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IMPACT OF CHILD BIRTHS ON THE HEALTH AND JOB PERFORMANCE OF ACTIVE AND RESERVE MARINES

by

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Talent management is a primary concern for the United States Marine Corps. According to the Department of Defense 2018 demographics, of the 185,415 Marines serving on active duty in 2018, 25.5% of them have at least one child. In order to maintain the health and performance of these Marines, continuous review of standing policies needs to occur to ensure that they are supported in times of transition both during the pregnancy and during the recovery process. The goal should be for Marines to recover to pre-birth capabilities upon return to work. In conjunction with previous work, this thesis provides guidance on how child births affected first-term parents who were active and reserve Marines from January 2010 to October 2019. Previous results showed significant health impacts for first-time Marine parents. The differences in policies for active duty and reserve Marines should provide guidance on how contract differences affect recovery time and job performance between these two groups and different categories of reserve Marines.

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IMPACT OF CHILD BIRTHS ON THE HEALTH AND JOB PERFORMANCE OF ACTIVE AND RESERVE MARINES

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ABSTRACT

Talent management is a primary concern for the United States Marine Corps. According to the Department of Defense 2018 demographics, of the 185,415 Marines serving on active duty in 2018, 25.5% of them have at least one child. In order to maintain the health and performance of these Marines, continuous review of standing policies needs to occur to ensure that they are supported in times of transition both during the pregnancy and during the recovery process. The goal should be for Marines to recover to pre-birth capabilities upon return to work. In conjunction with previous work, this thesis provides guidance on how child births affected first-term parents who were active and reserve Marines from January 2010 to October 2019. Previous results showed significant health impacts for first-time Marine parents. The differences in policies for active duty and reserve Marines should provide guidance on how contract differences affect recovery time and job performance between these two groups and different categories of reserve Marines.

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LIST OF ACRONYMS AND ABBREVIATIONS.

CFRA	California Family Rights Act
CFT	Combat Fitness Test
COLA	Cost of Living Allowance
DEP	Delayed Entry Program
DoD	Department of Defense
DADT	Don’t Ask, Don’t Tell
FMLA	Family and Medical Leave Act
FPD	Frankfort Police Department
FITREP	Fitness Report
IMA	Individual Mobilization Augmentee
IRR	Individual Ready Reserves
PFL	Paid Family Leave
PFT	Physical Fitness Test
NDAA	National Defense Authorization Act
SMCR	Selected Marine Corps Reserves
TFDW	Total Force Data Warehouse
USMC	United States Marine Corps

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I. INTRODUCTION

For several decades now, leading corporations have focused efforts on building and sustaining human capital within their organizations. A major study, surveying over 300 corporations, discussed the biggest challenges faced by their organizations of which the leading response was "finding the right number of leaders". Other major concerns remaining relevant as demographics and workforce preferences change over time (Stahl et al, 2012, p4). The same efforts used to implement new technologies and globalize corporations, should also match the efforts of improving talent management and human resources for the employee. This sentiment is mirrored by the Commandant's concern of our current antiquated manpower model, retaining Marines based off experience and time served, not talent management and performance (Commandants Planning Guidance, 2019, p. 7). Similar to other competitive firm, our enterprise has to maintain and support its primary commodity. It is a business of people, without which, the mission will not be supported.

The Society for Human Resource Management (SHRM) conducted a survey of employers that enhanced employee benefits to recruit and retain top talent. According to Karen Wessels, a senior research specialist leading the project, 28 percent of the corporations enhanced benefits by improving leave and family benefits (Miller, 2018, para. 4). In line with previous thesis work conducted and societal changes in response to talent management, this thesis focuses on the effect's births have on Marines and how appropriate benefits and policies can support Marines and facilitate retention. As the current parental policy is under review, the outcomes of this thesis will lend guidance on how to move forward with enhanced benefits based off health and performance outcomes.

A. PURPOSE

The purpose of my thesis is to analyze the effects childbirth has on active duty and reserve Marines as well as provide results and recommendations that can help shape future policy. My analysis will help formulate opportunities for talent management and increase retention of our current service members. The Marines, as well as the overall U.S. Armed

Forces, should provide every opportunity for our volunteer force to be successful, particularly in areas of work-family life balance. We need to understand that Marines have other options within the workforce; therefore, we must be cognizant to meet and maintain the livelihood of our Marines similar to options available other career fields. Military service is unlike any other calling, which is why we should strive even harder to support our Marines and their families. As found in my research, federal and state policies are insufficient and outdated compared to Department of Defense (DoD) policy, and private industry has paved the way for unprecedented support through paid paternal and maternal leave policies. Without sacrificing our mission of being "America's expeditionary force in readiness" (Marines, 2020, middle of page) and our ability to maintain readiness standards to "win our Nation's battles swiftly and aggressively in times of crisis" (Marines, 2020), we should implement every policy that would take care of our troops and their families.

B. SCOPE AND METHODOLOGY

Panel data methods were used to analyze data from January 2010 to October 2019 for active-duty and reserve Marines. Through analysis of 27.3 million observations, by running time series regressions, I extrapolate insights into the research by analyzing the effects of first-time childbirth on outcomes of a combined fitness performance metric and job performance metric. The data was used to analyze effects on active-duty male and female Marines, reserve male and female Marines, and to conduct subgroup analysis on four military occupational specialty (MOS) groups: aviation MOS', combat service support MOS', combat MOS', and other MOS'. The models are presented as event study regressions, tracking Marines over a period of time and parsimonious models.

C. RESULTS AND FINDINGS

For both male and female Marines, there is a decrease in fitness performance outcomes compared to their previously performed outcomes as identified between -24 to 10-months before childbirth. There was another decrease immediately following childbirth. Active-duty male Marines recovered to previously performed outcomes within the 13 to 24 months post-childbirth. Overall, female Marines, based off their combined fitness outcomes, did not return to previous outcomes within the 24-month period post-

childbirth. However, the range of points equate to a 10.73-point difference for physical fitness test (PFT) scores and a 7.02-point difference for combat fitness test (CFT) scores. For reference, the term "at the margins" is defined as the border between first, second, and third-class fitness evaluation scores. Therefore, Marines that perform at the margins can experience negative affects due to potential changes in classes of scores. See Tables 13 and 9 (p.49) for reference conversions of fitness test scores.

D. ORGANIZATION AND CHAPTERS

The introduction, Chapter I, provides an overview of the entire thesis for ease of reading and understanding. Next, I conduct a thorough review of the evolution of DoD policies, demographics of the Marine Corps and comparable workplace policies developed in the civilian sector. In Chapter III, I explain the data resourced and the methodology used to analyze that data. Chapter IV presents the results of my analysis and lastly, Chapter V gives the recommendations and future research opportunities as well as a conclusion for my thesis.

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II. LITERATURE REVIEW

Childbirth is a life-changing experience. Bringing a new baby into the world can be a joyful experience, but also a very challenging and chaotic time for new parents. Several factors, such as loss of sleep, financial stress, family support, career influence, and health concerns, can determine what kind of stressors a family faces and what coping mechanism they need to handle such issues. While research focuses on overall family concerns regarding childbirth, this literature review will focus on the effects of childbirth for families who have high-risk or high-demanding careers, similarly to that of military service members. Careers such as police officers, firefighters, and federal employees that work for agencies such as the Federal Bureau of Investigation, all face challenges comparable to service members. Not to undervalue the level of stress experienced by those in other career fields but added factors such as deployments, hostile work environments, irregular work hours, self-sacrifice, and potentially inadequate pay, help align this research to make for a more reasonable comparison against civilian organizations. Of note, there is not a significant amount of research published on these specific career fields; however, it is important to analyze the differences in policies across similar career fields to show how effective they are at meeting the needs of their employees and families. The comparison of the career fields to the military provides context as to whether the DoD is ahead or behind industry standards.

A. BACKGROUND

While the DoD undergoes various maternity and paternity leave policy changes, the Marines continue to place priority on retention of personnel to maintain a ready force and counter employment opportunities from the civilian world. The wellbeing of a Marine's family is a primary concern when it comes to retention of Marines and it is imperative that the Corps recognize the challenges families face. Similarly, the Corps should implement policies that mitigate family stressors, primarily after childbirth. Such stressors can make Marines less effective and ready when returning from maternity/paternity leave; often resulting in Marines departing service completely. The

primary focus for Marines should be mission accomplishment in lieu of all other priorities and roadblocks to mission accomplishment should be mitigated. Childbirth is a major life changing event and, in order to maintain mission readiness, there must be a balanced level of preparedness and effectiveness, mental toughness and stability. A childbirth drastically changes the lifestyle of Marines and every effort should be made to provide familial support to lessen the takeaway from work. As times have changed, the landscape of society has demanded that corporations and organizations better value their members, this sentiment is inclusive of family welfare and not just that of the employee. A holistic approach to the welfare of the Marine means that families also must be a priority.

1. Evolution of Policy Changes

> We have incredibly talented women who want to serve, and they also want to be mothers and have the time to fulfill that important role the right way. We can do that for them. Meaningful maternity leave when it matters most is one of the best ways that we can support the women who serve our country. This flexibility is an investment in our people and our Services, and a safeguard against losing skilled service members
>
> Secretary Ray Mabus,
> —Capitol Hill Testimony

The quote above shows how far we have come, not just in valuing female service members, but realizing that the Corps' mindset must evolve to remain an attractive option for employment. Prior to 2009, there were no provisions for paternity leave that allowed fathers to take a paid leave of absence after having a child. Standing guidance allowed for submission of annual leave, charging the secondary caregiver (fathers) annual leave balance which accrues at a rate of 2.5 days per month. According to the FY2009 National Defense Authorization Act, "a married member of the armed forces on active duty whose wife gives birth to a child shall receive 10 days of leave to be used in connection with the birth of the child" (Kapp et al, 2008).

Former Secretary of the Navy, Ray Mabus increased maternity leave to an unprecedented 18 weeks of leave for mothers (Rhodan, 2015) and increased paternity leave

from 10 to 14 days for secondary care givers. In 2016, Secretary of Defense Ashton Carter, sought additional policies for maternity and paternity leave. As part of the "Force of the Future" , which sought to recruit talented candidates and retain current talent within the DoD, the new policy changed maternity leave to 12 weeks from the previous 18 week convalescent period authorized for the primary care giver. Another change passed in P.L. 114-328, granting 6 weeks of leave for the primary caregiver of an adopted child and 21 days to the secondary care giver (Kamarck et al., 2017). To receive eligibility, the service member must be a part of an active component or a member of a reserve component under active status (Kamarck et al., 2017). This status will become very important during my analysis of how reserve members of the Marine Corps recover in comparison to active-duty members as the policy does not always pertain to them.

It is important to address the changes for same-sex Marine couples, beginning in 2011 when "don't ask, don't tell" (DADT) was removed. As the policy was rescinded, same-sex couples were afforded the opportunity to not only marry but also to request benefits on behalf of their spouses and future children. Due to the increase of benefits and making marriage and family an easier process from a policy standpoint, the number of families in the service increased.

Upon taking command in 2019, Commandant General David Berger, published future operating guidance for the Marine Corps. In this guidance, he stressed the importance of making families a priority.

> We should never ask our Marines to choose between being the best parent possible and the best Marine possible, these outcomes should never be in competition to the extent that success with one will come at the expense of the other. (Commandants Planning Guidance, 2019, p. 7)

Expansion of the current maternity leave policy is under evaluation as the Commandant is considering a one-year leave of absence for mothers. This would allocate adequate recovery time for factors such as health, bonding time, mental status, etc. When making these evaluations, the Corps should also examine how an increase in leave time might negatively affect the service such as likelihood of return, career progression, and manning levels to cover gaps.

As research was being conducted on the history of policies, the USMC published a new Marine Corps Order, MCO 5000.12F, Marine Corps Policy Concerning Parenthood and Pregnancy. The new policy increases the post-birth recovery window to nine months, allowing new mothers more time before being required to perform a fitness test.

2. Demographics of USMC Families

> Since the advent of the all-volunteer force in the 1970s, marriage, parenthood, and family life have become commonplace in the U.S. military among enlisted personnel and officers alike, and military spouses and children now outnumber service members by a ratio of 1.4 to 1.
>
> The Demographics of Military Families and Children
> Institute for Veteran and Military Families, Syracuse University (2020)

In order to provide context to the reader, this section addresses the differences between active duty service and serving as a Marine in the reserves. While serving on active duty, Marines are retained by the service full time to perform their assigned military MOS or in a manner assigned to them at the time. Because of this, active duty Marines will depend upon current policies to afford them recovery time post-childbirth. For Marines serving in the reserve, several contracts fall under this category. Marines can serve as a part of the Selected Marine Corps Reserve (SMCR), Individual Mobilization Augmentee (IMA), Active Reserve (AR), or Individual Ready Reserve (IRR). For Marines serving as part of the SMCR, IMA or AR, their active-duty service time would permit them to the same rights as Marines serving on full-time active-duty orders. If a Marine's pregnancy or childbirth falls within this window, they will receive the same concessions for leave as active duty Marines. If Marines are not serving any of the afore mentioned capacities, they would be subject to their primary employments leave policy; for the sake of this research these Marines fall under a "civilian policy" and be categorized as such. Due to the variability in policies and lifestyle change comparison between active duty and reservist, the response to recovery time and overall effects post-childbirth should show the differences in recovery based on outcomes of these groups.

a. Active Duty Demographics

Serving in the U.S. Armed Forces is unique to any other career Americans may choose to undertake. Similarly, due to the unique nature of the job, families face challenges and hardships that most American families do not experience. In 2018, the active-duty force strength in the Marine Corps consisted of 185,415 Marines. Accompanying those Marines were 161,751 family members, 92,816 of which were children. 46.6% of those children were between the ages of zero to five years (DoD, 2018).

b. Reserve Demographics

In 2017, there were 101,751 total ready reserve Marines in Service. Ready reserve accounts for three categories: selected reserve, individual ready reserves, and other reserve categories. The selected reserve accounts for 34.77% of the reserve forces and encompasses the SMCR, IMA, and AR. The IRR accounts for 65.20% of the reserve force and these Marines fall into three categories. The IRR accounts for (1) Marines in the delayed entry program (DEP), prior to bootcamp, (2) Marines at the end of first enlistment retained for mission essential requirements, and (3) voluntarily serving in a contingency capacity (Department of Defense, 2017).

B. COMPARABLE WORKFORCE POLICIES

Childbirth is both mentally and physically demanding. Previous work, such as Capt Michael Larson's 2020 thesis on "Parenthood and Its Effects on Health and Performance in the U.S. Marine Corps," discusses the overall changes that first-time Marine mothers and fathers face regarding health and performance. I expound on those health challenges that affect both women and men in careers with high intensity and high-stress environments.

In the late 1970s it became apparent that pregnancy was a cause for discrimination in the workplace. To ensure women received the same rights as men for employment, the Civil Rights Act of 1964 was amended to include the Pregnancy Discrimination Act of 1978. The amendment was adjusted as follows, "the terms, 'because of sex' or 'on the basis of sex' include, but are not limited to, because of or on the basis of pregnancy, childbirth, or related

medical conditions; and women affected by pregnancy, childbirth, or related medical conditions shall be treated the same for all employment-related purposes, including receipt of benefits under fringe benefit programs, as other persons not so affected but similar in their ability or inability to work, and nothing of this title shall be interpreted to permit otherwise" (U.S. Equal Employment Opportunity Commission, n.d.). As will be discussed later in this section, even with laws in place, state and federal jobs still discriminated based on childbirth. "In 1984, the Women's Legal Defense Fund began the fight to draft legislation entitling eligible employees of covered employers to take unpaid, job-protected leave for specific family and medical reasons" (National Partnership for Women & Families, 2020). This legislation would come to be formally known as the Family and Medical Leave Act (FMLA) in January 1993 (National Partnership for Women & Families, 2020). This act affords employees twelve workweeks of leave in a 12-month period for such reasons as childbirth (U.S. Department of Labor, 2020). Some states have expanded their policies such as California's Paid Family Leave (PFL) which provides monetary benefits but not including job protection as with FMLA or California's Family Rights Act (CFRA). CFRA "authorizes eligible employees to take up a total of 12 weeks of paid or unpaid job-protected leave during a 12-month period" (Disability Benefits 101, n.d).

Research shows that federal and state careers over the years have afforded employees some degree of leave for child baring mothers while paternity leave is lacking. Until recently, leave was afforded as an out of pocket expense for most, meaning sick leave or personal days could be taken without compensation. Reviewing the Los Angeles Police Department's published policies, as one of the more progressive policies reviewed, "a pregnant employee may take a maternity leave of absence or use accumulated sick leave benefits at some percentage of their choice." If a policy is provided, the use of sick leave or personal leave without compensation is the norm. Outside of the DoD, in state and federal career fields, very rarely is there a leave system specifically designated for maternity or paternity leave, and in cases where maternity/paternity leave is provided, compensation is not provided. In reviewing policies, there is a lack of standardization or policies in place across states and departments. In most cases, where female employees are operating in these career fields, options for a change in placement to allow for light/limited

duty activities as the pregnancy progresses was not afforded to them or was viewed negatively as they could not complete their originally assigned duties. Conversely, most departments had a standing light/limited duty clause authorized for officers or firefighters with on-the-job injuries; however, this clause was not afforded to pregnant employees. For instance, a female officer of the Frankfort Police Department (FPD) was denied this opportunity upon becoming pregnant and requesting a modified assignment (American Civil Liberties Union, 2017). Let us consider the hazards of working as a police officer or firefighter and the unique circumstances that are specific to first responders: operation of firearms, daily exposure to dangerous situations, hazardous or corrosive materials, weight of personal protective equipment, excessive work hours, and external environmental stressors. Any career field that requires a level of physical activity that would naturally be modified by pregnancy should address alternative methods of employment for the safety of the employee and their co-workers. On average, a firefighter wears 45 to 77 pounds worth of personal protective equipment (Guerra, 2018). A Marine serving in the infantry carries a combat load ranging from 80 to 100 pounds and depending on the environment potentially heavier if required. While this does not apply to every Marine, all Marines are required to complete hikes with gear loads and expected to perform the same levels of fitness in regard to standardized physical tests such as the PFT and CFT regardless of pregnancy. Police officers are no different, for they are required to perform physical fitness requirements upon entry as well as perform their daily duties under an equipment load that ranges from 25 to 30 pounds (K. Barber, personal communication, April 13, 2020). This does not include officers assigned to special units such as special weapons and tactics teams. These challenges remain unique to these career fields. The jobs that should require the most concessions do not. The more progressive policies lie within private corporations using these types of policies as a promotion or recruiting tool, showing how working for their company will provide added support and benefits to their employee's families.

Through salary comparison, DoD service members are supported more financially and traditionally earn higher wages than both firefighters and police officers due to housing allowance, cost of living allowances (COLA), allowance for subsistence, medical benefits, and other pay and incentives. Marines, depending on geographical duty station location

and rank receive these additional benefits as a part of their salary. Conversely, police officers do receive comparable medical benefits (A. Gotelli, personal communication, April 24, 2020) without other incentive pay whereas firefighters do not receive any incentives in comparison to military service members (A. Gonzales, personal communication, April 24, 2020). While this does not account for all situations, entry-level Marines benefit from a robust maternity/paternity policy by offsetting cost that their civilian counterparts may experience. According to the U.S. Bureau of Labor Statistics in 2019, the median annual wages for police and detectives were $65,170, while firefighters made significantly less at $50,580 (U.S. Bureau of Labor Statistics, 2020). Unpaid policies cause undue stress on families that want to serve their country in any capacity, federal, state, or military. The DoD provides this to members of the armed forces not only through paid leave opportunities but through additional pay benefits.

Finally, the research shows that the DoD is leading the way in progressive policies for both the primary caregiver and the secondary caregiver in comparison to similar civilian careers. Largely, federal employees are not supported with transitions from full duty status to light/limited duty status or provided paid leave options. Currently, the new federal policy for paid paternal leave in connection with birth, adoption, or foster care placement should go into effect October 2020 (Cabaniss, 2019). The new federal policy is currently in review as certain government entities were not accounted for and not all federal employees will receive benefits at this time.

III. DATA AND METHODOLOGY

A. DATA DESCRIPTION

The data used for this thesis was provided by the Marine Corps' Total Force Data Warehouse (TFDW) and expands upon the original data set used by Capt Michael Larson (2020) to further the analysis on health and performance changes before and after birth for first-time active-duty Marine parents. I will use the previous data collected by Capt Larson, as well as an additional three years ranging from January 2010 through December 2012 and April 2019 through October 2019. This updated dataset will continue to cover monthly observations for all active-duty Marines from January 2010 through October 2019. To expound upon the previously conducted research, I will use this dataset with matching variables to analyze the health and performance changes before and after birth for first-time reserve Marine parents. The period used for reserve data, parallels the active-duty data, January 2010 through October 2019. The data includes the following demographic variables for every Marine: age, gender, rank, race/ethnicity, marital status, general classification scores (measures of intelligence), education status, and service type (active or reserves). To create two distinct groups (the "treated" parents and the "control" non-parents) for analysis, the dataset includes the following dependent variables: date of birth, gender, race/ethnicity, location, and if the spouse is dual military or married to a civilian. Other variables used in this thesis are individual PFT scores and CFT scores which are standardized to create a combined fitness score, as well as fitness report data (FITREP) and performance and conduct scores (PROCON) which tracks the Marines performance evaluations (Larson, 2020). Both the FITREP and PROCON scores will be standardized to create one job performance rating for Marines. Due to the nature of my analysis, observations are defined as month by month time periods to facilitate changes that Marines experience directly aligned to pre-birth and post-birth monthly time periods. All time periods will drive outcomes regarding PFT and CFT scores as well as performance evaluations.

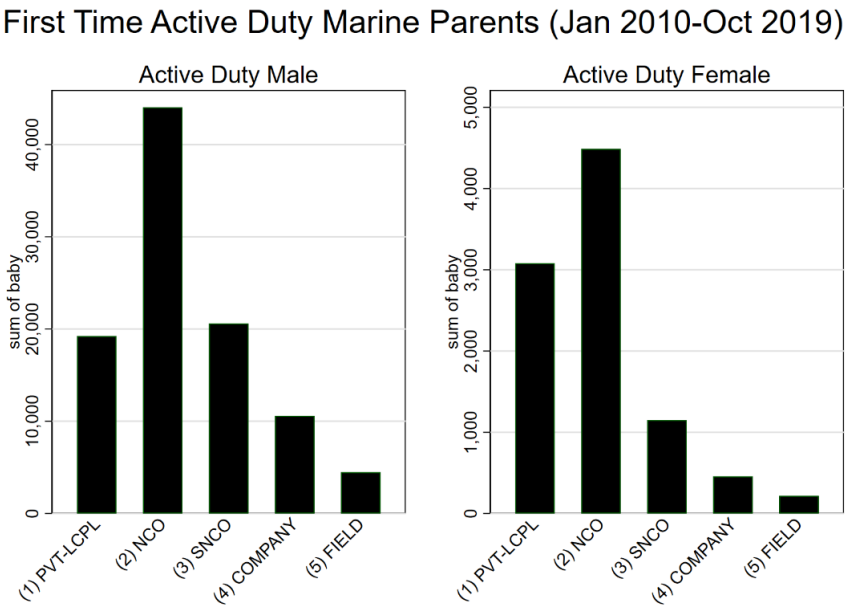
In the first model, my preferred analysis requires that we observe the new parents for at least 12 months before and 12 months after the birth. This restriction allows for a specific

observation window in order to prevent evaluating new parents that immediately join or depart the military. In the second model, a more restrictive sample is used. I limit the analysis to parents who stay in the Marines at least 24 months after the birth, this ensures the changes are not driven by parents departing the Marine Corps. Since the research is focused on first-time parents, any Marines without children or who we do not observe having a baby, will be considered non-parents and a part of the control group for this study.

1. Summary Statistics

The data sourced from TFDW ranged from January 2010 to October 2019. The data covers all Marines on active-duty or reserve SMCR, IMA, and AR orders. For general understanding, the total number of babies born in perspective to service type, gender, and rank are show below.

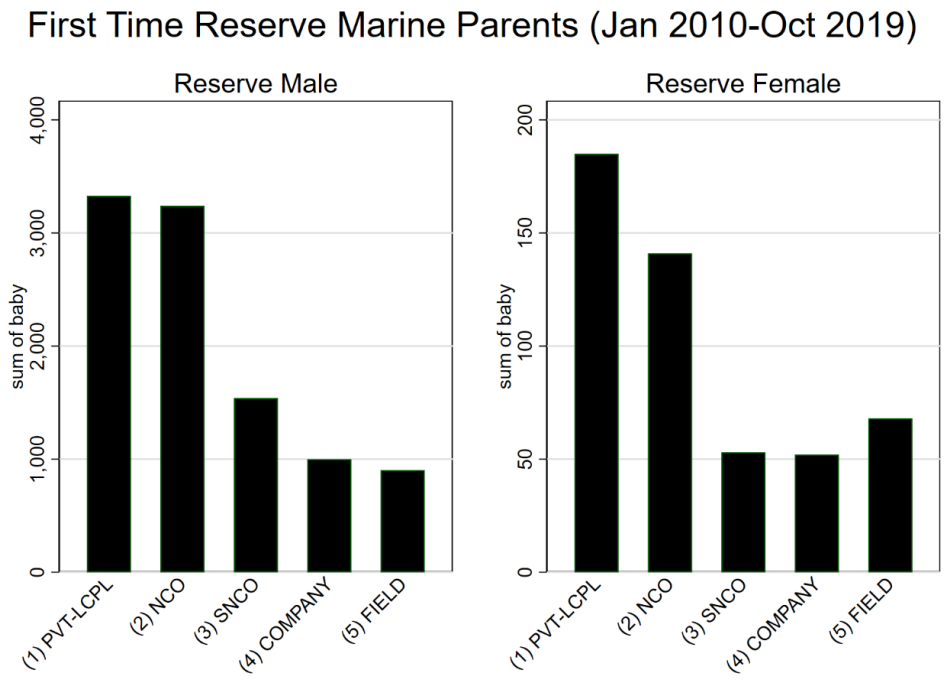
Figures 1 and 2 display the rank distribution of first-time parents by gender and rank for active and reserve components, respectively. The figures demonstrate that families are a major part Marines lives. Comparably, the non-commission officer (NCO) ranks, experience highest number of births during this period among active duty. In the Marine Corps, NCO covers most of the young population of Marines, ranging from 20 to 25 years of age.



Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 1. First Time Active-Duty Marine Parents.

The same is shown with the reserve data in Figure 2, but higher ranks also experience first-time childbirths at a higher rate.



Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 2. First Time Reserve Marine Parents

Below are descriptive statistics tables for active-duty male and female Marines, and reserve male and female Marines in the sample. Each table compares the treatment group (Marines experiencing first-time births) and the control group (Marines never having a child or had a child prior to January 2010). The values in column one and two show the mean values for each variable followed by their standard deviations. The third column in each table gives the differences in coefficients and the corresponding T-statistic, showing statistical significance. The higher the statistical significance, the more likely the treatment group and control group differ from one another.

The descriptive analysis for active-duty fathers shows that Marines in the control group scored higher on AFQT scores while new fathers scored higher on GCT scores. New fathers have a higher education, are older, likely to be an officer, and new fathers are likely from the aviation MOS group or the other MOS group in comparison to combat arms MOS' and combat service support MOS'.

Table 1. Descriptive Statistics: Active-Duty Male Marines

	Active-Duty New Fathers	Controls	Difference between Fathers and Controls
	Mean/SD	Mean/SD	Coeff Diff/ T-Statistic
AFQT Score	56.058	59.644	3.586***
	(25.882)	(21.712)	(23.705)
GCT Score	110.757	107.045	-3.713***
	(14.013)	(19.271)	(-28.314)
Some College	0.035	0.034	-0.001
	(0.184)	(0.182)	(-0.692)
College	0.149	0.065	-0.085***
	(0.356)	(0.246)	(-48.542)
Age	22.351	21.550	-0.801***
	(4.113)	(5.291)	(-22.214)
Married	0.279	0.166	-0.113***
	(0.448)	(0.372)	(-43.399)
African American	0.096	0.093	-0.003
	(0.294)	(0.290)	(-1.390)
Hispanic	0.130	0.148	0.017***
	(0.337)	(0.355)	(7.125)
Officer	0.135	0.048	-0.087***
	(0.341)	(0.213)	(-57.095)
Year	2010.826	2012.991	2.165***
	(1.420)	(3.201)	(100.303)
Number of Kids	0.006	0.218	0.212***
	(0.098)	(0.707)	(44.656)
Combat MOS	0.278	0.331	0.053***
	(0.448)	(0.471)	(16.378)
CSS MOS	0.351	0.382	0.031***
	(0.477)	(0.486)	(9.189)
AVN MOS	0.265	0.189	-0.076***
	(0.441)	(0.391)	(-28.014)
Other MOS	0.106	0.098	-0.008***
	(0.308)	(0.298)	(-3.753)
Observations	22237	397031	419268

Note: Tabular depiction of demographics for active-duty male Marines in the sample covering January 2010 – October 2019. First and second column display values of the mean, followed by standard deviation (SD) in parentheses. Third column shows the differences in coefficients between the treatment group (first-time births) population and the control group. The T-statistics is provided in parentheses below the coefficient differences. Statistical significance shown by: *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Similar to active-duty male Marines, new mothers have lower AFQT scores and higher GCT scores. This is in line with the data showing new mothers are more likely to be officers as higher GCT scores are required for Marine officers.

Table 2. Descriptive Statistics for Active-Duty Female Marines

	Active-Duty New Mothers	Controls	Differences between Mothers and Controls
	Mean/SD	Mean/SD	Coeff Diff/ T-Statistic
AFQT Score	54.601	57.560	2.959***
	(22.143)	(21.652)	(6.399)
GCT Score	103.276	101.925	-1.350***
	(12.639)	(18.454)	(-3.489)
Some College	0.036	0.045	0.009*
	(0.186)	(0.207)	(2.030)
College	0.090	0.083	-0.006
	(0.286)	(0.276)	(-1.067)
Age	20.927	20.956	0.030
	(3.733)	(4.463)	(0.315)
Married	0.171	0.124	-0.047***
	(0.376)	(0.329)	(-6.622)
African American	0.154	0.137	-0.017*
	(0.361)	(0.344)	(-2.318)
Hispanic	0.191	0.198	0.008
	(0.393)	(0.399)	(0.897)
Officer	0.076	0.047	-0.029***
	(0.266)	(0.212)	(-6.358)
Year	2011.283	2013.636	2.353***
	(1.682)	(3.278)	(34.456)
Number of Kds	0.010	0.112	0.102***
	(0.115)	(0.452)	(10.911)
Combat MOS	0.045	0.055	0.010*
	(0.208)	(0.229)	(2.111)
CSS MOS	0.605	0.574	-0.032**
	(0.489)	(0.495)	(-3.023)
AVN mos	0.201	0.197	-0.004
	(0.400)	(0.398)	(-0.438)
Other mos	0.149	0.173	0.025**
	(0.356)	(0.379)	(3.057)
Observations	2344	35478	37822

Note: Tabular depiction of demographics for active-duty male Marines in the sample covering January 2010 – October 2019. First and second column display values of the mean, followed by standard deviation (SD) in parentheses. Third column shows the differences in coefficients between the treatment group (first-time births) population and the control group. The T-statistics is provided in parentheses below the coefficient differences. Statistical significance shown by: *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

New reserve fathers show lower AFQT scores and high GCT scores. New fathers are more likely to have some education or even a college degree. In the subgroup comparison there is a significant difference with more new fathers in the aviation community in relation to the number of nonfathers where as other communities do not show a statistical change between the treatment and control groups.

Table 3. Descriptive Statistics for Reserve Male Marines

	Reservist New Fathers	Controls	Difference between Fathers and Controls
	Mean/SD	Mean/SD	Coeff Diff/ T-Statistics
AFQT Score	59.888	61.886	1.997***
	(24.604)	(23.236)	(4.710)
GCT Score	110.537	107.599	-2.937***
	(15.463)	(21.955)	(-7.414)
Some college	0.077	0.061	-0.016***
	(0.266)	(0.239)	(-3.617)
College	0.120	0.070	-0.049***
	(0.325)	(0.256)	(-10.490)
Age	22.735	22.248	-0.487***
	(4.842)	(5.813)	(-4.622)
Married	0.169	0.133	-0.036***
	(0.375)	(0.339)	(-5.878)
African American	0.095	0.087	-0.008
	(0.294)	(0.282)	(-1.582)
Hispanic	0.155	0.157	0.002
	(0.362)	(0.364)	(0.252)
Officer	0.075	0.036	-0.039***
	(0.263)	(0.186)	(-11.316)
Year	2010.891	2012.702	1.812***
	(1.407)	(3.101)	(32.549)
Number of Kids	0.003	0.172	0.169***
	(0.062)	(0.607)	(15.566)
Combat MOS	0.400	0.412	0.012
	(0.490)	(0.492)	(1.347)
CSS MOS	0.459	0.459	-0.000
	(0.498)	(0.498)	(-0.043)
AVN MOS	0.084	0.064	-0.020***
	(0.278)	(0.244)	(-4.524)
Other MOS	0.057	0.065	0.008
	(0.231)	(0.246)	(1.872)
Observations	3128	83965	87093

Note: Tabular depiction of demographics for active-duty male Marines in the sample covering January 2010 – October 2019. First and second column display values of the mean, followed by standard deviation (SD) in parentheses. Third column shows the differences in coefficients between the treatment group (first-time births) population and the control group. The T-statistics is provided in parentheses below the coefficient differences. Statistical significance shown by: *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

The descriptive statistics for reserve female Marines had a total of 3252 observations. Due to the small number of females in the sample, we do not see statistical significance in the analysis provided and therefore these models have been removed from the study.

Table 4. Descriptive Statistics for Reserve Female Marines

	Reserve New Mothers	Controls	Difference between Mothers and Controls
	Mean/SD	Mean/SD	Coeff Diff/ T-Statistics
AFQT Score	56.780	58.154	1.374
	(24.820)	(25.224)	(0.716)
GCT Score	106.726	103.020	-3.706*
	(11.862)	(22.162)	(-2.243)
Some College	0.077	0.069	-0.008
	(0.267)	(0.253)	(-0.401)
College	0.164	0.146	-0.018
	(0.371)	(0.353)	(-0.654)
Age	22.552	23.897	1.345**
	(5.362)	(6.355)	(2.804)
Married	0.164	0.233	0.069*
	(0.371)	(0.423)	(2.160)
African American	0.131	0.118	-0.013
	(0.338)	(0.323)	(-0.522)
Hispanic	0.219	0.167	-0.051
	(0.414)	(0.373)	(-1.799)
Officer	0.115	0.078	-0.037
	(0.320)	(0.268)	(-1.787)
Year	2010.951	2011.861	0.910***
	(1.392)	(2.768)	(4.412)
Number of Kids	0.011	0.204	0.193***
	(0.148)	(0.598)	(4.356)
Combat MOS	0.082	0.081	-0.001
	(0.275)	(0.274)	(-0.024)
CSS MOS	0.760	0.727	-0.032
	(0.429)	(0.445)	(-0.955)
AVN MOS	0.093	0.102	0.009
	(0.291)	(0.302)	(0.382)
Other MOS	0.066	0.087	0.021
	(0.248)	(0.281)	(0.992)
Observations	183	3069	3252

Note: Tabular depiction of demographics for active-duty male Marines in the sample covering January 2010 – October 2019. First and second column display values of the mean, followed by standard deviation (SD) in parentheses. Third column shows the differences in coefficients between the treatment group (first-time births) population and the control group. The T-statistics is provided in parentheses below the coefficient differences. Statistical significance shown by: *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

2. Data Outcomes

The following are dependent variables, as defined in Capt Larson's thesis, that explain the outcomes on health and performance for first time parents:

- *Combined Fitness Score*: a standardized variable where the mean=0, and SD=1, based on the combined scores from the physical and combat fitness tests. Both the PFT and CFT use a 300-point scale (100 maximum points for each event).
- *Top Performance on Fitness Test:* the probability that a Marine achieves a first-class score (235 points or higher for both the PFT and CFT). This is a binary variable and represents percentage point changes between outcomes across time.
- *Job Performance Rating:* a standardized supervisor-rated job performance evaluation for both officers and enlisted. Appendix [B] describes the characteristics of each evaluation. (Larson, 2020, p. 29)

To create one metric for fitness testing, I combined the PFT and CFT test scores into a standardized value, the combined fitness score. Each test is administered during different parts of the calendar year with the PFT being conducted from January to June and the CFT being conducted July to December. Following Larson (2020), I convert the scale scores into Z-scores by year and gender simultaneously for both active and reserve officers, then combine the scores into a fitness score such that most Marines have two fitness tests per year, which have an overall mean of zero and a standard deviation of one. Z-scores allow me to examine multiple outcomes per year while addressing the inherent differences in the two.

Due to differences in job evaluation between FITREPs and PROCONs, I converted both evaluations into Z-scores by year and gender to establish one metric of job performance. A Marine will be reported on, for several occasions, throughout the year and each time a reporting period occurs, a score is generated accordingly.

Throughout the data collections period several changes were made to the PFT/CFT events and scoring. Both fitness tests provide variation in the score system based on gender and age, as well as variations for movements to provide Marines every opportunity to be successful. The tables below address the current standards and variations in movements allowed for both fitness test.

Table 5. USMC PFT Events

PHYSICAL FITNESS TEST (PFT)	ALTERNATIVE MOVEMENTS
January - June	
Pull-ups: Max Repetitions	Push-ups: Max Repetitions in 2 Min
Crunches: Max Repetitions 2 Min	Plank Position for Max Time
3-Mile Run	5,000m Row

Table 6. USMC CFT Events

COMBAT FITNESS TEST (CFT)
July – December
Movement to Contact: 880 Yard Run
Ammo Can Lifts: Max Repetitions in 2 Min
Maneuver Under Fire: 300 Yard Obstacle Course

B. METHODOLOGY

The data collection pulled from TFWD allows me to conduct a time-series analysis to estimate differences between the control and treatment groups; this methodology closely mirrors the methods used by Larson (2020). The control group is defined as first time parents with a minimum of four years of service. The treatment group is defined as non-parents over the same timeline. By using panel data methods, I can observe the same Marine at different points in time (M. Bacolod, lecture notes, April 30, 2020). Following in line with the methods used by Capt Laron, I will use two strategies to measure the primary outcome variables in Equations (1) and (2). Both equations allow me to analyze the panel data by following these Marines longitudinally over time (Larson, 2020).

The first model, adapted from Larson (2020), estimates the monthly impact of parenthood on health and performance for first-time parents, measured separately by gender and by active/reserve status.

$$Y_{it} = \sum_{k \geq -m}^{l} M_{it}^{k} \delta_k + X_{it}\beta + \gamma_i + \tau_t + \varepsilon_{it} \quad (1)$$

The outcome estimates, Y_{it} in Equation (1) include both parents and non-parents. M_{it}^{k}, represents monthly dummy variables for the pre- and post-birth periods. These variables range from *m* months before birth to *l* months after birth, and I focus on a range from *m=-12 to l=12.* All effects are relative to -24 to -10 months. Thus, δ_k provides an estimate of the effect of childbirth on parents' outcomes *k* months before and after birth. X_{it} represents the time variable individual characteristics of a Marine to include age, rank, time in service and τ_t is a time fixed effect accounting for general changes over time, which is particularly important for capturing any changes to any service-wide policy that might affect the outcome for all Marines. A key component of the analysis is an individual fixed effect (γ_i) that accounts for individual characteristics that are constant within individuals over time (e.g., genetics), which allows us to interpret any changes to performance as changes within an individual. Finally, ε_{it} is the error term.

The individual month coefficients δ_k, provide monthly estimates of changes in performance during the full pre- and post-pregnancy period. Graphical depiction reflects trends covering 24-months pre- and post-pregnancy. Equation (2) provides a simplified "parsimonious" model that captures changes during four distinct periods throughout the pregnancy period.

> To create a more parsimonious model of health and performance changes over time relative to 10 months before birth, I define:
>
> P_{it}^{1}= 1 for months -9 to -1 for all male outcomes and female job performance measures if the Marine has a baby, and P_{it}^{1}=0 otherwise.
>
> BJ_{it}^{1}= 1, for months 1–2 for males, 8–12 for females, if the Marine has a baby, and BJ_{it}^{1}=0 otherwise. This establishes any immediate postnatal drops in performance. The timing is different for males and females because mothers are not required to perform fitness testing 6 months post-childbirth to support recovery.
>
> BJ_{it}^{2}= 1, for months 3–12 for males, 13-24 for females, if the Marine has a baby, and BJ_{it}^{2}=0 otherwise. This establishes additional postnatal trends and

allows us to assess whether there is some level of recovery to previously performed capabilities.

BJ_{it}^{3}= 1, for months 13–24 for all male Marines who have a baby. This establishes trends beyond the first year of birth. Females do not receive this variable as it is accounted for in birth jump 2. (Larson, 2020, pp. 32–33)

Equation (2), from Larson (2020), re-estimates the impact of childbirth on health and job performance as:

$$Y_{it} = P_{it}^{1}\alpha_1 + BJ_{it}^{1}\alpha_2 + BJ_{it}^{2}\alpha_3 + BJ_{it}^{3}\alpha_4 + X_{it}\beta + \gamma_i + \tau_t + \varepsilon_{it} \quad (2)$$

where $\alpha_{1\text{-}4}$ respectively represent the effect of the pregnancy trends, the immediate postnatal drop (Birth jump 1), and additional post-birth patterns up to 24 months (Birth jump 2 and 3), all relative to pre-pregnancy levels from 10 to 24 months before birth. This model forces the gap between parents and non-parents to (i) be zero in the pre-pregnancy period; (ii) grow, decline, or remain steady in the 9 months before birth, (iii) creates average differences between the timeframes following childbirth relative to the levels demonstrated during -24 to -10 months. Forcing the gap to be indistinguishable from zero for parents and non-parents means that we assume that the non-parents are a good control comparison for the parents before a Marine in the treatment group has a child. This is where the causal impacts come from. The variables, $X_{it}\beta, \gamma_i, \tau_t, \varepsilon_{it}$, remain the same from Equation (1).

Since my research includes reservist data, I will conduct subgroup analysis on impact differences between active duty Marines and reserve Marines, differences between active-duty and reserve officers, differences between active-duty and reserve enlisted, as well as MOS group analysis.

C. SCOPE AND LIMITATIONS

To control for variations in the data that could present during the pregnancy period, all fitness observations for females from nine months prior to birth and seven months post-birth are eliminated from the sample. Regarding job performance metrics, females still receive evaluations during the pregnancy period. The only observations removed from the sample will be the birth month to seven months post-delivery to account for paternity leave and recovery time before being recorded to perform a physical fitness test.

To eliminate confusion between pre- or post-birth effects for male outcomes, the birth month is removed from the sample. The effects of paternity leave are not accounted for in my analysis.

Unlike Capt Larson's thesis, I have included reserve Marines in the sample. By doing so I introduce several challenges regarding policy effects on theses Marines. To simplify the research, Marines listed as AR will be accounted for as active-duty Marines. Due to the nature of their contract, the period in which they serve is identical to active-duty Marines; therefore, they are affected by the parental policy just the same. Reserve Marines categorized as SMCR and IMA were evaluated separately using the same methods discussed in the methodology section. Their separation allows me to compare the outcomes of reservist, who are not affected by the current parental policy, with outcomes of active-duty Marines that are affected by the policy. Due to the design of this study, I do focus on those times when reserve Marines would be affected by the policy because they are serving in a mobilized capacity. In order to capture those periods accurately, reserve Marines would be moved between and active duty and reserve status depending on their level of employment. Follow on research could address the specific instances in which reservist fall under the paternal leave policy and how those outcomes are compared to Marines not affected by the policy.

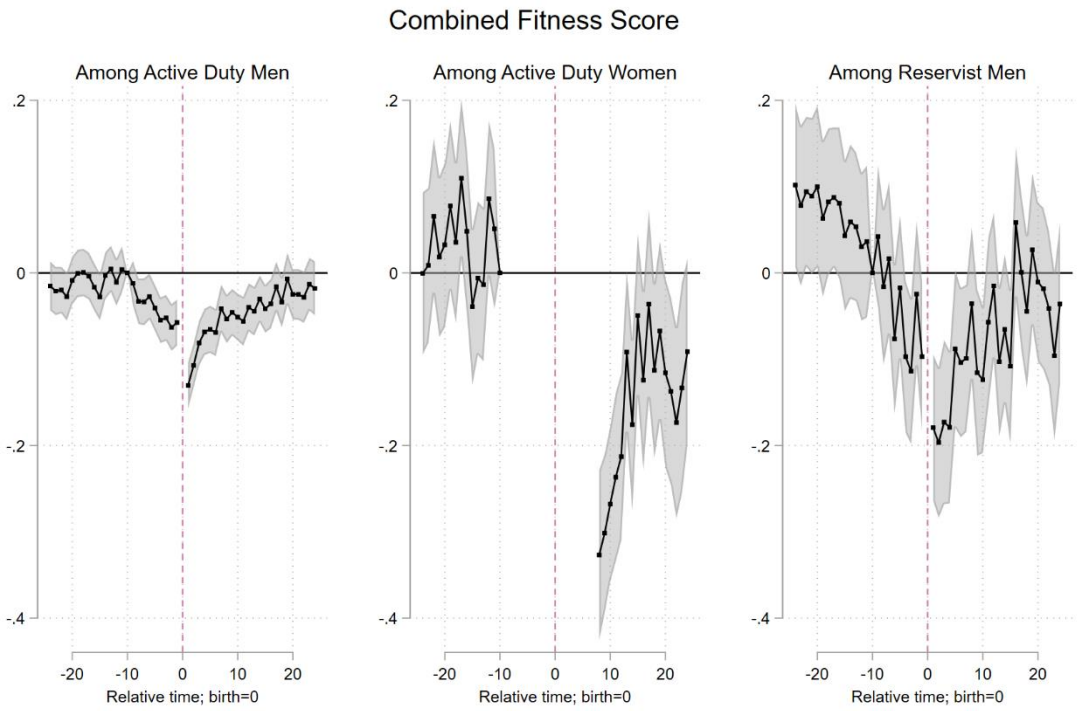
Over the course of the nine-year period analyzed in my research, the Marine Corps has implemented several changes to the physical fitness program and parental leave policy (Larson, 2020, p34). The study design accounts for these changes over time. As for the most current change to the paternity leave policy, which was published during my analysis, those changes are not addressed in my research. This could lend to further analysis of policy effects in the future.

IV. RESULTS

A. EVENT STUDY REGRESSIONS

Figures 3, 4 and 5 show comparisons for combined fitness scores, first-class fitness scores, and job performance scores. During the review of the outcomes, it was determined that the sample size for first-time births for reserve women was too insignificant to successfully conclude causal effects from the model; therefore, it was removed from the study. For all graphs, the y-axis (vertical axis) shows standard deviations from the mean. The x-axis (horizontal axis) represents relative time in relation to birth of the child which is identified at time equals zero. All values to the left of zero represent months prior to birth and all values to the right of zero represent the time post-childbirth. The gray areas of the graph represent the confidence interval in which the point estimate can fall within. The larger the standard error is, the larger the grey area on the graph will be. For male Marines, the only month not observed is the actual birth month of the child. For female Marines, the pregnancy period and post-childbirth recovery period are removed from the sample in regards to fitness outcomes in order to standardize the results. The pregnancy period is identified as the time 10 months prior to delivery and the recovery period is defined as the 7 months post-delivery. The parental leave policy grants exemption from physical fitness testing during this period. For reference, conversions between standard deviations and PFT/CFT scores are provided in Appendix I. Both tables provide context for how significant the effects of childbirth are on outcomes.

Figure 3 below is a visual depiction of combined fitness score outcomes across a 24-month period. For male Marines, the pregnancy period shows a downward trend in fitness performance. Two months post-childbirth there is an immediate drop in performance of 0.132 standard deviations which translates to 4.13 points on the CFT and 2.70 points on the CFT. After the initial two months, these Marines recover to their relative state just before birth and begin to trend towards previous fitness outcomes. For the next year to two years, fitness performance increases to pre-birth performance outcomes for these fathers. As anticipated, the data shows fitness performance decreases during the pregnancy period and immediately post-childbirth.

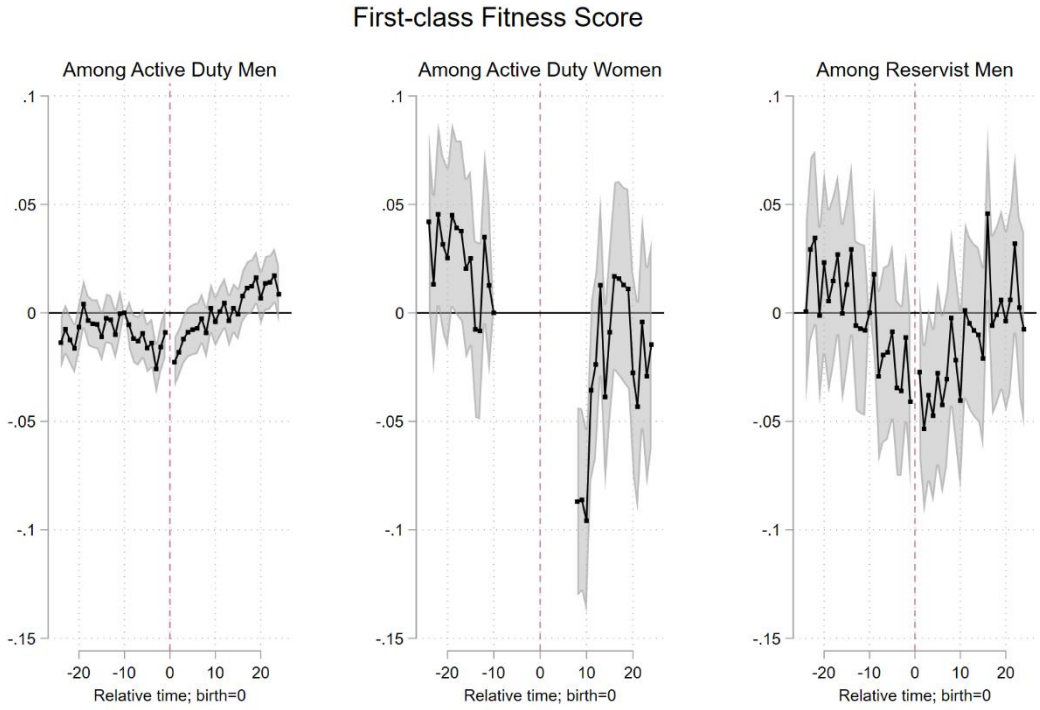


Note: Graphical depiction of outcomes. Mean 0, SD=1. Time is relative to birth=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010–October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 3. Fitness Outcomes for Active-Duty Men and Women, and Reserve Men

Active-duty mothers see a significant decrease from their previous performance standard. They experience a 0.343 drop in the standard deviation during month eight which immediately follows the recovery period. There is a consistent increase in fitness performance outcomes post-recovery, but females do not recovery to previous fitness outcomes. To clearly understand what this means, there is potentially a 10.73-point difference for PFT scores and a 7.02-point difference for CFT scores. Significant negative impacts would only occur at the margins. For reserve men, the combined fitness score shows a decline of 0.132 standard deviations. The graphical depiction for reserve men clearly shows the same trend as active-duty Marine males, which is a decrease in performance through the pregnancy period as well as a significant drop post-childbirth. Moreover, the standard errors are very large and make it difficult to interrupt if the outcomes are statistically significant. Figure 4 depicts pregnancy effects on outcomes

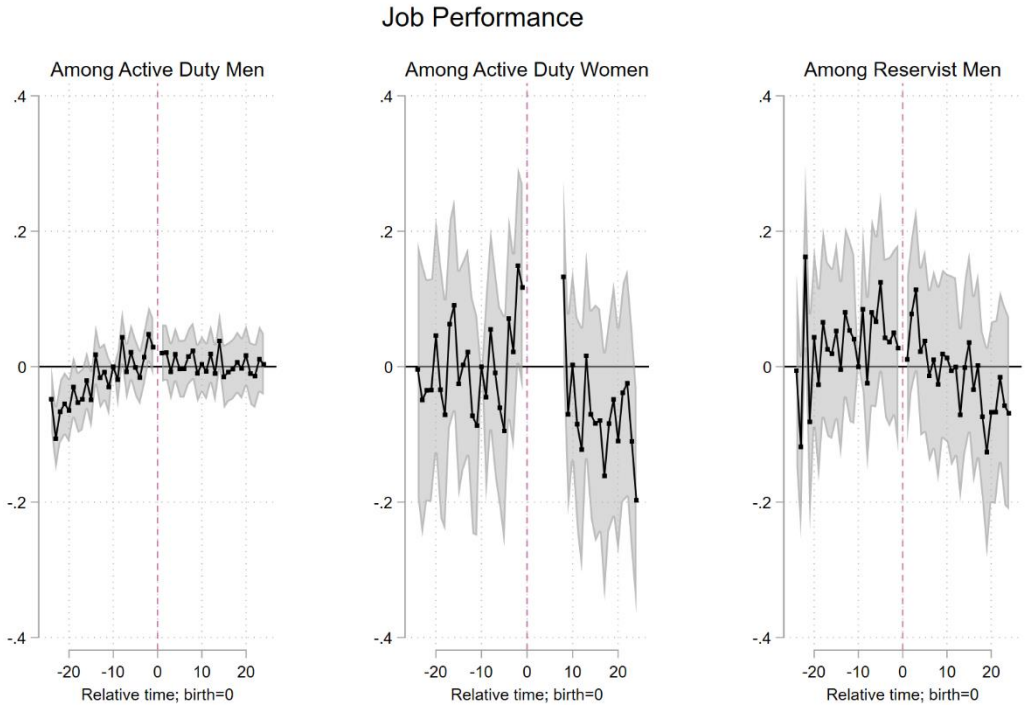
among higher performers. For active-duty fathers we see a decrease of 3.2 percentage points in the probability of obtaining a first-class fitness score in the month following childbirth. Around month ten, these fathers return to previously performed standards. In a similar analysis of active-duty mothers, I found a drop of 8.5 percentage points in the probability of obtaining a first-class fitness score. It is safe to assume that higher performing Marines tend to return to their previous baseline at a quicker rate. As the gray error shows, the standard errors for active-duty females are higher; therefore, while we do see an increase in performance at a quicker rate, the data does not show a significant statistical difference from previous outcomes. For reserve men, we see the same trends that occurred in the combined fitness scores; however, the increase is not as significant as the overall population.



Note: Graphical depiction of outcomes. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010–October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 4. First-class Fitness Scores for Active-Duty Men and Women, and Reservist Men

I next examine job performance outcomes. For active-duty fathers, job performance remains relatively like previously performed outcomes, not demonstrating any significant change due to first-time childbirth. While there appears to be a negative trend for active-duty mothers, 8 months post-childbirth, the standard errors are large, and it cannot be determined if the outcomes are statistically different than zero. For reserve men, again the standard errors are so large there is no way to determine if the outcomes are statistically different from zero.



Note: Graphical depiction of outcomes. Mean 0, SD=1. Time is relative to birth month=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010 – October 2019. Data source; Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 5. Job Performance Outcomes for Active-Duty Men and Women, and Reservist Men

B. PARSIMONIOUS MODELS

Tables 7, 8, and 9 provide outcomes for combined fitness scores, first-class fitness scores, and job performance using the simplified "parsimonious" model. The previous conversion table still applies for these tables. In each table there are two restrictions on the sample. The first restriction is columns (1), (3), (5), which are the most permissive with the treatment group including all first births and the control group including all Marines without children. The second restriction is columns (2), (4), and (6), which requires the treatment group at least contain observations plus or minus 12 months around the first birth. For discussion, I will focus on the second model requiring more observation time.

Table 7. Outcomes for Active-Duty Male Marines

	(1)	(2)	(3)	(4)	(5)	(6)
	Combined Fitness Score		First-class Fitness Scores		Job Performance	
Pregnancy	-0.031***	-0.016***	-0.012***	-0.020***	0.038***	0.044***
	(0.004)	(0.005)	(0.002)	(0.002)	(0.006)	(0.008)
Birth Jump 1	-0.131***	-0.079***	-0.035***	-0.026***	0.018+	0.049***
1 to 2 months	(0.007)	(0.009)	(0.003)	(0.004)	(0.010)	(0.012)
Birth Jump 2	-0.059***	-0.019***	-0.019***	-0.013***	0.004	0.052***
3 to 12 months	(0.004)	(0.004)	(0.002)	(0.002)	(0.006)	(0.007)
Birth Jump 3	-0.025***	-0.002	-0.011***	-0.005**	0.013*	0.036***
13 to 24 months	(0.004)	(0.004)	(0.001)	(0.002)	(0.006)	(0.006)
Observations	2056598	1910690	2056598	1910690	1588368	1480747
R-squared	0.587	0.587	0.399	0.400	0.450	0.451
All First Births	X		X		X	
-12/+24 months		X		X		X

Note: Table depiction of outcomes. Mean=0, SD=1 for combined fitness outcomes and job performance. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth month=0. Pregnancy represents -9 to -1 months. Birth Jump 1 represents 1 to 2 months. Birth Jump 2 represents 3 to 12 months. Birth Jump 3 represents 13 to 24 months. Columns (1), (3), (5): no time restriction. Columns (2), (4), and (6) require -12 to 24 months of observed time for the Marine to remain in the sample. Standard errors in parentheses: +p<0.10, *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Active-duty fathers experience a drop of 0.079 standard deviations in the following months post-birth. Between 3 to 12 months there is an increase in performance of .06 standard deviation, such that their performance is only 0.019 standard deviations lower than it had been during birth jump 1 (1 to 2 months post-childbirth). Marines reach their previously performed fitness outcomes during birth jump 2 as a .06 standard deviation change equates to 1.84 points on the PFT and 1.23 points on the CFT.

Again, comparing the first-class fitness scores for Marines we see better trends in recovery rates. By 3 to 12 months, the data shows a drop of 1.3 percentage points in the probability of obtaining a first-class fitness score. Job performance as with the previous regression models is similar outcomes or increased outcomes for job performance, demonstrating that childbirth is not negatively affecting this outcome.

The parsimonious model for reserve Marines provides more statistically significant information then in the event study regression provided above, partly because effects are averaged across months. For both combined fitness score and first-class fitness rates we see a decrease in performance during the pregnancy period (-9 to -1 months). A significant decrease of 0.230 standard deviations occurs in the following months post-birth. An increase of 0.138 standard deviations occurs for combined fitness scores during Birth Jump 2. This is an increase of 4.56 points for the PFT and 3.48 points for the CFT. For first-class fitness outcomes we see a drop in performance of 6.1 percentage points. During the next period of 3 to 12 months the drop is 2.7 percentage points and continue out to 24-months, only a decrease of 1.5 percentage points. Job performance remains positive relative to the pre-pregnancy period and either is unchanged or slightly increases throughout the evaluation period.

Table 8. Outcomes for Reserve Male Marines

	(1)	(2)	(3)	(4)	(5)	(6)
	Combined Fitness Scores		First-class Fitness Scores		Job Performance	
Pregnancy	-0.080***	-0.090***	-0.024***	-0.031***	0.053**	0.064**
	(0.015)	(0.018)	(0.006)	(0.007)	(0.017)	(0.021)
Birth Jump 1	-0.221***	-0.230***	-0.056***	-0.061***	0.057*	0.072*
1 to 2 months	(0.030)	(0.035)	(0.013)	(0.015)	(0.027)	(0.034)
Birth Jump 2	-0.111***	-0.092***	-0.034***	-0.027***	0.078***	0.096***
3 to 12 months	(0.015)	(0.018)	(0.006)	(0.007)	(0.016)	(0.020)
Birth Jump 3	-0.053***	-0.028+	-0.015**	-0.013*	0.040*	0.051**
13 to 24 months	(0.014)	(0.016)	(0.006)	(0.006)	(0.016)	(0.018)
Observations	280780	269348	280780	269348	329655	317003
R-squared	0.639	0.639	0.510	0.510	0.416	0.415
All First Births	X		X		X	
-12/+24 months		X		X		X

Note: Table depiction of outcomes. Mean=0, SD=1 for combined fitness outcomes and job performance. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth month=0. Pregnancy represents -9 to -1 months. Birth Jump 1 represents 1 to 2 months. Birth Jump 2 represents 3 to 12 months. Birth Jump 3 represents 13 to 24 months. Columns (1), (3), (5): no time restriction. Columns (2), (4), and (6) require -12 to 24 months of observed time for the Marine to remain in the sample. Standard errors in parentheses: +p<0.10, *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Active-duty mothers experience a 0.193 standard deviation drop in combined fitness performance in the 8-12 months after birth. Between 13 to 24 months the data shows a recovery of 0.144 standard deviations. This is in line with previous analysis showing females Marines have not recovered to their previously performed fitness outcomes by 2 years post-childbirth. First-class fitness mothers experience a drop of 7.4 percentage points in the rate of receiving a first-class fitness scores immediately following the recovery period, but birth jump 2 only a 1.7 percentage point drop in rates. The data for job performance does not show significant statistical change from the baseline after birth, though the mothers perform slightly higher during pregnancy than before pregnancy.

Table 9. Outcomes for Active-Duty Female Marines

	(1)	(2)	(3)	(4)	(5)	(6)
	Combined Fitness Score		First-class Fitness Score		Job Performance	
Pregnancy	0.000	0.000	0.000	0.000	0.047**	0.055*
	(.)	(.)	(.)	(.)	(0.017)	(0.027)
Birth Jump 1	-0.242***	-0.193***	-0.074***	-0.068***	0.010	0.021
8 to 12 months	(0.018)	(0.021)	(0.008)	(0.009)	(0.024)	(0.031)
Birth Jump2	-0.077***	-0.049**	-0.017**	-0.016*	-0.035+	-0.021
13 to 24 months	(0.014)	(0.016)	(0.006)	(0.006)	(0.020)	(0.023)
Observations	158698	147374	158698	147374	138522	127117
R-squared	0.595	0.595	0.400	0.398	0.446	0.448
All First Births	X		X		X	
-12/+24 months		X		X		X

Note: Table depiction of outcomes. Mean=0, SD=1 for combined fitness outcomes and job performance. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth month=0. Pregnancy represents -9 to -1 months. Birth Jump 1 represents 1 to 2 months. Birth Jump 2 represents 3 to 12 months. Birth Jump 3 represents 13 to 24 months. Columns (1), (3), (5): no time restriction. Columns (2), (4), and (6) require -12 to 24 months of observed time for the Marine to remain in the sample. Standard errors in parentheses: +p<0.10, *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

C. SUBGROUP ANALYSIS

The first subgroup analysis are three parsimonious models, focusing on enlisted. I separately examine, male active-duty, male reserves, and female active-duty enlisted Marines. Below are tables depicting the outcomes.

The immediate effects post-childbirth shows male reserves over double the decline in performance for combined fitness scores relative to active duty, comparing a drop of 0.093 standard deviations for active-duty and a drop of 0.228 for reservist. Similarly, for first-class fitness rates, active duty experiences a drop of 1.1 percentage points while reservists drop by 4.2 percentage points. Both experience an increase in job performance outcomes between birth jump and birth jump 2.

Table 10. Outcomes for Active-Duty Enlisted Male Marines

	(1)	(2)	(3)	(4)	(5)	(6)
	Combined Fitness Score		First-class Fitness Score		Job Performance	
Pregnancy	-0.059***	-0.026***	-0.008***	-0.008***	-0.000	0.029**
	(0.004)	(0.005)	(0.002)	(0.002)	(0.007)	(0.009)
Birth Jump 1	-0.169***	-0.093***	-0.035***	-0.011**	-0.031**	0.025+
1 to 2 months	(0.007)	(0.009)	(0.003)	(0.004)	(0.012)	(0.015)
Birth Jump 2	-0.090***	-0.021***	-0.011***	0.008***	-0.034***	0.045***
3 to 12 months	(0.005)	(0.005)	(0.002)	(0.002)	(0.009)	(0.010)
Birth Jump 3	-0.051***	0.005	0.007**	0.023***	-0.025**	0.027*
13 to 24 months	(0.005)	(0.006)	(0.002)	(0.002)	(0.010)	(0.011)
Observations	2122224	2031874	2122224	2031874	1301617	1250197
R-squared	0.589	0.588	0.415	0.413	0.430	0.427
All First Births	X		X		X	
-12/+24 months		X		X		X

Note: Table depiction of outcomes. Mean=0, SD=1 for combined fitness outcomes and job performance. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth month=0. Pregnancy represents -9 to -1 months. Birth Jump 1 represents 1 to 2 months. Birth Jump 2 represents 3 to 12 months. Birth Jump 3 represents 13 to 24 months. Columns (1), (3), (5): no time restriction. Columns (2), (4), and (6) require -12 to 24 months of observed time for the Marine to remain in the sample. Standard errors in parentheses: +p<0.10, *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Table 11. Outcomes for Reserve Enlisted Male Marines

	(1)	(2)	(3)	(4)	(5)	(6)
	Combined Fitness Score		First-class Fitness Score		Job Performance	
Pregnancy	-0.084***	-0.089***	-0.018**	-0.027***	0.052*	0.095***
	(0.013)	(0.016)	(0.006)	(0.007)	(0.020)	(0.025)
Birth Jump 1	-0.251***	-0.228***	-0.057***	-0.042**	0.061+	0.085*
1 to 2 months	(0.024)	(0.030)	(0.011)	(0.013)	(0.032)	(0.039)
Birth Jump 2	-0.128***	-0.101***	-0.027***	-0.017*	0.081***	0.126***
3 to 12 months	(0.015)	(0.017)	(0.006)	(0.007)	(0.023)	(0.027)
Birth Jump 3	-0.048**	-0.020	0.010	0.019*	0.067**	0.110***
13 to 24 months	(0.015)	(0.017)	(0.007)	(0.007)	(0.025)	(0.028)
Observations	462793	453242	462793	453242	267304	262658
R-squared	0.589	0.588	0.440	0.438	0.389	0.388
All First Births	X		X		X	
-12/+24 months		X		X		X

Note: Table depiction of outcomes. Mean=0, SD=1 for combined fitness outcomes and job performance. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth month=0. Pregnancy represents -9 to -1 months. Birth Jump 1 represents 1 to 2 months. Birth Jump 2 represents 3 to 12 months. Birth Jump 3 represents 13 to 24 months. Columns (1), (3), (5): no time restriction. Columns (2), (4), and (6) require -12 to 24 months of observed time for the Marine to remain in the sample. Standard errors in parentheses: +p<0.10, *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

The outcomes for active-duty enlisted females reflect that of previous outcomes. Physical fitness increases by 0.120 standard deviations from birth jump 1 and birth jump 2, but enlisted women do not return to their original levels. Statistical significance declines for first-class fitness scores and job performance due to a reduced sample size. Comparison against reserve enlisted females is unavailable because the population of reserve enlisted first-birth females is limited and therefore not depicted in subgroup analysis.

Table 12. Outcomes for Active-Duty Enlisted Female Marines

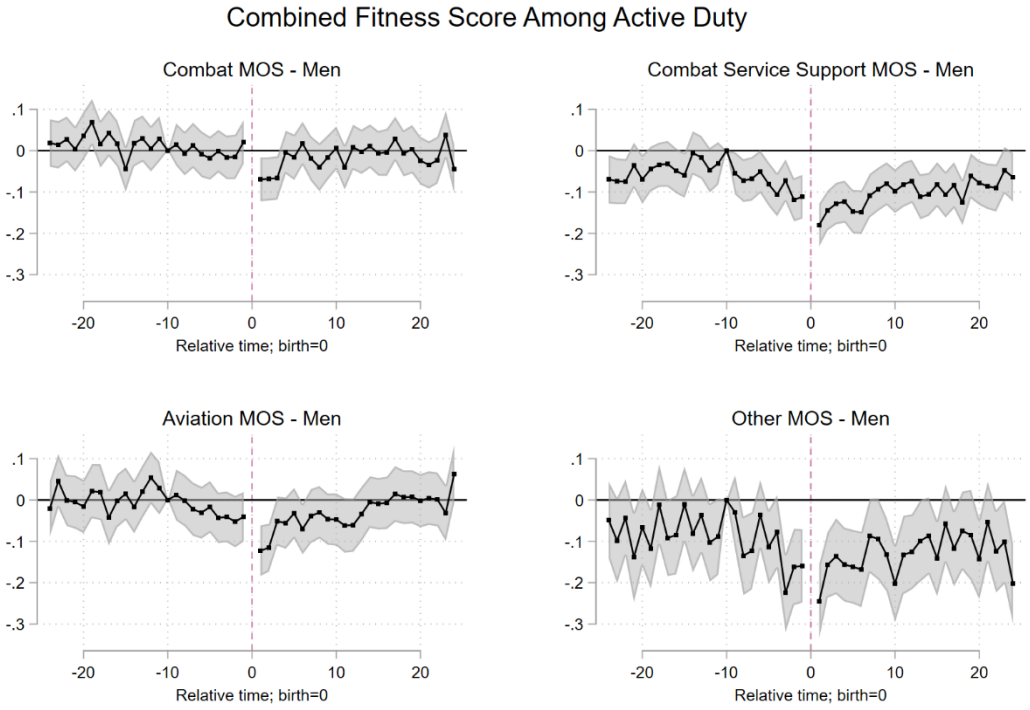
	(1)	(2)	(3)	(4)	(5)	(6)
	Combined Fitness Score		First-Class Fitness Score		Job Performance	
Pregnancy	0.000	0.000	0.000	0.000	-0.064	-0.030
	(.)	(.)	(.)	(.)	(0.107)	(0.128)
Birth Jump 1	-0.437***	-0.416***	-0.104*	-0.100*	-0.288+	-0.196
8 to 12 months	(0.093)	(0.104)	(0.041)	(0.046)	(0.152)	(0.154)
Birth Jump 2	-0.321**	-0.296**	-0.081*	-0.080+	-0.203	-0.023
13 to 24 months	(0.101)	(0.111)	(0.038)	(0.041)	(0.191)	(0.121)
Observations	14201	14006	14201	14006	7994	7879
R-squared	0.582	0.582	0.434	0.433	0.457	0.464
All First Births	X		X		X	
-12/+24 months		X		X		X

Note: Table depiction of outcomes. Mean=0, SD=1 for combined fitness outcomes and job performance. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth month=0. Pregnancy represents -9 to -1 months. Birth Jump 1 represents 1 to 2 months. Birth Jump 2 represents 3 to 12 months. Birth Jump 3 represents 13 to 24 months. Columns (1), (3), (5): no time restriction. Columns (2), (4), and (6) require -12 to 24 months of observed time for the Marine to remain in the sample. Standard errors in parentheses: +p<0.10, *p<0.05, **p<0.01, ***p<0.001. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

The following graphs represent a breakdown between MOS groups. Each MOS follows under one of four groups: combat MOS, combat service support MOS, aviation MOS, and other MOS. Combat MOS' are those field that are categorized as specific combat arms MOS such as infantry, artillery, tanks, etc. Combat service support MOSs are those fields that support combat arms MOSs such as logisticians, engineers, motor transport operators, etc. Aviation MOSs are all aviation related specialties. Other MOSs covers such specialty fields as legal and public affairs. The data below allows me to exam different outcomes amongst the four groups to determine if specific field are experiencing different effects.

Active-duty male Marines serving in a combat arms MOS experience an immediate decline in performance post-childbirth 0f 0.092 standard deviations. As shown in the graphical depiction, performance recovers very quickly back to prebirth outcomes. For CSS MOS' show a decline in performance outcomes leading into the birth month followed

by a drop of 0.188 standard deviations which equates to 5.88 points on the PFT and 3.85 points on the CFT. There is steady increase in performance, reaching pre-pregnancy performance before 24-months. Aviation MOS' have a drop in combined fitness outcomes of 0.099 standard deviations. The standard errors for other MOS' is high due to a smaller population of Marines serving in these MOS'. However, the data still reports the same trends. This is the only MOS group that reports lower performance by 24-months post-childbirth that almost equivalent to the first month post-childbirth



Note: Graphical depiction of outcomes. Mean 0, SD=1. Time is relative to birth=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Time period: January 2010 – October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

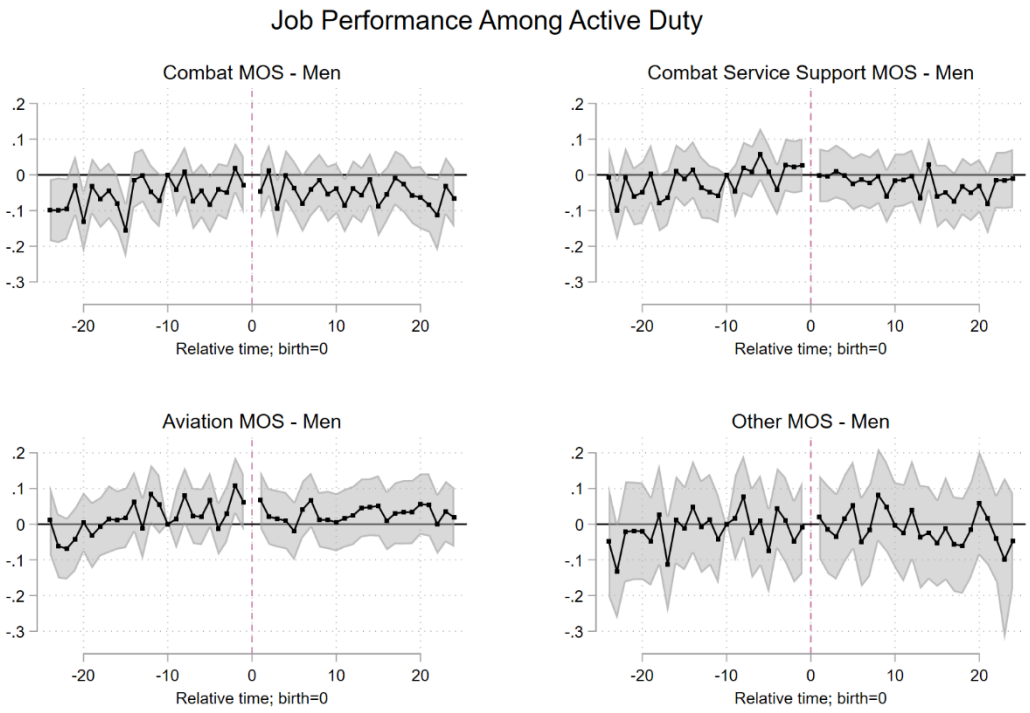
Figure 6. MOS Comparison for Combined Fitness Scores for Active-Duty Male Marines

The data for first-class fitness show similar changes in percentage point drops for all groups except for Marines serving in "other" MOS. Job performance comparisons

shows the same trends immediately following birth as in all other models. However, the data does not show statistical significance that the outcomes differ from prior performance.

Note: Graphical depiction of outcomes. First-class fitness represents a binary variable of percentage point changes between outcomes across time. Time is relative to birth=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010 – October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 7. MOS Comparison of First-class Fitness Scores for Male Marines

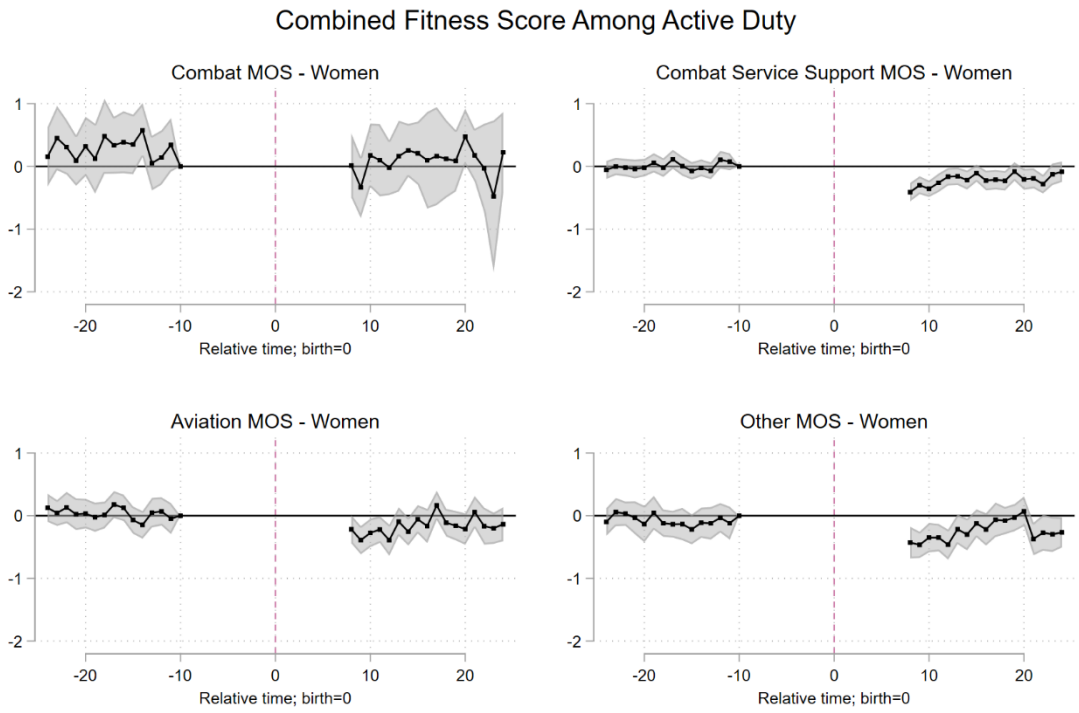


Note: Graphical depiction of outcomes. Mean 0, SD=1. Time is relative to birth=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Time period: January 2010 – October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 8. MOS Comparison for Job Performance for Active-Duty Male Marines

Analyzing the graphical depiction of active-duty female Marines we can derive that for combat arms MOS the standard errors are large and hard show no statistical evidence that post-birth outcomes differ from pre-birth performance. The population of females serving in a combat arms capacity is relatively small compared to other MOS'. This is expected as these specialties recently became available to female Marines in 2015. For females serving in aviation MOS there is a drop of 0.241 immediately following the recovery period. Of note, when reading the combined fitness score graphs for active-duty females, the scale is between 1 and -2. For this reason, the visual depiction does not clearly give an accurate picture of the effects of childbirths on outcomes. Combat service support MOS' experience a similar decline of 0.357 standard deviations post the recovery period. These Marines remain between 0.19 and 0.24 standard deviations below previously performed outcomes

through 24-months. The other MOS category data shows a drop of 0.394 to .410 standard deviations in months 9 and 10. Aside from combat arms MOS Marines, all females across aviation, combat service support and the other MOS' experience the same trends as previously briefed from other models.



Note: Graphical depiction of outcomes. Mean 0, SD=1. Time is relative to birth month=0. Shadow areas represent confidence intervals for estimates. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010–October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

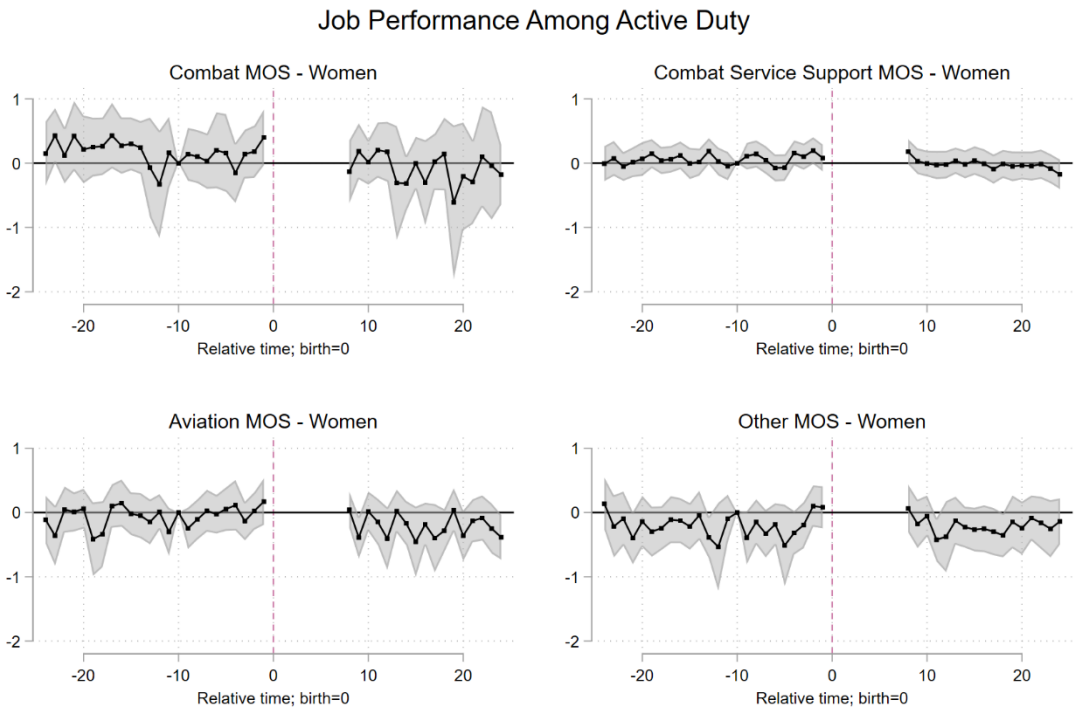
Figure 9. MOS Comparison for Combined Fitness Scores for Active-Duty Females Marines

The two MOS groups showing a drop in performance of first-class fitness rates are combat service support Marines and Marines falling in the other MOS category. Both experience a drop of 9.8 to 11.0 percentage points recovery period. Aside from this specific window there is no evidence that there are statistical differences before and after childbirth.

Note: Graphical depiction of outcomes. First-class fitness represents a binary dependent variable of percentage point changes in the probability of obtaining a first-class score. Time is relative to birth=0. Shadow areas represent confidence intervals for estimates. Analysis window for males -24 to -1-months, and 1 to 24-months. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010–October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 10. MOS Comparison for First-Class Fitness Scores for Active-Duty Female Marines

For all subgroup MOS', the data did not show any statistical difference in job performance before or after first-time childbirth.



Note: Graphical depiction of outcomes. Mean 0, SD=1. Time is relative to birth month=0. Shadow areas represent confidence intervals for estimates. Analysis window for females -24 to -10 months, and 8 to 24-months. Time period: January 2010–October 2019. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Figure 11. MOS Comparison for Job Performance for Active-Duty Female Marines

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V. RECOMMENDATIONS AND CONCLUSIONS

A. FUTURE RESEARCH

Since my research focuses on first-time births, follow on research could expand this to the effects tracked over time for parents with more than one child and how each birth effects performance over the longevity of a Marines career. Furthermore, I am only accounting for effects occurring from physical childbirth. Marines choosing to adopt, experience some of the same stressors biological parents experience as well as some challenges that are specific to adopting children. This data could provide guidance for the parental policy specifically for parents in relation to adoption. Subgroups within the adoption research could be differences that same sex couples experience.

Thousands of our Marines are married to other service members. Analysis of the effects on dual military could provide insight into both the maternity and paternity leave policies. Considerations for Marines married to other Marines as well as other service members could be broken down into subgroups for analysis.

For more specific analysis, the effects deployments have during pregnancies, for all categories. A researcher could focus on periods when the service member was deployed, covering periods of pre-pregnancy (-24 to -10 months), during pregnancy(-9 to -1), the birth month, immediately following delivery(1 to 2 or 8 to 12 months) and so on. Similar periods as used for my research. Performance research should be conducted on ways to improve physical performance post-childbirth.

Finally, as the current policy is under review, effects of different lengths of maternity leave and the pros and cons should be analyzed to formulate the way forward in regard to potentially implementing a one-year maternity leave policy.

B. RECOMMENDATIONS / CONCLUSION

My research is provided as guidance on performance outcomes for decision makers to use to support our warfighters. The evidence shows that 8 months post-childbirth, female Marines are not recovering to pre-birth performance outcomes. While we see this in the

data, it directly effects at the margins as the point conversions do not show a significant overall decrease in performance. All Marines, both male and female, experience a drop in performance, and for the most part, recover within 24-months and while for female the data does show a statistical difference in performance for females, the actual points lost when converted to PFT or CFT scoring is insignificant. Job performance appears to be largely unaffected by first-time childbirth, although increasing the population could provide better insight for female Marines and reserve Marines.

The DoD is at the forefront for parental policies, and, as such, should continue analyzing how these policies make service a relevant and viable option for civilians looking to join the military.

Every Marine is different. It would be unreasonable to assume that recovery and birthing experiences would be the same for every Marine. Policies are in place to provide guidelines for leaders but should not prevent leadership from making educated decisions on behalf of and in support of their Marines. The outcomes in the thesis, should be used as a reference to improve policy and provide our Marines every opportunity for improvement and advancement while protecting their rights to establish families.

APPENDIX A. CONVERSION TABLES

Table 13. Standard Deviation Conversions for Fitness Outcomes

Active-Duty Male Marines			Active-Duty Female Marines			Reserve Male Marines		
SD (+/-)	PFT	CFT	SD (+/-)	PFT	CFT	SD (+/-)	PFT	CFT
0.1	3.129	2.0461	0.1	3.3283	2.1182	0.1	3.3065	2.5223
0.5	15.645	10.2305	0.5	16.6415	10.591	0.5	16.5325	12.6115
1.0	31.29	20.461	1.0	33.283	21.182	1.0	33.065	25.223

Note: The values for PFT/CFT show point differences based on standard deviation values. Use values to determine point conversions in scores in relation to time on figures and tables. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Table 14. Standard Deviation Conversions for Job Performance

Active-Duty Male Marines		Active-Duty Female Marines		Reserve Male Marines	
SD (+/-)	JP	SD (+/-)	JP	SD (+/-)	JP
0.1	0.0995	0.1	0.0993	0.1	0.1022
0.5	0.4975	0.5	0.4965	0.5	0.511
1.0	0.995	1.0	0.993	1.0	1.022

Note: The values for job performance show point differences based on standard deviation values. Use values to determine point conversions in scores in relation to time on all figures and tables. Data source: Total Force Data Warehouse, raw data sent by email to the author, Apr. 28, 2020.

Table 15. Conversion for PFT

26-30 Age Group

Male Pull-ups		Female Pull-ups	
Reps	Points	Reps	Points
5	40	4	60
10	57	8	80
15	73	12	100
Male Crunches		Female Crunches	
Reps	Points	Reps	Points
90	67	90	76
95	73	95	82
100	80	100	88
Male Run Time		Female Run Time	
Time	Points	Time	Points
22:00	76	22:00	94
21:30	79	21:30	97
21:00	82	21:00	100

Note: The PFT is scored based off age groups and gender. For reference the age group of 26 to 30 is the used. The left columns represent number of repetitions or times conducted, while the right columns represent the points received for completing those repetitions/times. Data source: USMC, n.d.

Table 16. Conversions for CFT

26-30 Age Group

Male Movement to Contact		Female Movement to Contact	
Time	Points	Time	Points
2:50	90	3:20	94
2:45	95	3:15	97
2:40	98	3:10	100
Male Ammo Can Lifts		Female Ammo Can Lifts	
Reps	Points	Reps	Points
90	68	60	80
95	74	65	87
100	80	70	93
Male Maneuver Under Fire		Female Maneuver Under Fire	
Time	Points	Time	Points
2:20	88	3:05	88
2:15	92	3:00	91
2:10	96	2:55	93

Note: The CFT is scored based off age groups and gender. For reference the age group of 26 to 30 is the used. The left columns represent number of repetitions or time conducted, while the right columns represent the points received for completing those repetitions/times. Data source: USMC, n.d.

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APPENDIX B. GLOSSARY OF TERMS

Active Reserve (AR): Marines who are part of the Selected Reserve on full-time active duty under 10 U.S.C. Sections 10211, 12310(d) or MCO 1001R.1K A-2 for the purpose of organizing, administering, recruiting, instructing, or training the Reserve Component. (United States Marine Corps, Forces Reserve [USMCFR], n.d.)

Individual Mobilization Augmentee (IMA): An individual member of the Selected Reserve who receives training and is pre-assigned to an AC organization, the Selective Service System (SSS), or a FEMA billet that must be filled to meet the requirements of the organization to support mobilization (including pre- and/or post-mobilization) requirements, contingency operations, operations other than war, or other specialized or technical requirements. IMAs train with these organizations on a regular/scheduled basis. The inactive duty for training (IDT) requirement can vary from 0 to 48 IDTs per year. A minimum of 12 days annual training (AT) (13 including travel) is required of all IMAs. Reference MCO 1001.62. (USMCFR, n.d.)

Individual Ready Reserve (IRR): A trained manpower pool of Ready Reserve Marines who are not in the Selected Reserve. The IRR consists of : (1) Marines who have had training and served previously in the Active Component (AC) or in a Selected Marine Corps Reserve (SMCR) unit and have some period of Military Service Obligation (MSO) remaining, (2) Marines who have completed their MSO and are in the IRR by choice, and (3) Marines of the Delayed Entry Program (DEP). (USMCFR, n.d.)

Marine Forces Reserve (MARFORRES): Command located in New Orleans to oversee the MAGTF MSCs of the Reserve Component. COMMARFORRES exercises OPCON over MSC's and is responsible for the common staff functions of the subordinate command Headquarters which have been integrated within his staff. COMMARFORRES also exercises ADCON over members of the IRR and IMA/MTU program. COMMARFORRES is responsible for effecting lateral coordination with the Commander, U.S. Marine Corps Forces Command (COMMARFORCOM) or such other AC commanders as may be appropriate for the conduct of joint operations, exercises, and training. (USMCFR, n.d.)

Ready Reserves: Those units and individuals of the RC liable for active duty in time of war or national emergency. The Ready Reserve of the Marine Corps consists of the SelRes and the IRR. (USMCFR, n.d.)

Selected Marine Corps Reserve (SMCR) Unit: SelRes organized units consisting of drilling Reservists under MARFORRES belonging to the 4th Marine Division (4th MarDiv), 4th Marine Logistics Group (4th MLG), 4th Marine Aircraft Wing (4th MAW), and Force level units of MARFORRES. All SMCR units are under the administrative and operational control (ADCON/OPCON) of the Commander, Marine Forces Reserve (COMMARFORRES). (USMCFR, n.d.)

Selected Reserve (SelRes): The SelRes is the part of the Ready Reserve consisting of members of Selected Marine Corps Reserve (SMCR) units, Individual Mobilization Augmentee (IMA), and member serving on the Active Reserve (AR) program. (USMCFR, n.d.)

Combat Fitness Test (CFT): The CFT assesses a Marine's functional fitness where males and females perform the same exercises but are scored differently on the same 300-point scale. There are three exercises that must be completed to the standards of the Marine Corps to pass the CFT. (Marines.com, n.d.)

Taken by all Marines between January and June. The max score one can receive is 300 (100 for each of the 3 events):

- Movement to contact (MTC): 800-meter run
- Ammo Can Lift: shoulder press of a 35lb ammo can in 2-minute timeline
- Maneuver under fire (MANUF): 350-yard obstacle course that simulates combat activities. (Larson, 2020, p. 69)

[Note: scores are adjusted based off age group and gender.]

Conduct Score (CON): individual conduct measure for junior enlisted Marines (E1-E4). (Larson, 2020, p. 69)

Fitness Report (FITREP): performance evaluation document used for senior enlisted (E5-E9), and all officers. The FITREP evaluates Marines on 11 characteristics from leadership ability to initiative. The report ranges from 0-5 in value. The length of observation varies but usually is between 3 and 14 months. (Larson, 2020, p. 69).

Physical Fitness Test (PFT): The Marine Corps PFT is a standard test that measures the battle-readiness of each Marine once a year [January–June], with a focus on stamina and physical conditioning.

The test includes three events:

- pull-ups or push-ups

- crunches or plank pose
- three-mile run

Marines are assessed on a points system across these three categories and must receive a high enough score to pass the Marine PT test. (Marines.com, n.d.)

- Pull-ups (or push-ups): maximum repetitions in a 2-minute time limit
- Crunches: maximum repetitions in a 2-minute time limit
- 3-Mile Run: Marines receive maximum points with a time 18:00 minutes or below. (Larson, 2020, pg. 69)

[Note: scores are adjusted based off age group and gender.]

Proficiency Score (PRO): job performance measure for junior enlisted Marines (E1-E4). (Larson, 2020, 69)

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