0.0012249)	0.0260131*** (0.001224)
Never Married	-0.0249686*** (0.0012065)	-0.0253637*** (0.0011935)
Age (log)	-0.1847913*** (0.0015842)	-0.1850476 (0.0015873)
Year 2009	-	0.000984 (0.0013143)
Year 2010	-	-0.0009444 (0.0013152)
Year 2011	-	0.0022456* (0.0013516)
Year 2012	-	0.0025842* (0.0013704)
Year 2013	-	0.0018942 (0.0013531)
Year 2014	-	0.0027529** (0.0013731)
Iowa	-	-0.0034739* (0.0018511)

Kansas	-	-0.0063845*** (0.0017697)
Minnesota	-	-0.0009439 (0.0018547)
Missouri	-	-0.0095255*** (0.0017044)
Montana	-	-0.0062932*** (0.0021795
Nebraska	-	-0.003958** (0.0019396)
North Dakota	-	-0.0075754*** (0.0022119)
Only females are included in these regressions. Regression (1) includes both married and unmarried females. Regression (2) includes married, widowed, divorced, and separated females. There are 684 same-sex partners included in this regression. There are 231,135 observations. Standard errors are in the parentheses. ***, **, * indicate significance at 1, 5, and 10 percent, respectively.		

Table 12 presents the logistic regressions for all of the variables in the female only regressions. The explanatory variables of interest are presented in column one and the results of the regressions are reported in the column labeled (1) and (2). Column (1) does not include year or state effects; the year and state effect results are in column (2). The table provides the coefficient estimates, their levels of significance, and their standard errors.

Table 13 presents the logistic regressions for all of the variables in the couples regressions. The explanatory variables of interest are presented in column one and the results of the regressions are reported in the column labeled (1) and (2). Column (1) does not include year or state effects; the year and state effect results are in columns (2). The table provides the coefficient estimates, their levels of significance, and their standard errors.

Table 13 – Regression Results for Couples (All Variables)

Dependent Variable - Fert	(1)	(2)
Both self-employed	0.0051453 (0.0045591)	0.0044241 (0.0045065)
Female self-employed, male wage-employed	0.0034828 (0.0030556)	0.0028765 (0.0030265)
Female self-employed, male no pay	0.0759963 (0.0576701)	0.0759744 (0.0576795)
Both wage-employed	-0.0100399*** (0.002037)	-0.0103549*** (0.0020421)
Female wage-employed, male self-employed	-0.0029031 (0.0024362)	-0.0036715 (0.0024102)
Female wage-employed, male no pay	-0.0238763** (0.009502)	-0.0235664** (0.0095513)
Both no pay	0.045799 (0.0513608)	0.0453229 (0.0510794)
Female no pay, male self-employed	-0.0064046 (0.0141218)	0.0061856 (0.0140377)
Female no pay, male wage-employed	0.0175726 (0.0146948)	0.0163382 (0.0144811)
Female earnings	-1.81e-07*** (2.29e-08)	-1.88e-07*** (2.30e-08)
Male earnings	6.80e-08*** (1.07e-08)	6.65e-08*** (1.07e-08)
Female white	0.003191 (0.0045362)	0.002026 (0.0046088)
Male white	-0.0152356** (0.0048201)	-0.015686** (0.0048368)
Female other race	0.0012081 (0.0052292)	-0.0002165 (0.0051322)
Male other race	-0.0129052*** (0.0036701)	-0.0133772*** (0.0036292)
Both are native born	-0.0249853*** (0.0035274)	-0.023698*** (0.0034887)
Female diploma	-0.0104368*** (0.0022172)	-0.0107421*** (0.0022086)
Male diploma	-0.0046224** (0.0020752)	-0.0046992** (0.0020722)
Female some college	-0.0091403*** (0.0022676)	-0.0097447*** (0.0022553)
Male some college	-0.0003142 (0.0022045)	-0.0005504 (0.0021981)
Female associate's degree	0.0004169 (0.0026551)	-0.0008481 (0.0026206)
Male associate's degree	0.0038611 (0.0025709)	0.0027713 (0.0025402)

Female bachelor's degree	0.0077975** (0.0027169)	0.006934** (0.0027006)
Male bachelor's degree	0.0038683 (0.0024436)	0.0034364 (0.0024324)
Female master's degree	0.02127*** (0.0037809)	0.0208234*** (0.0037647)
Male master's degree	0.0142595*** (0.0034735)	0.0142051*** (0.0034683)
Female professional degree	0.0160476** (0.0056571)	0.0148803** (0.005576)
Male professional degree	0.0196926*** (0.0052535)	0.0197273*** (0.00525)
Female doctorate degree	0.0409867*** (0.0087112)	0.0398003*** (0.0086133)
Male doctorate degree	-0.0139869** (0.0059888)	-0.0138328** (0.0059677)
Female age (log)	-0.1698652*** (0.0041887)	-0.1700732*** (0.0041868)
Male age (log)	-0.0517728*** (0.0042358)	-0.0518184*** (0.0042329)
Year 2009	-	0.001766 (0.0018377)
Year 2010	-	0.0021092 (0.001848)
Year 2011	-	0.0032361* (0.0018855)
Year 2012	-	0.0034889* (0.0019032)
Year 2013	-	0.001552 (0.0018591)
Year 2014	-	0.0013754 (0.0018629)
Iowa	-	-0.0054238** (0.0025547)
Kansas	-	-0.007825*** (0.0024959)
Minnesota	-	-0.0032808 (0.0025406)
Missouri	-	-0.0118211*** (0.0023846)
Montana	-	-0.0077727** (0.0030738)
Nebraska	-	-0.0034601 (0.0027677)
North Dakota	-	-0.0110662*** (0.0030344)
The sample consists of partners only; single females are not included in this regression. There are 174,220 observations in this data. Column (2) controls for year and state effects. Standard errors are in the parentheses. ***, **, * indicate significance at 1, 5, and 10 percent, respectively.		

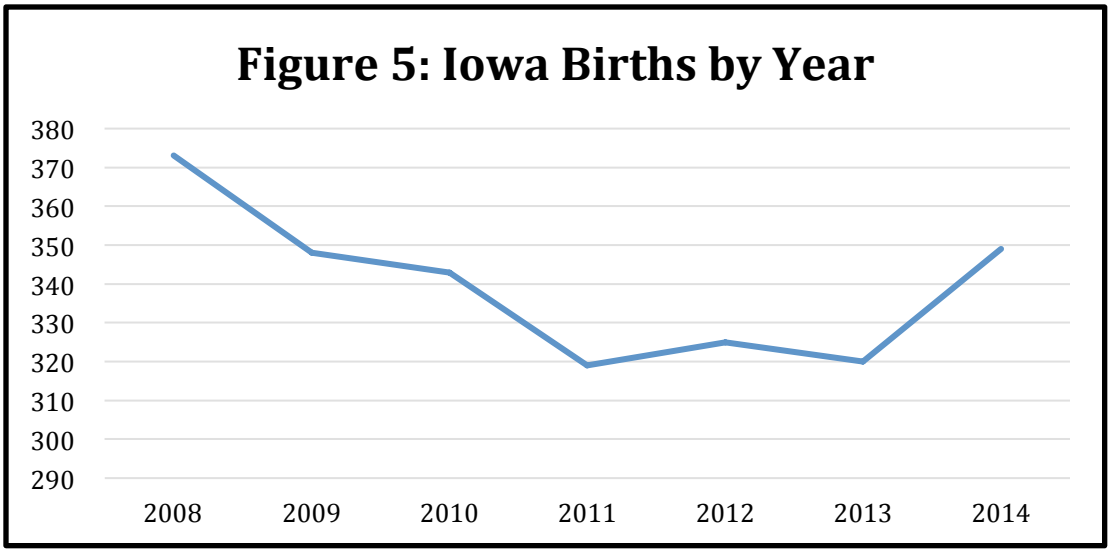
Oil Boom

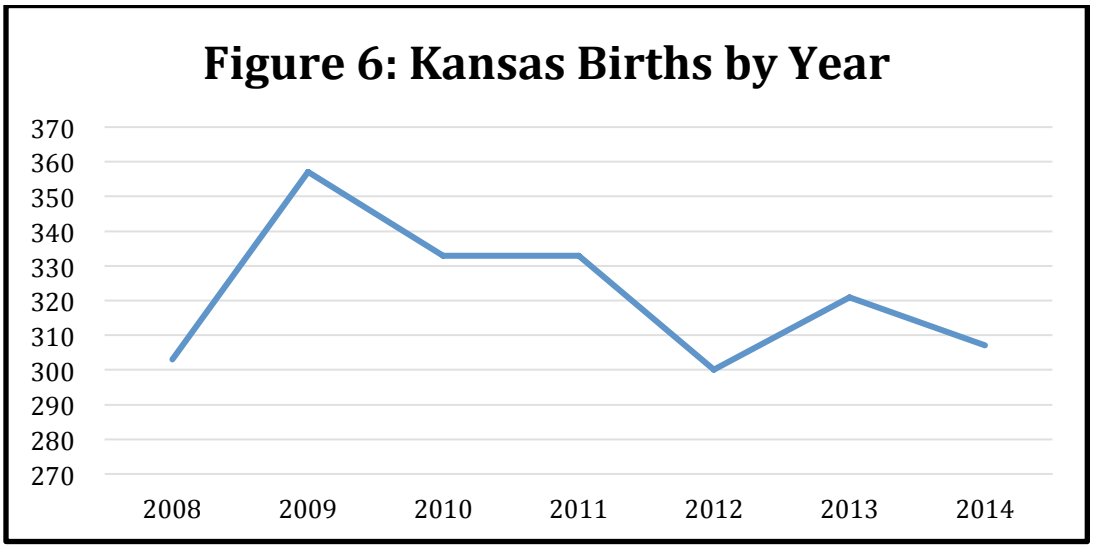
North Dakota is currently experiencing a growth in the population because of the oil boom in the western part of the state. The oil boom is bringing people into the area to work on the oilrigs, increasing pressure on existing infrastructure. The need for more infrastructure is also causing more people moving to the area because of business and job opportunities outside of the oil industry. The eastern side of Montana is also seeing similar effects of the oil boom, however not as large as western North Dakota. This is because most of the Bakken formation is located in western North Dakota compared to northeastern Montana (Bakken Formation). Over this time the state of North Dakota experienced higher tax revenues, which is benefitting the whole state (Keystone Energy Forum). Montana is also seeing tax revenues from the oil and gas industry, however since Montana is on the outskirts of the oil boom there is not as much oil being produced in the state of Montana causing a lower tax revenues compared to North Dakota. Since Montana is a neighboring state to North Dakota and is experiencing a little bit of the oil boom, Montana needs to be included in this study as a comparison to North Dakota.

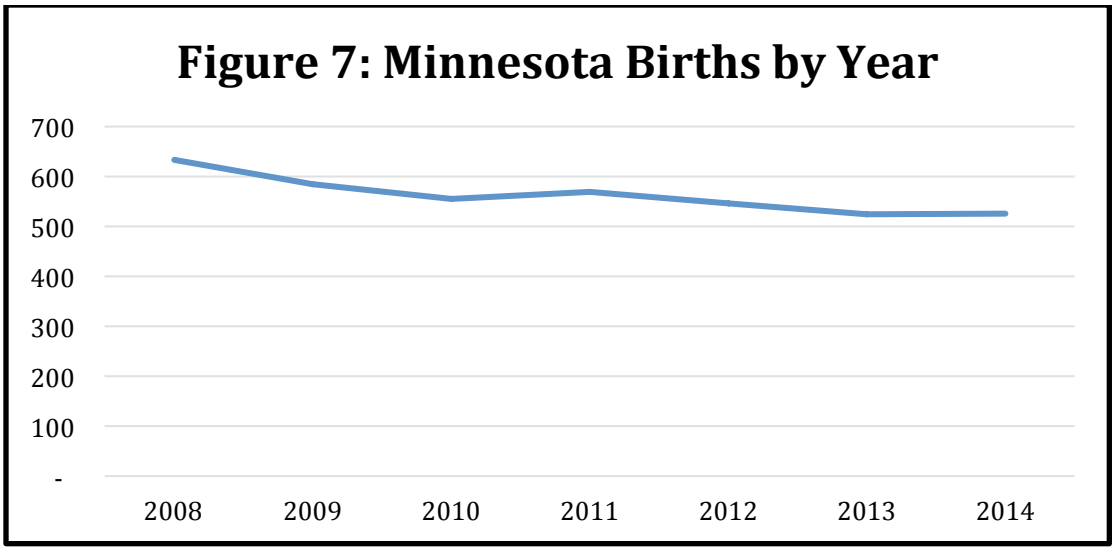
Same-sex Female Couples

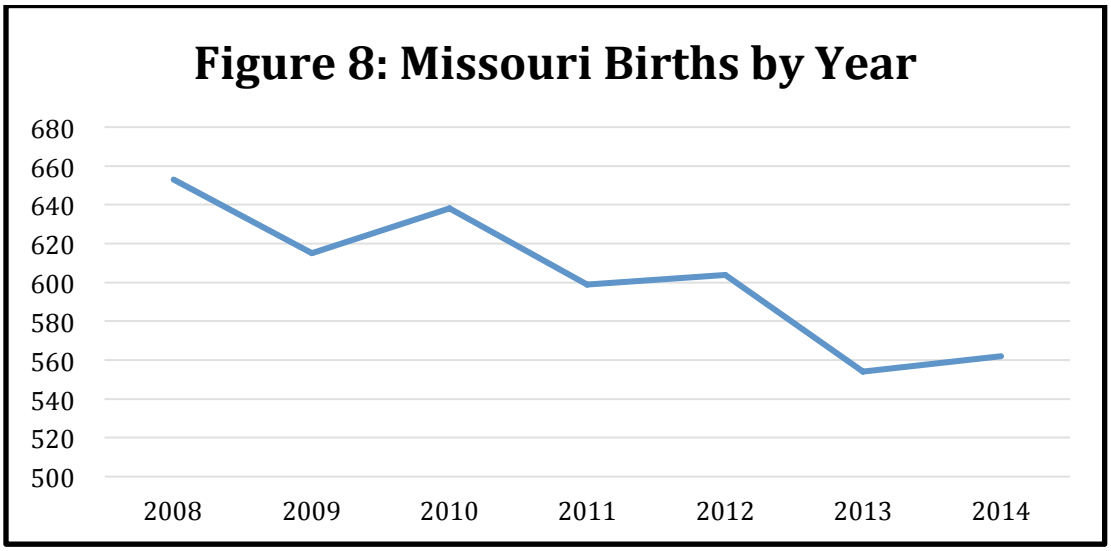
The data included 684 female same-sex couples. Of these couples, 16 of their partners had a baby in the last twelve months; there are 2 cases in which both of the females had a baby in the past twelve months.

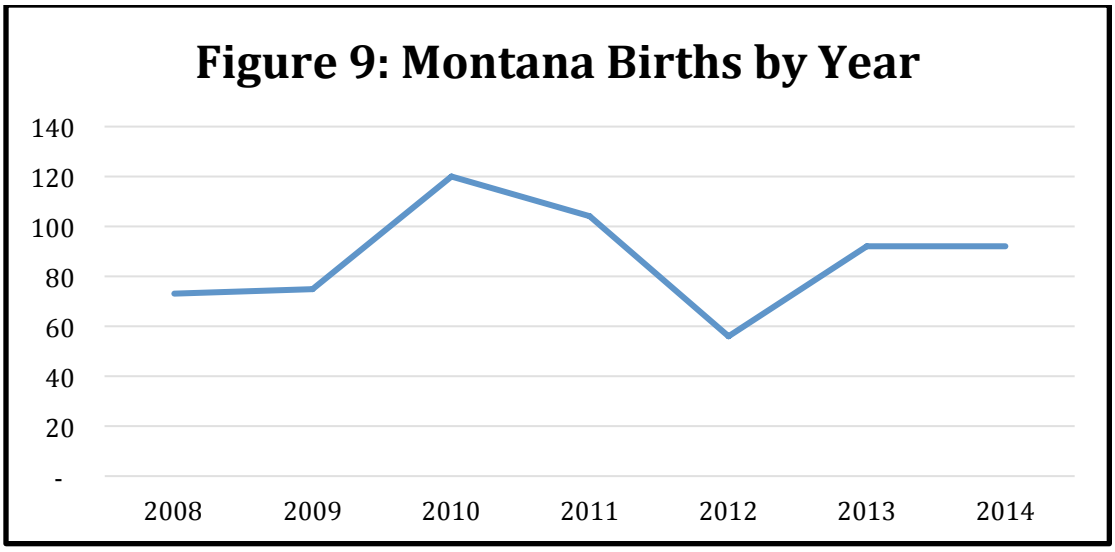
Figures of births by state by year

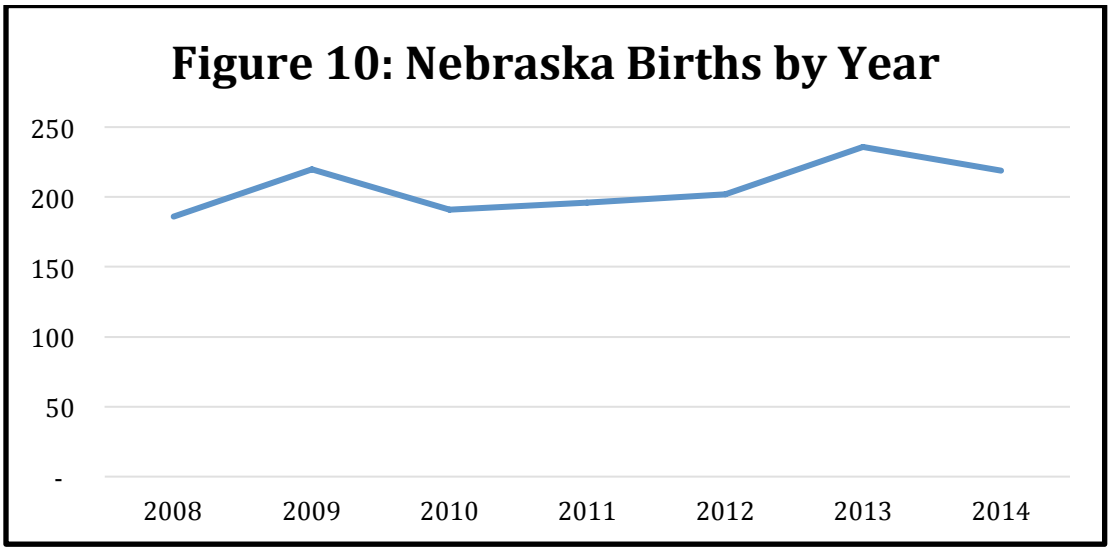


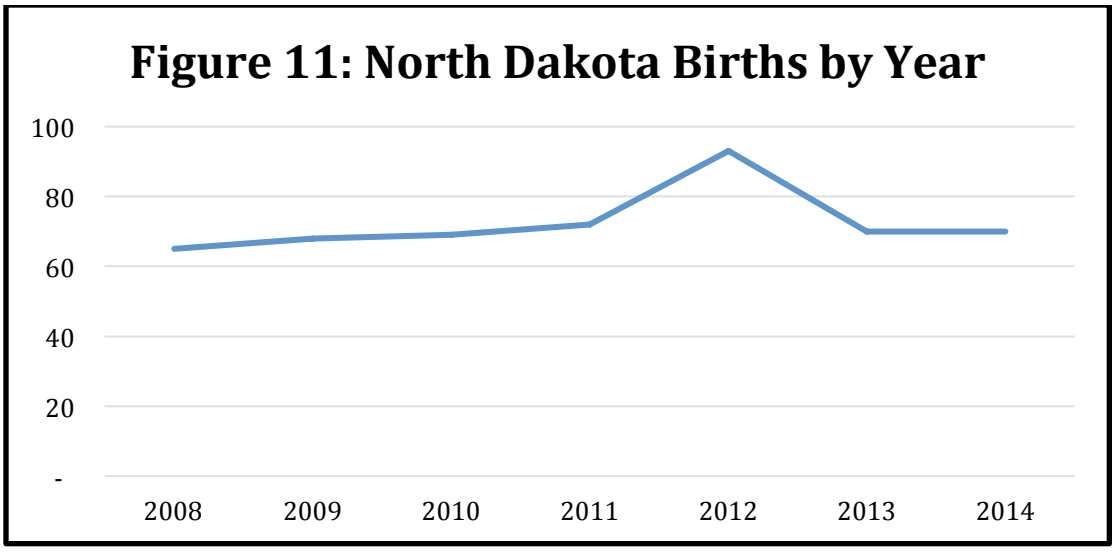












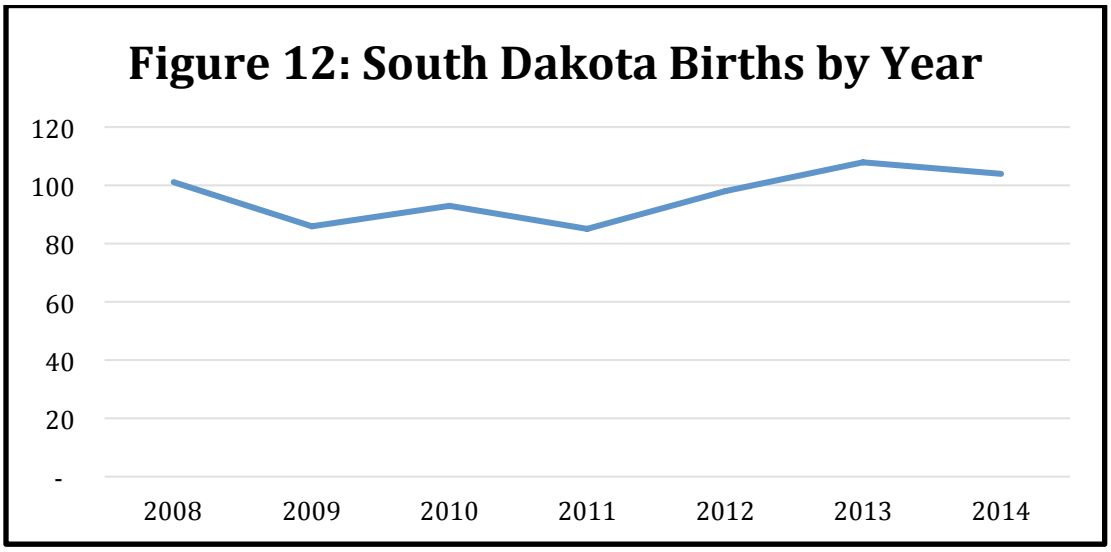


Figure of births and educational attainment

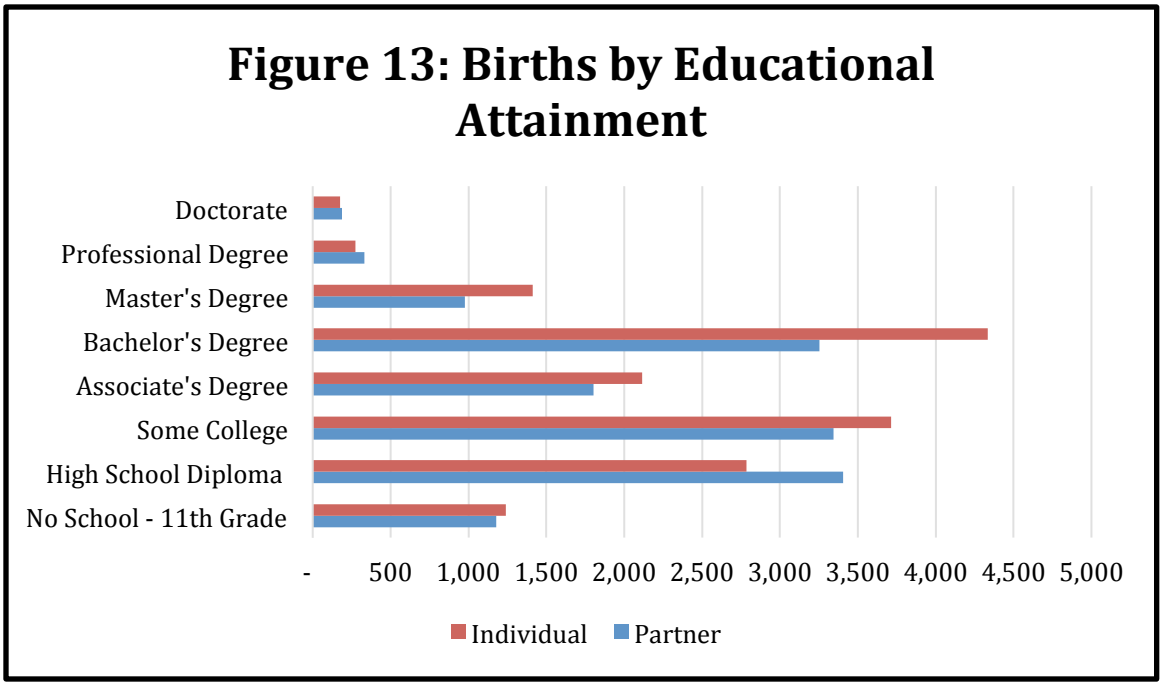
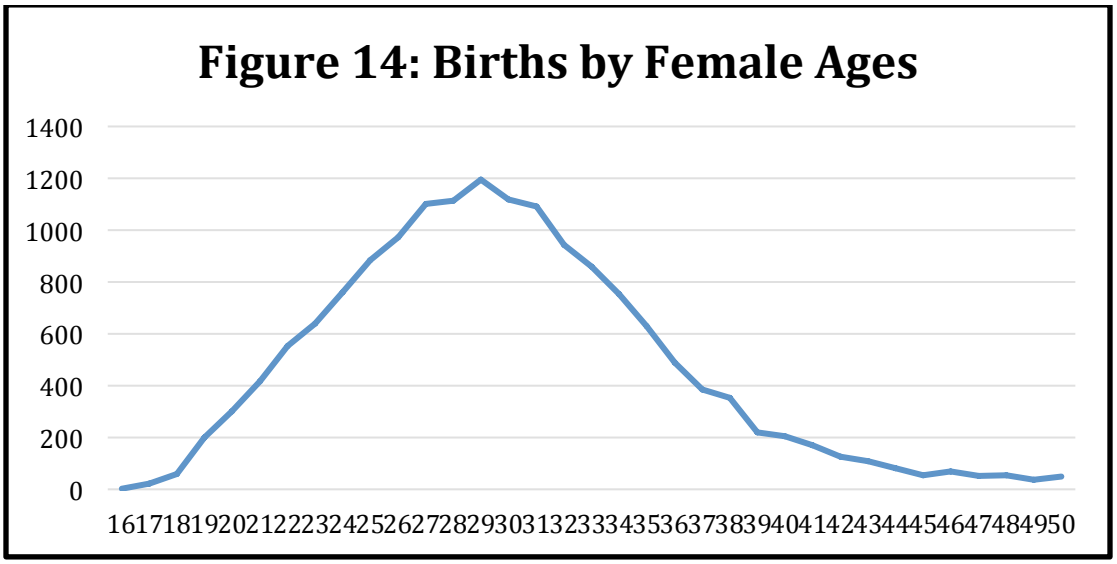
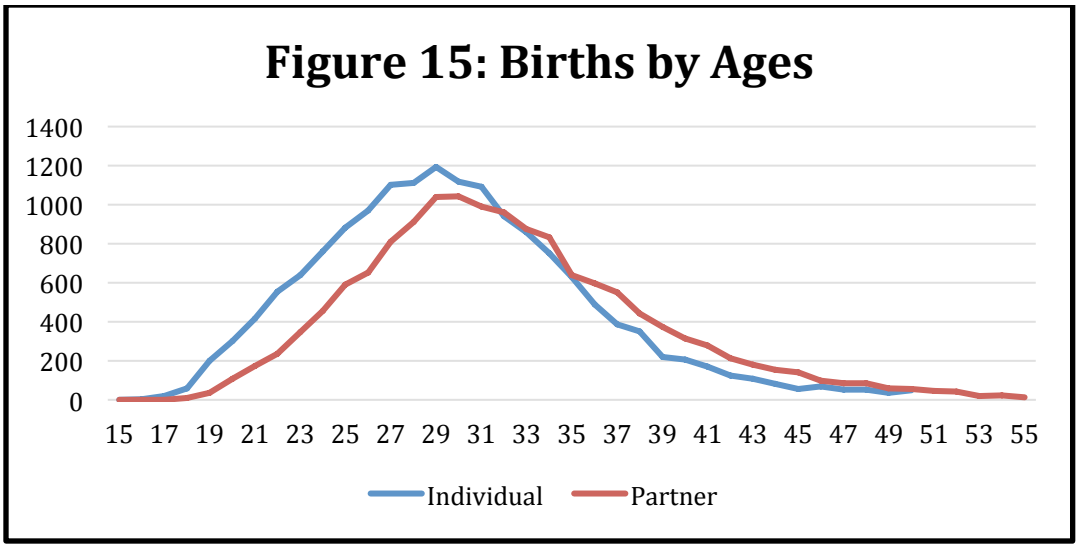


Figure of births by age





REFRENCES

About the Survey. (n.d.). Retrieved 2016, from http://www.census.gov/programs-surveys/acs/about.html

Allen, W. D., & Curington, W. P. (2014, February 25). The Self-Employment of Men and Women: What are their Motivations? *J Labor Res Journal of Labor Research, 35*(2), 143-161. doi:10.1007/s12122-014-9176-6

Aughinbaugh, A., & Sun, H. (2016, April). Fertility of women in the NLSY79. *U.S. Bureau of Labor Statistics*. Retrieved 2016.

Bakken Formation: News, Map, Videos and Information Sources. (n.d.). Retrieved 2016, from http://geology.com/articles/bakken-formation.shtml

Baumol, W. (1990). 'Entrepreneurship: Productive, Unproductive, and Destructive', *Journal of Political Economy*, 98(5): 893-921.

Birth Data. (2015, September 29). Retrieved 2016, from http://www.cdc.gov/nchs/nvss/births.htm

Broussard, N. H., Chami, R., & Hess, G. D. (2013). (Why) Do self-employed parents have more children? *Review of Economics of the Household Rev Econ Household, 13*(2), 297-321. doi:10.1007/s11150-013-9190-0

Dettling, L. J., & Kearney, M. S. (2013, October 17). House prices and birth rates: The impact of the real estate market on the decision to have a baby. *Journal of Public Economics, 110*, 82-100. doi:10.1016/j.jpubeco.2013.09.009

GEM Global Entrepreneurship Monitor. (n.d.). Retrieved 2016, from http://www.gemconsortium.org/

Hart, D.M. (2003). 'Entrepreneurship Policy: What it is and Where it came from',in Hart, D.M. (ed.) *The Emergence of Entrepreneurship Policy: Governance, Start-ups and Growth in the US Knowledge Economy*. Cambridge: Cambridge University Press: 3-19.

Hundley, G. (2000). Male/Female Earnings Differences in Self-Employment: The Effects of Marriage, Children, and the Household Division of Labor. *Industrial and Labor Relations Review, 54*(1), 95-114. doi:10.2307/2696034

Kanbur, S.M. (1979). 'Of Risk-Taking and the Personal Distribution of Income', *Journal of Political Economy*, 87(4): 769-97.

Keystone Energy Forum. (2015). Retrieved 2016, from http://www.ndenergyforum.com/topics/north-dakota-revenue

Kirzner, I.M. (1973). *Competition and Entrepreneurship*. Chicago: University of Chicago Press.

Landsburg, S. (2006). Why Europeans Work Less Than Americans. Retrieved 2016, from http://www.forbes.com/2006/05/20/steven-landsburg-labor_cx_sl_06work_0523landsburg.html

Naudé, Wim (2008). Entrepreneurship in economic development. Research Paper, UNU-Wider, United Nations University (UNU), No. 2008/20, ISBN 978-92-9230-066-1

Noseleit, F. (2014, March 22). Female self-employment and children. *Small Bus Econ Small Business Economics, 43*(3), 549-569. doi:10.1007/s11187-014-9570-8

Pappas, S. (2013, May 10). 5 Ways Motherhood Has Changed Over Time - Live Science. Retrieved 2016, from http://www.livescience.com/29521-5-ways-motherhood-has-changed.html

Population in the U.S. (n.d.). Retrieved 2016, from https://www.google.com/publicdata/explore?ds=kf7tgg1uo9ude_

Rackin, H. M., & Bachrach, C. A. (2016, May 12). Assessing the Predictive Value of Fertility Expectations Through a Cognitive–Social Model. *Popul Res Policy Rev Population Research and Policy Review*. doi:10.1007/s11113-016-9395-z

Schultz, T. (1975). 'The Value of the Ability to Deal with Disequilibria', *Journal of Economic Literature*, 13(3):827-46.

Sobel, R. (n.d.). Entrepreneurship. Retrieved 2016, from http://www.econlib.org/library/Enc/Entrepreneurship.html

Wadhwa, V., Holly, K., Aggarwal, R., & Salkever, A. (2009, July). Anatomy of an Entrepreneur: Family Background and Motivation. *SSRN Electronic Journal SSRN Journal*. doi:10.2139/ssrn.1431263

Wennekers, S. and Thurik, R. (1999). 'Linking Entrepreneurship and Economic Growth', *Small Business Economics*, 13(1): 27-55.

Wong, P.K., Ho, Y.P and Autio, E. (2005). 'Entrepreneurship, Innovation and Economic Growth. Evidence from GEM Data', *Small Business Economics*, 24:335-50.