Abstract: Over the past forty years women have made significant advancements in the labor force through the elimination of gender barriers and increases in earnings potential and human capital accumulation. In this paper I attempt to analyze how the relationship between fertility timing and the career attainments of women has evolved in the face of these achievements. I develop a model using data from the 2005 survey of the Panel Study of Income Dynamics analyzing the effects of age at first birth on wages and human capital accumulation for women aged 35-50 at in the year 2005. Using the results from my analysis I compare them with previous studies examining similar relationships on an earlier cohort of women to examine how the magnitude of these relationships have changed. I find that evidence to support an increase in the wage differentials for working women and a decrease in the gap of human capital accumulation (measured by years of education). The results are consistent with theory and suggest that age at first birth acts both directly on wages as well as indirectly through human capital accumulation.

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I. Introduction:

Over the past several decades, women have seen drastic increases in labor force participation and career opportunities. However, as more women continue to enter the labor force, it raises the question as to what the consequences are of increasing labor force participation on motherhood and family formation? Statistics show that over the past thirty years, an increasing number of women are delaying childbirth. Just one example in the United States is that from the mid seventies to the end of the eighties, the fertility rate rose almost fifty percent among women in their thirties.\(^1\) Thus this raises the question as to whether or not the timing of childbearing (age at the birth of the first child) has an impact on certain economic indicators such as wage and education attainments. More specifically, does the increasing number of women who are delaying childbirth indicate that beginning the process of family formation later in life coincides with greater professional success?

Much of the original literature regarding childbearing and economic well being was focused around the economic consequences of adolescent childbearing. Not surprisingly many of the studies concluded that teenage childbearing has an overall negative effect on income throughout the course of an individual’s life. While teenage pregnancy does not have a direct effect on income, it is highly correlated with variables that do influence wages. One of the most influential indicators of an individual’s wage is the level of education that they have attained. A 1982 study performed by Dillard and Pol, shows that teenage mothers have an 85% high school drop out rate, compared to 7-9% for childless teenage girls. This statistic leads to the conclusion that decreased

educational attainment is a lifetime consequence of teenage childbearing. As a result of this loss of education, teenage mothers generally do not obtain the same career opportunities, wages, or opportunities for advancement as their childless counterparts.

A complete and thorough analysis of their data leads Dillard and Pol to the conclusion regarding the effects between adolescent childbearing and wages that, “age at first birth strongly affects education attainment, which in turn has a strong positive indirect effect on both the market wage…If teenage motherhood does have economic impacts on women, such effects are most likely to operate through loss of education.”\(^2\)

Having shown that education has such a drastic impact on future wages, the question arises as to whether or not similar theories can be applied to non-adolescent mothers. While surely the overall economic effects will not be as significant, perhaps the timing of childbearing for adult age mothers does have an effect on educational or even human capital attainment which in turn affect’s earnings and career choices. Until recently, very little research had been done examining this potential relationship, however, increasing labor force participation by women and declining fertility rates have raised questions as to a potential correlation.

Much of the research done trying to examine any potential relationship between the timing of childbearing and the wage attainments of women has been done using data collected starting in the late sixties. The most widely used data set was the National Longitudinal Survey of Women, which began with a sample of women who were in their early twenties in 1968. Given the advances that have been made in the educational and career opportunities for women in the four decades since then, as well as a general

increase in overall labor force participation, it raises the questions as to whether or not conclusions drawn on this cohort of women, apply to later generations. It also raises the question as to whether the advancements that women have made over the past forty years have had an influence on the relationship between family formation and their career attainments.

The following literature review will describe how many studies conducted to date have found that there is a relationship between the timing of family formation and the wage attainments of women. They conclude that delaying childbearing has a positive impact on a women’s career. Using these studies as a baseline indicator, I would like to perform a similar analysis on a more recent cohort of women and compare the results. Specifically I would like to answer the question: “In the face of all the advancements women have made over the past four decades, how has the relationship between the timing of childbearing and consequently the career attainments of women evolved over time?”

II. Economic Theory:

Economic theory generally suggests that the correlation between labor force participation rates of women and fertility are negative; however, the relationship seems somewhat endogenous. As rates of employment among women have increased over the past several decades, we have seen a steady decline in overall fertility rates, but an increase in the fertility rate amongst women in their thirties. This seems to indicate that as women continue to attain higher levels of education and career potential they are foregoing childbearing. However, causation can be argued in both directions. It is possible that a decline in overall fertility due to advancement in contraceptives such as
the birth control pill have enabled women to pursue their careers without the interruption of childbearing. On the other hand causation can be argued the other direction where women are able to invest in human capital more than even before and therefore are seeking a return on their investment by pursuing careers and foregoing family formation. Casual factors remain topics of debate, but economist Gary Becker suggests in his work that fertility and employment are simultaneously determined by the same basic economic indicators (women’s real wages, unemployment, education, etc.). He classifies women’s employment and fertility as choice variables, or variables that people choose based on certain constraints. Thus if these variables both move together, economic theory suggests that external variables determine both variables exogenously. However, it is hard to imagine that the relationship between fertility and one’s employment is determined entirely by external variables. Rather it seems sensible to conclude that at least part of the correlation between the two could be the result of what Engelhardt (2003) terms a ‘sequential decision process’.

Either way, assuming a negative correlation means that motherhood results in a decrease in labor force participation for women, which results in a loss of wages. It is possible though that the extent of these losses may vary depending upon the length of time that a women is forced to exit the labor force. It is here that economic theory of opportunity costs suggests that those who have accumulated more human capital and wages forego more and therefore experience a higher cost to childbearing than those who perhaps have not accumulated as much work experience. However, new legislation in the past decade, particularly the Family Medical Leave Act of 1993, has allowed women

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some form of job security while out of the labor force due to maternity. Some even argue that this new legislation has enticed women to return to the labor force following childbirth rather than exiting all together. It is logical to assume that those women who have been in the work force longer are more likely to be eligible for such maternity benefits, and therefore they may not endure as high of cost as theory suggests in comparison to other women. In fact, this may violate theory entirely and the impacts of career interruptions from childbirth may be greatest for those mothers who have not accumulated sufficient experience by the time they leave the workplace.4

This effect of children on wages has an indirect effect working through the effects of labor force participation. Economists have also developed a theory known as the “direct” child wage penalty which is the result of “reduced productivity resulting from childbearing and rearing.”5 This effect differs from the indirect effect in that it is defined as the wage loss that results from the presence of children holding work experience constant. It is hypothesized that having to balance career tasks with the demands of childrearing could result in decreased productivity of mothers in the workforce and thereby lowering wages. There is some dispute amongst economists as to the significance of this effect due to the potential for heterogeneity. It is possible that mothers and childless women harbor different characteristics when it comes to ambition, preferences, and career aspirations; all variables which are difficult to measure and may be picked up by a variable measuring the child wage penalty. Hiromi Taniguchi (1999), performed a study with the primary focus being the “direct wage-depressing effect” of children, the results of which will be discussed later.

4 Taniguchi, 1010.
5 Taniguchi, 1009.
When discussing potential effects of childbearing on wages, one must also consider the effects that childbirth has on the development of human capital. It is accepted in economic theory, that continuing acquisition of human capital is essential for the development of one’s career and professional success. It can come in the form of education, work experience, skills, etc. and theory predicts the more an individual acquires, the better off they will be in the work force in regards to wages. Thus, when trying to examine any impact childbearing may have on wage attainment, it is essential to try and develop some sort of theory to explain any potential relationship between childbearing and the acquisition of human capital.

In 1993, Blackburn, Bloom, and Neumark published a study trying to develop a theory between human capital investment and the timing of childbearing. Their theoretical model took the standard model for human capital and made one alteration: they allow for the decision to bear a child to affect the decision on whether or not to invest in human capital. This alteration is combined with essential features of the standard human capital model: workers have the opportunity to invest in training that increases productivity; it is desirable for workers to invest in this training if the potential benefits (higher wages) outweigh any potential costs. By constructing the model in this way, it has been developed to show that delaying childbearing corresponds to an increased investment in human capital and that potential instruments causing late childbearing also influence increased investment in human capital. The authors acknowledge the potential endogenous relationship between the two variables.

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With the critical features in place the authors then present a scenario of a typical woman who is starting her working career. At the outset she is faced with the prospect of investing in human capital or whether or not she should begin the process of family formation and bear a child. They then construct an expression, optimizing the age at first birth first assuming investment and second assuming no investment in human capital. The final assumption of the model is that the woman is optimizing in her age at first birth and therefore will make her decision based on her age at the time of the scenario and its relationship to her optimal childbearing age as predicted by the model. From there the model attempts to answer whether or not lifetime utility would be higher had the individual invested or not invested.

As stated early, the general conclusion of the theoretical model proposed by Blackburn et. al is that a woman who has chosen to make an investment in human capital will choose to delay her childbearing in an attempt to reap some of the returns on that investment. It then follows that since economic theory predicts a positive correlation between human capital and wages, those who choose to delay childbearing will have higher wages than comparable women who bore a child earlier assuming that their initial productivities were the same. Interestingly, the model also predicts that over time the wage disparity between early and delayed child bearers will continue to increase due to the acquisition of larger amounts of human capital. Due to the constraints, the model predicts that early child bearers are unable to “catch up” in terms of human capital acquisition as it assumes a constant rate of growth. Even if the model is altered so that the rate of acquisition of human capital decreases after the birth of a child, early child bearers still lag.
The overall implication of the Blackburn model is that women who delay childbearing will have larger relative earnings compared to those women who bore a child early on in their professional career. This is due to the fact that early child bearers forego human capital accumulation at an earlier time, and therefore never obtain the same levels of education, work experience, etc, as those women who chose to delay. The other interesting implication of this model is that it seems to suggest that the initial years of an individual’s working career are extremely important to the acquisition of human capital and the establishment of oneself in the workforce.

The model that Blackburn, Bloom, and Neumark propose seems to have solid practical implications to real world occurrences. It seems reasonable to conclude that women who bear children say in their mid twenties forego some sort of capital accumulation compared to similar women who delayed childbearing until the arbitrary age of thirty. These women who delayed motherhood by five years theoretically had the opportunity to pursue an advanced degree, establish themselves in the workforce, and/or gain valuable experience in a potential career field. For women who had children, while it is reasonable that they could also pursue an advanced degree and establish themselves in the workforce shortly after having a child, it is quite possible that the same amount of capital accumulation takes longer and/or the returns aren’t as great. This again may be an indicator of some sort of direct child wage penalty. Having to care for a child takes time and effort, and therefore mothers trying to obtain similar levels of capital accumulation to those without children may experience less of the benefits due to the demands of childcare. In the end, literature and theory seem to suggest a fairly strong positive

7 Blackburn, 11.
relationship between the acquisition of human capital and age at first birth and thus a positive relationship between age at first birth and wages.

One more relationship that must be considered when trying to draw conclusions about childbearing and wages is the effect of marriage on a women’s wage. This relationship however is somewhat ambiguous. First off, recent findings have suggested a positive effect of marriage on female wages. While this goes against some conventional theories, some possible explanations for this finding are that women who get married have higher earnings potentials than those who do not or perhaps they are introduced to new professional opportunities through their husband that they would not have had otherwise. However, when it comes to motherhood and employment, it seems logical to conclude that the amount a women works is dependent upon her husband’s earnings as well as the appropriation of family tasks. Therefore, if the husband makes a sufficient income, it is very possible that the women will not work because there is no financial need to do so, and therefore she will devote her time to child rearing. Thus, marriage can create conflicting results when it comes to childbearing and wages, and these potential effects must be taken into account when doing empirical analysis.

Overall, theories seem to suggest a potential relationship between the timing of childbearing and the wage attainments of women. While there seems to be a strong negative correlation between motherhood and employment, recent evidence seems to suggest that delaying childbearing may be able to help offset some of this negative impact. Increased labor force participation of women has forced employers to confront the effects of motherhood on the workplace, and new family friendly legislation (FMLA, 1993) has provided mothers with some job security, and perhaps enticing them to return

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8 Taniguchi, 1009.
to the workforce following childbirth. It seems that women who delay childbearing and establish themselves in the workforce are more likely to receive these benefits than those who exit the workforce early, therefore offsetting some of the cost of childbearing. Acquisition of human capital also plays an important role in the wage attainment of an individual. Theory suggests that age at first birth and human capital acquisition are positively correlated, thus leading to a positive correlation between age at first birth and lifetime earnings. Overall, it seems to provide a reasonable explanation of the real world trend, that overall fertility rates are declining and that fertility rates amongst women in their thirties have continually increased over the past several decades.

**III. Empirical Evidence:**

Over the past several years, there has been an increasing amount of research trying to analyze the relationship between the timing of childbearing and the wage attainments of women. Hiromi Taniguchi’s 1999 study examining the timing of childbearing on women’s wages produced quality results similar with the aforementioned theory. He used data from the National Longitudinal Survey of young women between 1944 and 1954, and focused his analysis on the direct child wage penalty. His findings revealed the presence of a wage penalty for women who gave birth between the ages of 20 and 27 of 3.7% in the OLS model and four percent in the fixed effects regression. Even more significant was the fact that his results showed there was no significant wage penalties for late child bearers and that the difference in the wage penalty between the two groups was significant at the one percent level for both the OLS and fixed effects models.
The fact that results show a direct child wage penalty concentrated in the group of women who first bore children between twenty and twenty-seven suggest that there is some validity to the argument that delaying childbearing leads to better economic well being. This result is consistent with life course theory in that the timing of childbearing does play a significant role in shaping a women’s career. It is reasonable to conclude that the advantages to late childbearing result from an increased accumulation of human capital compared to those women who did not delay. Taniguchi comes to the conclusion that ‘prebirth work experience is highly predictive when it comes to wage gains among mothers’.  

The results from his study also provided some other interesting empirical evidence in support of economic theories. First, his results show that work experience is a significant instrument in predicting wage gains (OLS models revealed a 4% gain for each additional year of experience), and that mothers typically have less work experience so part of their wage loss can be attributed to that. Second, he found evidence in support of the wage-boosting effect of marriage; married individuals saw a nine percent wage gain in the OLS model compared to individuals who never married. Interestingly enough, Taniguchi also found that divorce and separation resulted in wage gains for women as well. The final worthwhile conclusions drawn from his study is that the child wage penalty increases nonmonotonically with the number of children and that the direct child wage penalty is present, ‘net work experience’. His results show that there was a significant difference between the wage effect of having one versus no children compared to having one versus two children, with the effect being much stronger in the latter

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9 Taniguchi, 1017.
10 Taniguchi, 1014.
example. Overall, Taniguchi’s study provides a solid background of empirical findings in support of the notion that there is a positive effect between the age of a woman at the birth of her first child and her career wage attainment.

Another valuable study examining relationships between childbearing and labor force participation was published by Amy Pienta in the Journal of Women and Aging in 1999. She conducted this study in an attempt to try and understand the behavior of older women in the labor force and any potential influences on retirement decisions. She believed that women who are childless or delayed childbearing may be more likely to remain in the labor force later in life due to the fact that they have a stronger attachment to their careers. She also raises the interesting point that the cost of retirement for these individuals may be less than the cost for a woman who had children early and delayed entry into the work force due to their longer investment in a pension plan. The study is constructed around the hypothesis that ‘delaying childbearing, forgoing childbearing, and having smaller families will foster strong labor force attachment throughout life course-including retirement years’.

Her analysis is done with a cross-sectional examination of the 1984 Survey of Income and Program Participation. The variable that she was focused on measuring was ‘childbearing behavior’ which is an indicator of the timing of first birth. Pienta’s results show that whether or not women chose to have children has a direct effect on labor force behavior in later years. If a woman bears a child, she is slightly more likely to remain in the labor force compared to those women who remain childless, but the results are insignificant. In her second model, Pienta creates an interaction term (childbearing x

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work continuity), and this regression yields significant results revealing that there are substantial differences between labor force ties later in life between women who delayed childbearing and those who remain childless. Pienta also fails to find any significant difference between women who bore children earlier in their life (< 30) and those women who remain childless. She attributes this to the fact that women in this group of women are diverse in their views on work, childbearing and retirement and therefore she concludes that is not surprising that they do not follow any sort of pattern in regards to labor force behavior later in life.\textsuperscript{12}

The most significant results of Pienta’s analysis is that women who ultimately decided to delay childbearing experience greater attachment to the labor force later in life compared to women who remain childless. Her results reveal the fact that it is not when you have children, but rather whether not you have children that influences your labor force behavior as you near retirement. The results are consistent with the notion that childless women have the best opportunity to retire in their later years, and also show that women’s retirement income is reduced with each successive child.\textsuperscript{13} She cites the fact that this is also consistent with previous work by O’Rand and Landerman (1984).

Pienta offers several explanations for the results of her study. It has yet to be pointed out that a delay in childbearing also results in a delay in children exiting the household. This means that the financial strain that children place on a household is still present as the parents reach retirement age. Thus, when compared to childless women at that age, they have more of a financial burden and therefore may be forced to remain in the labor force in order to make ends meet. Pienta’s work raises some interesting issues

\textsuperscript{12} Pienta, 79.
\textsuperscript{13} Pienta, 80.
regarding the effect that childbearing has on women later in life, particularly as they reach the age of retirement. The ultimate conclusion that one can draw from all this is that the time at which a woman begins childbearing does have an impact on her labor force behavior later in life.

One final study that raises some interesting conclusions regarding childbearing and women’s wage attainment is a 1988 study by Calhoun and Espenshade. By pooling data from the NLS Survey of Young Women, Mature Women, and Youth Cohort, they attempt to analyze the relationship between childbearing and ‘forgone earnings’ by measuring the opportunity cost of children in terms of lost hours of market work and earnings. What makes their study unique is that they examined these factors controlling for race and found drastically different effects among African American and white women, which leads one to some interesting conclusions.

The results reported for white women show that having a child reduced the number of hours a woman worked in the year she gave birth by 256. The number of foregone hours continued to increase the following year, and did not begin to fall again until on average the third year after an individual gave birth. However, it is important to note that the number of annual hours worked never reached pre-childbirth levels for the remainder of their working life. Their results show on average a difference of approximately four hundred hours or 10 weeks less of work annually between 26-27 year old women who have a child versus those that are childless. Over the course of their working lives, the average college educated woman forgoes 1,762 hours of work for each child born.
When the authors examined the results in terms of forgone earnings, they found that the effect of children has a much more prolonged effect. Their results show that it takes “roughly ten years following birth before fifty percent of the total impact of each child on foregone market earnings is realized, because potential hourly earnings continue to increase with age as a women gains additional labor market experience.” Translated into numbers, the average college educated women forgoes $23,469 (1981 dollars) for each child that she bears.

The results of the study are also consistent with human capital accumulation theory and show that higher levels of education lead to reduced levels of forgone hours. They do however correspond to higher levels of forgone earnings, due to the fact that the opportunity cost of forgoing work is much greater for those women who are more educated. When examining the results of this study it is also worthwhile to look at the disparities across ethnic groups in terms of forgone hours and earnings. The average white woman forgoes approximately $25,000 in lifetime earnings and between 1,500 and 2,500 hours of work for each child that she raises while the average black women forgoes only $5,000 in lifetime earnings and 600-1000 hours of work per child. These numbers correspond to a five fold disparity in forgone earnings and 2.5 fold disparity in forgone market hours. Overall, the results of Calhoun’s study are consistent with theory and show that there is a substantial opportunity cost to childbearing and that women are forced to forgo labor market participation as a result of motherhood.

Another notable study in regards to applications of human capital theory is Blackburn’s *Fertility Timing, Wages, and Human Capital*. His model yields similar

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results to Taniguchi’s model in regards to work experience, showing that each additional year of training corresponds to a 5% increase in wages. In regards to age at first birth, the model predicts that women delaying childbearing on average make six percent more than early childbearers; however the results are only significant at the six-percent level, but remain significant at traditional levels in the joint F-test. From his analysis Blackburn concluded that fertility timing was a useful instrument in predicting wage differentials among women, along with differences in education, experience, and tenure. His analysis revealed that only part of the correlation can be attributed to unobserved heterogeneity and therefore human capital accumulation has some effect on the relationship between timing of childbearing and overall career attainment.

The final theoretical argument to examine using empirical findings is the negative association between fertility and women’s labor force participation and which requires some clearer evidence to establish causality. In his 2003 study, Engelhardt argues that much of the previous work attempting to examine the correlation between the two variables was flawed and therefore any conclusions drawn cannot be valid. The flaw Engelhardt accounted for was spurious regression which occurs when the t-statistic indicates a statistically significant relationship when none actually exists between the two variables. He also implemented a technique known as vector error correction models which allow one to make distinctions between short run and long run causality when dealing with time series data. The last thing he did was to allow for and test for parameter instability, which attempts to uncover whether or not the relationship between the two variables has changed over time.

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15 Blackburn, 13.
16 Engelhardt, 109,110.
Analysis of Engelhardt’s model leads to the conclusion of dual causality in the long-run between fertility and women’s labor force participation. It also confirms that there is a negative correlation between the two variables. However, he notes that in certain countries, overtime the relationship has become less negative as a result of increased availability of childcare and changes in attitudes towards working mothers which has lessened the effect of motherhood on labor force participation by women. He also points out that the only way in which increases in fertility will not lead to a decrease in women’s labor force participation is if countries are able to mitigate the conflicting nature of motherhood and work, otherwise the negative association remains.

As the role of women in the labor force has evolved over the past several decades, we have seen an increasing amount of research trying to examine the many different aspects of the fertility and employment relationship. Most of the studies to date have been performed using similar data collected on a single cohort of women. The studies presented here use data from the NLS, SIPP, and PSID surveys and are all dated no later than 1992. Thus, the conclusions drawn form these studies cannot necessarily be applied to later generations of women. Over the past several decades there have significant advancements by women in the labor force which potentially impact the relationship between family formation and career attainments.

The current literature seems to provide strong evidence of both a theoretical and empirical association between the timing of childbirth and the overall career success of women. When we compare the results of the more recent studies to older ones examining the effect of adolescent fertility on employment, we see that the results are similar, but at the same time slightly more complex for older women.
The general consensus among researchers was that adolescent fertility had a strong negative association with economic well-being; the primary reason being that it led to a serious decrease in a woman’s overall education. When examining the relationship between childbearing and wages for career age women, the relationship becomes slightly more complex due to an increasing number of explanatory factors. We still see that human capital acquisition is a powerful instrument in predicting outcomes in the labor market, and that the higher the age at first birth, the better off women are in that regard. However, career age women face increased opportunity costs to bearing children due to foregone hours of work, translating into foregone earnings. Also, women who bear their first child between the ages of 20-27 have been shown to have experienced a “direct” child wage penalty, holding any type of work experience constant. It is believed that this effect is due to the demands that childbearing places on mothers and the potential decrease in labor force productivity that results.

Theory and literature ultimately conclude that there is a conflicting nature between childbearing and work force participation, and that the two are incompatible in today’s society. Today more women are delaying childbearing or foregoing it all together than at any point in recent times, as evidenced by declining fertility rates. While newer legislation and changing attitudes have helped reduce the effects of motherhood on employment, whether or not policy makers and changing attitudes can help eliminate the positive correlation between the timing of fertility and wage attainment remains to be seen. This task might be slightly more complicated. Policy makers may have little influence over the indirect effect of children on wages, since it acts through human capital acquisition. While they may be able to shorten absences from the labor force, it is
shown that the rate of growth of human capital only declines after pregnancy. Therefore the major conclusion one can draw from all of this is that the early years of a woman’s career is essential to the acquisition of human capital and overall professional success; it is the amount of work experience, education, training, etc. that she has accumulated by the time of her first pregnancy that will have the greatest effect on her overall labor market outcome. Since these conclusions have been drawn using data from women who were entering the labor force around 1970, it cannot be said for certain that they would be the same for women of later generations. By analyzing more recent data, we can determine whether or not these aforementioned factors are still indicators of how successful a woman will be in her professional career. Also, by using the previously studied cohort of women as a baseline, we can examine exactly how these factors have changed over time.

IV. Data Review:

The data used for analysis is from the Panel Study of Income Dynamics 2005 survey. There are several advantages to using the PSID in trying to answer this research question. First, the PSID was generated in order to better understand determinants of family income and how it changes over time and therefore contains extensive amounts of data on a variety of factors that influence wages, education, and other variables. Also, the PSID has continued to add respondents over the course of the survey and as of 2005 contained information on over 8,000 households and sixty thousand individuals. This allows for an analysis of a more recent cohort of women than other household surveys (such as the NLS and SIPP), which have not added respondents since they began in the late sixties. The earlier surveys have also experienced attrition in regards to the number
of respondents, so the fact that the PSID has been able to grow in terms of number of individuals provides a large population from which to derive a sample of specific individuals to analyze.

In order to generate the necessary set of observations, two separate data sets were constructed from the original panel data and merged. The first data set isolated all heads of household who were female, and the second data set contained all the wives or those females that were living with a male head of house. Merging these two data sets together provided a sample of 2,564 women aged thirty-five to fifty in two thousand and five. This age was chosen because this meant that the women theoretically graduated college between 1977 and 1992. The sample that Blackburn used in his analysis contained women who graduated college between 1966 and 1976, and analyzing a sample that graduated from college more recently allows for comparison of results. To finalize the sample, all women who gave birth prior to the age of eighteen were dropped so that the results could be compared with Blackburn’s model as his sample contained only women who had given birth after they had turned eighteen.

One of the key variables in this analysis, age at first birth, was not included in the original data and had to be generated using the panel and individual data sets. The individual data set contained data for all individuals in the households contained in the survey from 1968 through 2005. By using the family ID number it was easy to match children and parents in the individual data set to those observations in the household data. The individual data set also coded whether or not children belonged to the couple, solely the head, or solely the wife, and therefore it was possible to match up children with their mothers. By taking the age of the oldest child in the data set and subtracting it from the
mother’s age in 2005, I was able to generate a variable measuring the age at which each mother gave birth to her first child. The mean age at which women gave birth to their first child was 26.6 years old with a range of eighteen years old up to forty-five. There were 545 women who were childless, representing approximately twenty-one percent of the sample.

**Table 1:** Wages and other characteristics for women aged 35-50 (PSID 2005 Panel) separated by whether or not the women have children

<table>
<thead>
<tr>
<th></th>
<th>Women With Children</th>
<th>Women Without Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at 1st Birth</td>
<td>26.66 (5.01)</td>
<td>--</td>
</tr>
<tr>
<td>Years of Education</td>
<td>12.90 (2.62)</td>
<td>12.81 (2.44)</td>
</tr>
<tr>
<td>Experience</td>
<td>5.48 (6.92)</td>
<td>5.81 (7.41)</td>
</tr>
<tr>
<td>% Single Mom</td>
<td>28.37% (0.45)</td>
<td>40.18% (0.49)</td>
</tr>
<tr>
<td>% working</td>
<td>75.8% (0.43)</td>
<td>77.06% (0.42)</td>
</tr>
<tr>
<td>% with a college degree</td>
<td>29.51% (0.46)</td>
<td>26.10% (0.44)</td>
</tr>
<tr>
<td>% high school graduates</td>
<td>84.86% (0.36)</td>
<td>85.14% (0.36)</td>
</tr>
<tr>
<td>% using day care</td>
<td>11.42% (0.32)</td>
<td>--</td>
</tr>
<tr>
<td>% minority</td>
<td>42.79% (0.49)</td>
<td>36.33 (0.48)</td>
</tr>
</tbody>
</table>

- standard deviations are reported in parentheses
- there are 1,963 observations with children and 545 observations without children

Another variable that needed to be generated from the data was a variable to measure wages. The original data set contained wage variables both in terms of hourly wages and salary. Therefore, I created two variables to measure wages, one for the annual salary of the individual and the other for the individual’s hourly wage. When salary variables were missing, they were replaced by the hourly wage multiplied by a two
thousand hour work year and when hourly wage variables were missing they were replaced by the individuals salary divided by two thousand hours. Since human capital theory suggests that a log-linear regression is the most ideal form to analyze wages, I generated natural log forms of both salary and hourly wage variables as well. The 2005 survey contained no data on hours worked per week so it was hard to generate a measure of part time work. Therefore, when going forward with my analysis measuring income in terms of hourly wages will most likely provide the most accurate results.

V. Analysis and Results

V.I ) Wage Equations

In order to examine the relationship between age at first birth and labor market outcomes, the first instrument I examined was wages. Using an OLS model I estimated the regression:

\[
\ln(\text{hourly wage}) = \beta_1 + \beta(\text{age at first birth}) + \beta(\text{childless}) + \beta(\text{years of education}) \\
+ \beta(\text{years of experience}) + \beta(\text{single mom})
\]  

(1)

I estimated equation one with a log-linear specification as predicted by human capital theory. Previous studies had shown that the relationship between age at first birth and wage attainments differed by race so this regression was run on three different samples of women. The results of my estimation are shown in Table 2, where column one represents the estimation for the entire population, column two represents white women, and column three shows the results for minorities. The results are consistent with theory for columns one and two, however the equation estimated for minorities shows no significant relationship between age at first birth and wages. It is evident from the coefficient on the childless dummy variable that children
The age at first variable suggests an increase in wages of 0.70 percent for every year that one prolongs childbirth. By grouping women into categories based on the age at which the bore their first child, it is possible to arrive at more significant conclusions from this coefficient. When developing age group categories I mimicked the work of Blackburn using the 18-21 year old category as a control, grouping childless women together, and then creating a group for 22-26 year olds. Blackburn’s fourth group included women who gave birth on or after their twenty-seventh birthday, however I split this category up into women who gave birth between the ages of 27-30 and then after their 31st birthday to have relatively equal amounts of women in each category. I then calculated the expected value for age at first birth for each category of women (19, 24, 28, 34), giving an average age with which I could calculate differences between age groups. By taking the expected value for age at first birth and multiplying it by the coefficient for age at first birth I

<table>
<thead>
<tr>
<th></th>
<th>Column (1)</th>
<th>Column (2)</th>
<th>Column (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years of Education</strong></td>
<td>0.0933 (0.00)</td>
<td>0.0898 (0.00)</td>
<td>0.0955 (0.00)</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
<td>0.0164 (0.00)</td>
<td>0.0142 (0.00)</td>
<td>0.0194 (0.00)</td>
</tr>
<tr>
<td><strong>Single mom</strong></td>
<td>-0.0168 (0.56)</td>
<td>-0.0380 (0.38)</td>
<td>0.0038 (0.91)</td>
</tr>
<tr>
<td><strong>Minority</strong></td>
<td>-0.1441 (0.00)</td>
<td>-- (-- (--)</td>
<td>-- (--)</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>0.2923</td>
<td>0.2383</td>
<td>0.3308</td>
</tr>
</tbody>
</table>

- p-values are reported in parentheses
- column (1) = equation estimated for the entire sample (1348 observations)
- column (2) = equation estimated for white women (840 observations)
- column (3) = equation estimated for minority women (508 observations)
- minority in column (1) is a dummy variable equal to one if the individual is a minority
generated a value of the coefficient for each age group and then examined the differences between the coefficient for the 18-21 year old group and the remaining three. A sample calculation is shown below:

\[ \beta(\text{age at first birth}) \times (24) - \beta(\text{age at first birth}) \times (19) \]

\[ .0070 \times (24) - .0070 \times (19) \]

\[ = .0035 \]

3.50% difference in wage attainment

This same calculation was performed on all age groups and childless women using the coefficients on age at first birth from column one and column two.

The estimated regressions suggest that age at first birth continues to have a strong positive impact on wage attainments. The initial regression predicts that women who give birth between 22 and 26 will attain roughly 3.5% higher wages compared to women who bear children earlier. For the older age groups the results are even more significant with a difference of 6.3% for those who gave birth between 27 and 30 and a 10.5% difference for women who gave birth after their 31st birthday. Finally, women who remain childless are predicted to earn roughly 10.3% more than women who bear children between the ages of 18 and 21. Performing the same calculations using the coefficients from the equation estimated for white women only produces even larger differences in wages for late childbearers. This equation predicts a difference in wages of 7.2% for the 22-26 group, 12.9% for the 27-30 category, 21.5% for the 31 and older group, and finally 20.8% for childless women. It is important to note that the coefficients on the variables controlling for years of education and work experience are relatively
similar across all three equations indicating that there is a significant difference in the relationship between age at first birth and wage attainment for whites and minorities.

Equation one raises some questions of endogeneity as well as issues of selectivity due to the fact that it was performed only on working women. I generated three interaction terms, interacting age at first birth with education and experience and then childless with education. The results of these equations are shown in Table 3. Use of interaction terms yielded no significant results when interacting age at first birth with work experience or childless with years of education. However, the table below does indicate a relatively significant result for the interaction term between age at first birth and education. The results in column one show that for every year that a woman forgoes childbirth her returns to education increase by roughly 0.2%.

**Table 3**: Wage equation estimates for working women using interactive specifications and OLS; the dependent variable is natural log of hourly earnings; p-values are in parentheses

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at 1st Birth</td>
<td>-.0163</td>
<td>.0072</td>
<td>.0123</td>
</tr>
<tr>
<td></td>
<td>(0.28)</td>
<td>(0.02)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Childless</td>
<td>--</td>
<td>.1566</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.38)</td>
<td></td>
</tr>
<tr>
<td>Years of Education</td>
<td>.0410</td>
<td>.0918</td>
<td>.0925</td>
</tr>
<tr>
<td></td>
<td>(0.21)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Experience</td>
<td>.0157</td>
<td>.0164</td>
<td>.0311</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>Single mom</td>
<td>-.0258</td>
<td>-.0172</td>
<td>-.0265</td>
</tr>
<tr>
<td></td>
<td>(0.44)</td>
<td>(0.55)</td>
<td>(0.43)</td>
</tr>
<tr>
<td>Minority</td>
<td>-.1131</td>
<td>-.1438</td>
<td>-.1141</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Interaction: AB x Years Ed</td>
<td>.0019</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction: Childless x Years Ed</td>
<td>--</td>
<td>.0065</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.61)</td>
<td></td>
</tr>
<tr>
<td>Interaction: AB x Exp</td>
<td>--</td>
<td>--</td>
<td>-.0006</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.15)</td>
</tr>
<tr>
<td>R²</td>
<td>.2904</td>
<td>.2625</td>
<td>.2901</td>
</tr>
</tbody>
</table>

* The equations in columns one and three were estimated without the variable for childless women and therefore only observations for women who had children were used
To further deal with issues of endogeneity, I also attempted to instrument age at first birth with variables controlling for mothers education, fathers education, and the hourly wage of the spouse. Performing a two stage least squares regression yielded no significant results as it produced a coefficient for age at first birth roughly ten times larger than any other regression. Also, I witnessed a significant drop in the coefficient on years of education which leads me to conclude that in the instrumental variable regression the coefficient on age at first birth was picking up a significant portion of the effects of education.

The other issue raised from the estimation by equation one is the potential for selectivity issues. Equation one was estimated only using a sample of working women which could cause sample selection bias. In order to try and correct for any possibility of issues dealing with selectivity, I ran a Heckman selection regression in which I used mothers education, fathers education, and spouse’s hourly wage as determinants of working status not included in the wage equation. The results of the Heckman selection estimation are presented in Table 4. Comparing the results in table four to those in table two column one we can see that the coefficients do change as a result of the selectivity correction. We see a large increase in the coefficient on the variable for controlling for childless as well as an increase in the coefficient on age at first birth.
The second indicator that I analyzed trying to examine the relationship between age at first birth and labor market outcomes was labor force participation. To do this I estimated the following equation:

\[
\text{Probability(working)} = \beta_1 + \beta(\text{Age Birth 22-29}) + \beta(\text{Age Birth 30+}) \beta(\text{childless}) + \beta(\text{years of education}) + \beta(\text{day care}) + \beta(\text{high school grad})
\]

Equation two is estimated with a probit model assuming the latent variable, probability to work, is distributed according to a normal distribution. The results are shown in table 5. In this case I use dummy variables to represent the categories grouping women by their age at first birth. This is consistent with Blackburn’s approach and while he does not perform any regressions involving labor force participation, he uses a very similar methodology for examining the relationship between age at first birth and education. The results of the labor force participation equations are not exactly as expected seeing that

<table>
<thead>
<tr>
<th>Corresponding OLS Equation</th>
<th>Table 2; equation 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rho</td>
<td>-0.4172</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>-2143.48</td>
</tr>
</tbody>
</table>

- mothers education, fathers education, and spouse’s hourly wage were used as indicators of working status not in the original wage equation
- p-values are report in parentheses; for Rho where the standard error is reported
Table 5: Labor force participation estimations using the probit model; the dummy variable is a zero one dummy representing whether or not the individual is working.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childless</td>
<td>0.061</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
</tr>
<tr>
<td>Age at 1st Birth 22-29</td>
<td>-0.050</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
</tr>
<tr>
<td>Age at 1st Birth 30 Plus</td>
<td>-0.092</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
</tr>
<tr>
<td>Years of Education</td>
<td>0.0216</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
</tr>
<tr>
<td>Day Care</td>
<td>0.121</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
</tr>
<tr>
<td>High School Grad</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

- reported coefficients represent the change in the probability of the dummy variable
- day care is a zero one dummy controlling for individuals using childcare services outside of themselves
- high school grad is a zero one dummy representing individuals who graduated high school or have a GED

There are negative coefficients on the dummy variables for the age at first birth categories 22-29 and 30 plus. A positive coefficient on the childless variable is consistent with theory in that women who do not have children are more likely to work than those who do. However, this regression suggests that the older a woman starts family formation the less likely she is to work, and this does not seem consistent with empirical evidence. One possible explanation for the negative coefficients for later childbearers is that I am examining a cohort of women who are currently 35-50 and those who women who had their first child after the age of thirty are more likely to be in the early stages of family formation when it is more likely that they have not returned to work. A more accurate measure of the working variable would be whether or not the individual had every worked at all during her lifetime including prior to pregnancy, however, the cross sectional data limits the scope of the regression. A more thorough analysis using panel data is necessary to yield significant results. However, it is worth noting that the
percentage of women who are working among those who have children and those who do not is very similar. Roughly seventy-seven percent of the women in the sample who are childless are working. This number is almost identical to the roughly seventy-six percent of women in the sample who have children that are currently employed.

V.III) Education and Degree Attainments

The final instrument that I examined in trying to analyze the relationship between age at first birth and labor market outcomes was their educational and degree attainments. I estimate the following equations in this section:

\[
\text{Years of education} = \beta(Age \text{ at } 1^{st} \text{ Birth 22-26}) + \beta(Age \text{ at } 1^{st} \text{ Birth 27-30}) + \beta(Age \text{ at } 1^{st} \text{ Birth 31+}) + \beta(\text{childless}) + \beta(\text{mothers education}) + \beta(\text{fathers education}) + \beta(\text{singlemom}) + \beta(\text{minority})
\]  

\[
\text{Probability (college degree)} = \beta(Age \text{ at } 1^{st} \text{ Birth 22-26}) + \beta(Age \text{ at } 1^{st} \text{ Birth 27-30}) + \beta(Age \text{ at } 1^{st} \text{ Birth 31+}) + \beta(\text{childless}) + \beta(\text{mothers education}) + \beta(\text{fathers education}) + \beta(\text{singlemom}) + \beta(\text{minority})
\]  

I estimated equation three using a tobit regression since years of education are truncated. The lower limit of my tobit regression was zero years of education and the upper limit was twenty-one years. Equation four was estimated using a probit model assuming the latent variable, the probability of attaining a college degree, was distributed according to a normal distribution. Each of these equations using the exact same independent variables and all are dummies. I choose to use dummy variables for age at first birth because they provided the best results and it was consistent with the methodology used in
Blackburn’s model. The results of both equations are presented in Table 5 with column’s one through three showing the results of the probit model and columns four and showing the results of the tobit regression.

**Table 5:** Educational attainment equations for women by age of first birth. Columns 1-3 present the probit model and columns four and five present the tobit model.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at 1st Birth 22-26</td>
<td>.1044</td>
<td>.1170</td>
<td>.0725</td>
<td>.3843</td>
<td>.5549</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.06)</td>
<td>(0.07)</td>
<td>(0.02)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Age at 1st Birth 27-30</td>
<td>.2714</td>
<td>.2918</td>
<td>.2242</td>
<td>1.154</td>
<td>1.35</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Age at 1st Birth 31+</td>
<td>.3486</td>
<td>.4057</td>
<td>.1774</td>
<td>1.469</td>
<td>1.86</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Childless</td>
<td>.1683</td>
<td>.1799</td>
<td>.1355</td>
<td>.7320</td>
<td>.9000</td>
</tr>
<tr>
<td></td>
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<td>(0.01)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Mothers Education</td>
<td>.0144</td>
<td>.0157</td>
<td>.0109</td>
<td>.1421</td>
<td>.155</td>
</tr>
<tr>
<td></td>
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<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Fathers Education</td>
<td>.0163</td>
<td>.0239</td>
<td>.0066</td>
<td>.0981</td>
<td>.133</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Single mom</td>
<td>-.0761</td>
<td>-.0117</td>
<td>-.0585</td>
<td>-.2524</td>
<td>-.146</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.74)</td>
<td>(0.02)</td>
<td>(0.03)</td>
<td>(0.38)</td>
</tr>
<tr>
<td>Minority</td>
<td>-.0465</td>
<td>White</td>
<td>Minority</td>
<td>-.0900</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>White</td>
<td>(0.42)</td>
<td>(0.03)</td>
<td>White</td>
</tr>
</tbody>
</table>

- Age at first birth categories represent zero one dummy variables
- An individual is said to have obtained a college degree if they earned a minimum of an Associates degree
- Columns (1) – (3) represent the probit model run on the entire sample, whites, and minorities respectively
- P-values are reported in parentheses

The results of the education and degree attainment regressions are consistent with expectations showing an increased probability of obtaining a college degree for those who prolong childbirth and consequently late childbearers on average attain more years of education. Those women who remain childless also show increased educational attainments compared to women who began the process of family formation between the ages of 18 and 21 as well as 22-26. While it would be beneficial to be able to measure degree attainment beyond just an associate’s degree, it is difficult to do so with the
current sample. Less than a third of respondents obtained any sort of college degree and less than two percent of the sample obtained anything higher than a bachelor’s degree. All results for the equations in columns one through five are significant at the ten percent level with a majority also being significant at the five percent level. This result confirms that there is a strong correlation between age at first birth and educational attainment, which in turn supports helps support the notion that age at first birth acts both directly on wages as well as through indirectly through human capital acquisition.

**VI. Conclusions**

The initial question that this paper attempted to answer was how has the relationship between fertility timing and the career attainments evolved over the past several decades. The results from this analysis are consistent with those from previous studies and show that despite significant advancements by women in terms of career potential, there is still a significant positive relationship between age at first birth and wage attainment. However, while the analysis shows that a relationship does exist, the magnitude of the relationship differs from previous studies. The most thorough study that I have found to date is the previously referenced 1993 study by Blackburn, Bloom, and Neumark so when comparing coefficients I am referring the results obtained by their analysis. It is also important to note that Blackburn’s study focused only on white women and therefore in drawing conclusions I am only using the results obtained for equations run solely on white women as well.

When examining the magnitude of the relationship between age at first birth and wages for white women, I found that my results show an increase in the magnitude of the relationship over those from Blackburn’s study. For women who gave birth between the
ages of 22 and 26, I found that they can expect a wage differential of roughly seven percent compared to those women who gave birth between eighteen and twenty-one, while Blackburn’s model shows a wage differential of only one percent. For late childbearers, Blackburn found similar results between them and those women who remain childless showing that each group can expect to earn roughly 14% more than their early childbearing counterparts. My analysis shows similar results for late childbearers and childless women, however the magnitude is larger showing wage differentials of 21.5 and 20.8 percent respectively. I believe one possible explanation for the increase in the magnitude of the coefficients is the fact that women have made drastic advancements in career and earnings potential through more human capital acquisition as well as the elimination of gender barriers in the workforce. As a result, the opportunity costs to childbearing have increased and therefore women who have children, especially those who have them young, are foregoing more potential earnings that those women from previous cohorts. This theory reinforces the notion that human capital attainment prior to your first pregnancy is critical to an individuals overall professional success. Thus, women who delay childbearing and invest in human capital are now experiencing greater returns than ever before, and as a result there has been an increase in the wage differential between early and late childbearers as well as childless women.

While these results can only be stated with statistically certainty for white working women, my analysis has some consistencies with previous studies in regards to the relationship between age at first birth and wages for minorities. A previously mentioned study by Calhoun in 1988 showed that the opportunity cost of child bearing was much less for minority mothers and therefore the magnitude of the relationship was
significantly less than white women. His results were in terms of forgone earnings and showed that African Americans forgo only twenty percent of the overall earnings that their white counterparts do when bearing a child. The fact that my wage equation for minorities shows no significant relationship between age at first birth and wages could also be evidence to the fact that this relationship is much less ambiguous amongst minority populations. Perhaps another worthwhile study is to examine how this relationship has evolved solely for minority populations over the past several decades given the advancements they have made in the labor force as well.

The other significant result from my analysis was the positive effect that prolonging childbearing had on the educational attainments of white women. Blackburn’s study did not look at degree attainments, so it is impossible to compare cohorts, but my analysis does show a significant impact on the probability of an individual obtaining a college degree based on her age at first birth. The results show that women who prolong childbearing are more likely to obtain higher education, and invest in human capital. In Blackburn’s model he measured human capital accumulation primarily through the number of years of education as well as the number of years of experience. He also had the benefit of a variable controlling for career training in his data set that I did not have at my disposal. In my analysis my primary measure of human capital accumulation was education and as previously mentioned I estimated an equation for years of education using the tobit model. My results are consistent with Blackburn’s showing the largest gain in human capital by those women who gave birth following their thirtieth birthday. Both my analysis and Blackburn’s model showed that the next largest gain was seen by childless women and then finally by those who gave birth between 22
and 26. All groups saw statistically significant human capital accumulation greater than the omitted category of 18-25. The magnitude of my coefficients on the age at first birth dummy variables show a reduction in the relationship between age at first birth and the years of education attained. My analysis suggests that women who gave birth between 22 and 26 only gain on average a half year more of education, compared to 1.26 years in Blackburn’s study. Results from Blackburn’s study indicated that late childbearers (age twenty-seven and up) acquire on average 2.3 more years of education while my analysis suggests an increase ranging from 1.35-1.86 years. Finally the difference in years of education attained by childless women compared to early childbearers is much less in my analysis showing only a difference of .90 years compared to roughly 2.2 years in Blackburn’s study. It is important to note that while the gap in the number of overall years of education has declined, the return on the investment in education has remained roughly the same. Blackburn’s interaction term of age at first birth with education indicates a 2.9% increase in the return to education for late childbearers while my analysis suggests a 2.4% increase in the return. I believe that one possible explanation for the decrease in the gap in years of education attained is the overall increase in education of women over the past forty years. Now more than ever women are encouraged to seek higher education and the opportunities to do so have been made more readily available to them. Along with the increase in the education of women, the past fifteen years have seen an increase in the overall accessibility of education for everyone. More universities are making themselves accessible to adults returning to school and certain universities have developed to cater specifically to this group of people. Also, with the development of the internet people can now obtain degrees online from their
own home which theoretically could significantly reduce the effect of children on the amount of education available to an individual.

My analysis seems to conclude that the advancements that women have made over the past few decades have had conflicting effects. With women making significant expansions in career and earnings potential, they have increased the opportunity cost of childbearing and therefore the direct effect of childbearing on wages seems to have increased. However, as women have been encouraged to seek higher education and opportunities to do so have become more readily available the magnitude of the effect on human capital accumulation seems to have diminished. A more advanced study could look at just how these two effects interact and see if one outweighs the other.

Despite advancements made by women in the labor force, it seems evident that there still is a conflicting nature between the pursuit of a career and family development. Theory predicts that much of the effect of age at first birth on career attainments acts through human capital acquisition. While changing attitudes and new legislation have led to an increase in wages and a reduction in the effects on human capital accumulation, an elimination of this effect all together may be difficult. Policy makers may have little influence over the indirect effect of children on wages. While they can potentially shorten absences from the labor force, it is shown that the rate of growth of human capital only declines after pregnancy. Therefore, the major conclusion that one can draw from all of this is that the early years of a woman’s career remain essential to human capital acquisition, and it is the amount of working experience, education, training, etc that she has acquired by the time of her first pregnancy that will have the greatest effect on her overall labor market outcome.
Works Cited


