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FIT FOR THE FORCE? AN EMPIRICAL ASSESSMENT OF THE USMC FORCE FITNESS INSTRUCTOR (FFI) PROGRAM

by

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March 2019

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Concerned with physical fitness, in January 2016 the Marine Corps established the Force Fitness Instructor (FFI) program. This FFI was to be trained in the latest scientifically proven methods of strength and conditioning techniques, programming, nutrition, and injury prevention. Coincident with the FFI program was implementation of increased standards for the Physical Fitness Test (PFT) and Combat Fitness Test (CFT) that began on 1 January 2017.

To evaluate the causal impact of the FFI program on Marines' fitness and health, I mimic an experimental research design and employ a difference-in-difference regression approach. I examine individual Marines' scores on the PFT and individual events and CFT and individual events, while having the FFI over five distinct time periods: > or = to 1, 30, 60, 90, and 120 days. I compare the scores of Marines in units with an FFI relative to those in like type units without, before vs. after receiving an FFI.

The data and analyses reveal that the over-time change in PFT and CFT scores of Marines who had an FFI decreased relative to those without. Results show a marked drop in PFT and CFT scores associated with the increased standards in 2017, regardless of whether a Marine had an FFI or not. However, the FFI caused an additional decrease in scores upward of 2.449 points in the PFT and 8.591 points in the CFT in the total sample population and even higher for female Marines, 6.075 and 16.020 points, respectively.

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FIT FOR THE FORCE? AN EMPIRICAL ASSESSMENT OF THE USMC FORCE FITNESS INSTRUCTOR (FFI) PROGRAM

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LIST OF ACRONYMS AND ABBREVIATIONS

AC	Aerobic Capacity
ACE	Aviation Combat Element
ACL	Ammo Can Lift
ALMAR	All Marine Message
BCP	Body Composition Program
CE	Command Element
CFT	Combat Fitness Test
DoD	Department of Defense
FFD	Force Fitness Division
FFI	Force Fitness Instructor
GCE	Ground Combat Element
HQMC	Headquarters Marine Corps
LCE	Logistics Combat Element
MAGTF	Marine Air Ground Task Force
MAP	Military Appearance Program
MARADMIN	Marine Administrative Message
MCO	Marine Corps Order
MEF	Marine Expeditionary Force
MIG	MEF Information Group
MTC	Movement to Contact
MUF	Maneuver under Fire
OpFor	Operating Forces
PFT	Physical Fitness Test
SE	Supporting Establishment
UBE	Upper Body Endurance

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I. INTRODUCTION

A. BACKGROUND

In its efforts toward improving force fitness, in 2016, the United States Marine Corps (USMC) revamped its Physical Fitness Program. Two of the most significant efforts of this update are the initiation of the Force Fitness Instructor (FFI) program and changes to two fitness tests, the Physical Fitness Test (PFT) and the Combat Fitness Test (CFT). Changes to the PFT and CFT included an increased number of age groups, modified event scores by age group, and increased class requirements (United States Marine Corps [USMC], 2016a). The event score changes reflect the Corps' focus on increased standards for pull-ups, crunches, Movement to Contact, ammo can lifts, and Maneuver under Fire.

Simultaneous to these changes, the Marine Corps implemented the FFI program, which provides the commander a subject matter expert resident to his unit, down to the company level, for all things related to physical fitness, nutrition, and injury prevention. The FFI's training and education is attained through a six-week training course in Quantico, VA. This thesis's objective is to evaluate the impact of a resident FFI on the physical fitness outcomes of the Marines in the unit to which he or she is assigned.

B. METHODOLOGY

I begin by surveying the academic literature on physical fitness and training, which shows the following: (1) periodization of training is paramount to achieving optimal performance while minimizing injury risks; (2) military members, and Marines in particular, are highly susceptible to overuse injuries; (3) the nutritional and body composition standards for Marines are not the same as the general population, nor should they be; (4) the Marine Corps PFT and CFT events test muscular and aerobic endurance but are missing an important muscular strength component; and (5) the Marine Corps Body Composition Program taping methods are designed around research that was inconsistent with rigorous statistical practices. The current FFI program of instruction (POI) appears to be largely inconsistent with these recognized academic findings. Specifically, the course does not incorporate classes on training periodization; the nutritional information taught to

inform Marines is antiquated and not applicable to Marines as athletes; and there is no mention of ways to impact body composition or the importance of body composition outside of the Marine Corps Body Composition and Military Appearance Programs. There is significant information in the POI on injury identification, but as previously mentioned, the most successful method to minimize the risk of overuse injury, periodized training, is not taught.

In order to then empirically assess the direct effects of the FFI on Marines' physical fitness and health as measured by performance on the PFT and CFT, causation is required. This cannot be accomplished through a standard Ordinary Least Squares (OLS) regression model because of the simultaneous changes in the scoring of the PFT and CFT. These scoring changes would show inaccurate negative effects associated to the FFI. To circumvent these simultaneous policy changes, I employ a difference-in-difference regression approach. This research design mimics an experiment, in that I identify the causal effect of an FFI by comparing the scores of individual Marines in units who had an FFI relative to those in similar units without, before versus after receiving an FFI. By comparing the change in scores of Marines with an FFI to the same across-time change for Marines in like-type units without an FFI, the difference-in-differences strategy essentially holds constant all policy changes common to all Marines, such as the change in physical standards and PFT and CFT scoring.

To implement this strategy, I first identify all FFI graduates and their commands through calendar year 2017 (CY17). From the list of these commands (the treatment group), the control group was identified to align by unit type and geography. Data for PFT, CFT, Body Composition, Military Appearance, Deployability, and Operational History was requested from Total Force Data Warehouse for 228 MCCs for the years 2015 to 2017. Once cleaned, this amounted to 181,959 individual Marines. Using this data and the PFT/CFT scoring charts, I built event scores to be used as outcome variables in the regressions. Because of the "options" that Marines have for the events in the PFT, I developed two additional variables: Upper Body Endurance (a composite of pull-up, push-up, and flex arm hang) and Aerobic Capacity (a composite of three-mile timed run and 5,000-meter row). Individual scores, rather than repetitions or time, were used for the

outcome variables because of the increased requirements for many of the events; however, I also use the individual repetitions and times for robustness check purposes.

Using this data, I then estimate the following difference-in-difference regression model:

$$Y=\beta_0+\beta_1 T+\beta_2 P+\beta_3 T*P+\beta_4 C+\varepsilon$$

where,

> Y= outcomes such as PFT Score, Upper Body Endurance (UBE) Score, Crunch Score, Aerobic Capacity (AC) Score, CFT Score, Movement to Contact (MTC) Score, Ammo Can Lift Score, or Maneuver Under Fire (MUF) Score
>
> T= 1 if the Marine was in a Treated Unit (had an FFI 30 days or greater, FFI 60 days or greater, FFI 90 days or greater, FFI 120 days or greater, or ever had an FFI)
>
> P= 1 if the outcome was in the Treated Time Period (2017)
>
> C= Control Variables (GCE, ACE, LCE, MIG, Female FFI, Female FFI and Female Marine, Female, Age, Age Squared).

The coefficient on T, β1, shows the level difference in outcomes between Marines in units with an FFI relative to those without an FFI, while the coefficient on P is an estimate of the change in outcomes before vs. after the FFI program, coinciding with the change in standards. My parameter of interest is the difference-in-difference estimator β3, which is the change in outcomes over time among those who had an FFI versus those who were not treated with an FFI.

To focus the effects, I estimate the regressions over three separate samples: total sample population, MAGTF Element/Supporting Establishment breakdown, and by gender breakdown.

C. RESULTS

As expected with the increased requirements and standards, PFT scores for all Marines in the study population decreased in 2017, on average, approximately six points, while the CFT scores decreased between 15 and 20 points. In addition to this decline,

however, the difference-in-difference results are overwhelmingly statistically significant and negative for both PFT and CFT scores, meaning that the addition of an FFI caused a decrease in PFT and CFT scores. The only exception is for PFT while having an FFI for 60 days or more, which is not uniformly statistically significant at the 0.01 level (99% level of confidence). Across multiple outcomes, samples, and ways of measuring exposure to an FFI, I show that, on average, having an FFI for any time period greater than one day results in a decrease of the individual Marine's PFT score between 1.489 to 2.449 points and a decrease of the individual Marine's CFT score between 1.205 to 6.529 points. At the individual event level, a Marine, on average, can have a statistically significant expectation of increasing both their upper body endurance and crunch scores, while seeing a more dramatic decrease in their aerobic capacity scores. It is notable that for the ammo can lift, the CFT's upper body endurance component, the difference-in-difference coefficient is negative. This is in stark contrast to the PFT's upper body endurance component that is positive, suggesting an FFI might have differential effects even on similar events.

I highlight and illustrate these overall results in Figures 1 and 2. Figure 1 shows the difference-in-difference effects on a Marine's PFT score if he/she had an FFI 30 days or greater (left panel) and 120 days or greater (right panel). Figure 2 shows a similar contrast of the effects of an FFI on a Marine's CFT score. Both figures show the negative effect of an FFI on the individual Marines' scores. In particular, turning to the left panel of Figure 1, in 2015–2016 Marines in units who eventually had an FFI (red line) score better than those who did not (blue line) by about 1 point higher on average. Marines in the study population all experienced a decline in their scores by 2017; both red and blue lines show a decline. However, Marines in units with an FFI experienced a greater decline; the red line drops more than the blue line. This additional decline is the causal effect of an FFI. In this left panel, the diff-in-diff effect of having an FFI for 30 days or greater is a decline of about 2 points on the PFT.

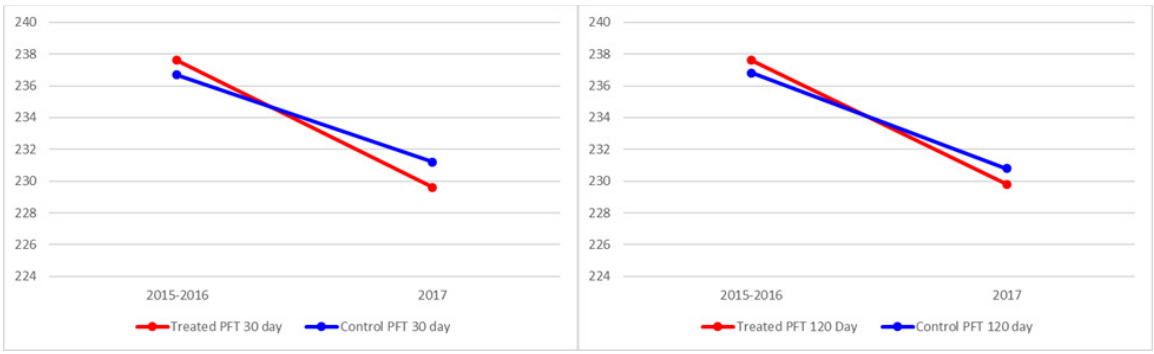

Figure 1. Difference-in-Difference PFT Representation

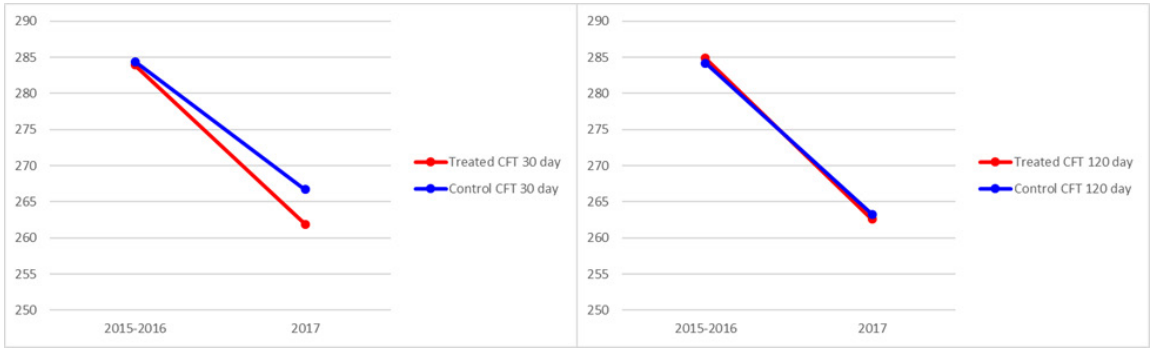

Figure 2. Difference-in-Difference CFT Representation

For the total sample population, while the increased standards can be associated with the decrease in scores, the addition of an FFI to an individual's unit causes an additional decrease in PFT and CFT scores. To further investigate the decline in average scores, I hypothesize, and the kernel density estimates of the data supports, that the addition of an FFI increases the scores of the poor performers while decreasing the scores of the high performers. This effectively draws the two tails of the distribution toward "average." This phenomenon, that the introduction of an FFI reduces the variance in PFT and CFT scores, explains the overall decrease in mean scores and an approximately two-point decrease in the standard deviation of PFT scores for the control compared to the treatment groups, 56 and 54 points, respectively. Put another way, the Marine Corps personnel sampled, as a whole and with an FFI, are not becoming more athletic or "fitter" but are becoming more average based on our PFT standards. The standard deviations for CFT

scores decreased approximately one point; however, this can be attributed to a higher overall mean in the CFT allowing for a smaller possible deviation.

In the MAGTF Element and Supporting Establishment breakouts, the MEF Information Group (MIG) and Command Element (CE) composite showed the highest level of decline from the addition of an FFI, with effects ranging from a decrease of 9.932 to 11.810 points without controls and decrease of 5.537 to 8.429 points with controls on PFT scores and a decrease of 11.020 to 16.710 points without controls and 8.104 to 13.550 points with controls. Supporting Establishment units had the next highest levels with a decrease of 2.953 to 11.550 points without controls and a decrease of 1.279 to 9.001 points with the controls on PFT scores and a decrease of 8.919 to 14.810 points without controls and 6.817 to 12.640 points with controls. Ground Combat Element (GCE) elements had negative effects for the addition of an FFI as well ranging from 1.957 to 3.972 points without controls and a decrease of 1.181 to 2.371 points with controls on PFT scores and a decrease of 1.123 to 4.132 points without controls and 1.852 to 2.957 points with controls. There is little evidence for either statistical or economic significance to the effects of an FFI on Marines in the ACE and LCE; however, these subsets see the greatest decrease in scores based on the treated year or change in standards, compared to the other MAGTF elements.

In the gender breakdown, female PFT scores were significantly more affected by the increased standards in 2017 than the male PFT scores, by as much as three times as negatively. Females were also much more negatively affected by the addition of an FFI, between 3.537 and 6.075 points on the PFT compared to males between 0.716 and 2.224 points. CFT results demonstrate a similar trend showing male effects being negative between 0.796 and 6.092 points and female effects being negative between 9.961 and 15.990 points on average.

To further check the robustness of my results, I also used the individual event repetitions and times as outcome variables to identify the FFI effects on the various events. The estimated effects were consistent with the score outcomes. For an individual having an FFI 120 days or greater, they can expect an additional 0.213 pull-ups, additional 1.287 crunches, run 15.400 seconds slower on the three-mile run, 0.917 seconds slower on the

Maneuver Under Fire, and 1.101 less ammo can lifts. Movement to Contact time did not have any level of statistical or economic significance.

D. RECOMMENDATIONS

The first recommendation is for the FFI program to be paused until a full Course Content Review Board (CCRB) is completed and Program of Instruction (POI) is signed. The POI, as of September 2018, is still in draft form even though more than 400 FFIs have been graduated and are training Marines in their units. A CCRB can evaluate the proper amount of time required to train a Marine, with a low-level baseline of background on topics covered as established in the course prerequisites, and find the proper amount of time associated with each curriculum aspect. A pause and reevaluation might also change the prerequisite requirements for a Marine to attend the course. Of import is to ask, what baseline information should a Marine know about training or nutrition before attending the course?

The second recommendation is for a follow-on study to this thesis using 2018 data to balance the pre- and post-treatment timelines. This would allow for 2015 and 2016 data as pre-trends and 2017 and 2018 data to be used in the post-treatment timelines. This addition to the study may normalize the treated year effects. Further investigation of the distributional effects of the FFI, perhaps by utilizing quantile regression methods, may provide additional insights.

The final recommendation is for a cost–benefit analysis (CBA) on the various subject matter experts that are available to Marines. This CBA needs to look at the costs and overlap of duties. As the Marine Corps continues to employ trainers at Semper Fit, nutritionists, athletic trainers, and the addition of FFIs, an analysis of the cost and benefits of each program, what they provide the force, and what optimal mix of these experts should be should be a high priority going forward.

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II. BACKGROUND

In this chapter, I discuss the background of the Marine Corps Physical Fitness Program and its components. The second section includes a discussion the development of the Force Fitness Division, the division in charge of the development of the Force Fitness Instructor (FFI) program.

A. MARINE CORPS HEALTH AND FITNESS PROGRAMS

The Marine Corps Physical Fitness Program is the overarching program for health and fitness within the Marine Corps. The physical fitness of the service is quantitatively measured by the Physical Fitness Test (PFT) and Combat Fitness Test (CFT). The PFT consists of three events: maximum repetition pull-ups or push-ups, maximum repetition abdominal crunches, and a three-mile timed run, or in select circumstances, 5,000-meter row ([United States Marine Corps [USMC], 2018, pp. 2-2–2-7). Scoring is based on the Marine's age and gender, up to 100 points per individual event and 300 points combined. The purpose of the PFT is to be "a collective measure of general fitness Marine Corps-wide" (USMC, 2016b, p. 1-1). The *Marine Corps Bulletin* (MCBUL) 6100 explains that the "PFT was specifically designed to test the strength and stamina of the upper body, midsection, and lower body, as well as efficiency of the cardiovascular and respiratory systems" (USMC, 2016c, p. 1-1). All active-duty Marines without mitigating circumstances must complete the PFT annually between 1 January and 30 June (USMC, 2018, p. 2-1).

The CFT consists of three events: Movement to Contact (880-yard timed run), Ammo Can Lift (maximum repetitions of a 30-pound ammo can from chest to overhead with a two-minute time limit), and the Maneuver Under Fire ("300 yard shuttle run that includes a variety of combat-related tasks") (USMC, 2018, p. 3-2–3-4). Scoring is based on the Marine's age and gender up to 100 points per individual event and 300 points combined. The MCBUL 6100 states the purpose of the CFT as to "assess a Marine's physical capacity in a broad spectrum of combat related tasks." and that the CFT "was specifically designed to evaluate strength, stamina, agility, and coordination as well as

overall anaerobic capacity" (USMC, 2016b, p. 2-1). All active-duty Marines without mitigating circumstances must complete the CFT annually between 1 July and 31 December (USMC, 2018, p. 3-1). The service attempts to measure health, both quantitatively and subjectively, by the Body Composition Program (BCP) and Military Appearance Program (MAP). MCO 6110.3A w/ Ch 1 states that it is "essential the Marine Corps develops a comprehensive program that will enhance Marine wellness, body composition, and military appearance … in order to improve Marine combat readiness and personal appearance" (USMC, 2017, p. 7).

The BCP consists of a Marine's height (rounded to the nearest 1/2 inch), weight (rounded to the nearest pound), and, if required, body fat percentage. Body fat percentage is required if a Marine exceeds the maximum weight for their height and gender. Male Marines are measured at the navel (rounded down to the nearest 1/2 inch) and the neck (rounded up to the nearest 1/2 inch). The difference of those two numbers is put into the table with the Marine's height to identify the measurement relevant body fat percentage. Female Marines are also measured at the hips (rounded down to the nearest 1/2 inch) and the formula is neck measurement subtracted from the waist added to hips measurement. This number is again put into the table with the Marine's height for the measurement relevant body fat percentage. The MAP focus of military appearance is based on a Marine's appearance and distribution of body fat (USMC, 2017, p. 1-11).

The MCO states that Commanders conduct the MAP assessment in the Service "C" uniform with focus areas for personal hygiene and grooming standards and weight distribution specifically at the neck and abdomen for males and neck, waist, and hips for females (USMC, 2017, p. 1-11). Per their respective MCOs, the PFT, CFT, and body composition programs are administered and monitored by either a trained Force Fitness Instructor (FFI) or Command Physical Training Representative (CPTR).

An additional training requirement for the CPTR is the PFT/CFT/BCMAP Monitor Certification Curriculum on MarineNet. Per the MarineNet description, the course is set up in three separate courses: Physical Fitness Test Monitor Certification Course, Combat Fitness Test Monitor Certification Course, and Body Composition Military Appearance Program Monitor Certification Course (MarineNet, 2018). Before any Marine can be

signed into writing as a CPTR, they must have completed the training in order to know the Marine Corps' official stance and regulation for proper technique and administration of the programs. This ensures all Marines monitoring PFT and CFT events are consistent with the requirements for events and judging the same.

Less than three months after assuming the office of Commandant of the Marine Corps, General Neller instituted a review of the Marine Corps' Physical Fitness Program (MCPFP) (Neller, 2015). The finalization of the review led to several significant changes to the MCPFP. The changes fell across three categories: Physical Fitness Test (PFT)/Combat Fitness Test (CFT), Body Composition Program (BCP), and Force Fitness Instructors (FFI) (Neller, 2016b). The first series of changes occurred on July 1, 2016, for the BCP and included an increased number of age groups, adjustment to the height, weight, and body fat percentage tables, increased body fat percentage allowances based on increased PFT and CFT scores, and new measurement method (USMC, 2016a). The second set of changes took effect January 1, 2017, for the PFT and CFT, which included an increased number of age groups, event scores changed and aligned by age group, and increased Class requirements (USMC, 2016c). General Neller (2016b) stated that the changes would "ensure standards are relevant, challenging, and also allow for greater distinction between Marines of different fitness levels and age groups". The third change to the MCPFP, which General Neller (2016c) called the "centerpiece of the MCPFP and key to its success," was the FFI program (p. 2). This aligns directly with the Commandant's tasks and guidance with respect to readiness, as detailed in his Fragmentary Order (FRAGO) *Advance to Contact*. These three tasks were "expand readiness efforts across the Corps to reflect a 'culture of standards and readiness,' encompassing the readiness of our Marines, Sailors, Civilians and Families, our facilities, and our equipment"; "increase the number of deployable and ready Marines across the Force"; and "establish a Force Fitness Instructor program no later than the end of FY17" (Neller, 2016a, p. 6-7). One of the key aspects, which ties multiple tasks, was to "reduce the number of non-deployable Marines and Sailors" injured during training (Neller, 2016a, p. 7).

B. MARINE CORPS FORCE FITNESS

In his initial guidance to the Force, General Neller (2016a) directed Combat Development and Integration (CD&I) to establish the FFI program no later than the end of Fiscal Year 2017 (FY17) (p. 7). Two short months later MARADMIN 147/17 established the Force Fitness Division (FFD) under Training and Education Command (TECOM). The FFD assigned mission is

> to be the service-level division for development and implementation of policy, standards, guidance, and reporting of all matters related to general physical fitness, occupational fitness, performance nutrition, body composition, martial arts, water survival, and sports medicine/injury prevention based on requirements and direction from higher headquarters. (USMC, 2017)

The Table of Organization (T/O) for TECOM identifies the FFD as "Marine Corps Fitness Division" with staffing for one Colonel with MOS 8041, two Majors with MOS 8006, two Captains with MOS 8006, and two Gunnery Sergeants with MOS 0919 (Total Force Management System, 2018, p. 17). The FFD was authorized additional staff of one GS-14, two GS-13, one GS-12, and 2.5 contractors by the Commanding General of TECOM (Training and Education Command, 2017). These numbers do not encompass the FFI instruction cadre utilized at the Force Fitness Readiness Center (FFRC) as part of the Martial Arts Center of Excellence (MACE) under The Basic School, Training Command.

Critical review of for official use only (FOUO) documents show that after validation and approval of structure, working groups were established to follow through with the Commandant's intent. The working groups identified the need to use the most current human performance concepts to ultimately make fitter Marines that are less injury-prone, which would in turn increase the proficiency of the units within the Marine Corps, as well as the future professionalization of the FFI program. Following these working groups, the FFRC began training the first FFIs on October 3, 2016 (Neller, 2016c, p. 2).

III. LITERATURE REVIEW

Table 1 provides a listing of the various articles used in the research of academic articles associated with Force Fitness Topics. Each article has been identified for relevancy of the later subchapters.

Table 1. Literature Review Matrix

Study Author/Year*	Training/ Performance	Injury Prevention	Nutrition	Body Composition	Similar Programs
ACE/2018					X
Afonso et al./2017	X		X		
Allison, Knapik, & Sharp/2006		X			
Allison et al./2017		X			
Apel, Lacy, & Kell/2011	X				
Atkins/2012		X			
Babcock, McCarrol, & Devor/2006				X	
Bartolomei et al./2014	X				
Bartolomei et al./2015	X				
Bergeron et al./2011	X	X			
Boye et al./2017	X	X			
Buford et al./2007	X				
Bullock et al./2010		X			
Dada et al./2017	X	X			
de Lima et al./2012	X		X		
Depts of the Army, Navy, and Air Force/2001			X		
Diehl/2011	X	X		X	
DOD/2002	X				
Drain et al./2017	X	X			
Drain et al./2017		X			
Foulis et al./2017	X				
Franchini et al./2015	X			X	
Friedl et al./2015	X	X			
Fry et al./1991	X	X			
Fry, Morton, & Keast/1991		X			
Grgic et al./2017	X			X	
Grier et al./2015					
Halson & Jeukendrup/2004		X			
Hauret et al./2015	X	X			
Hauschild et al./2016	X			X	
Hodgdon&Beckett/1984				X	
Hodgdon&Beckett/1984				X	

Study Author/Year*	Training/ Performance	Injury Prevention	Nutrition	Body Composition	Similar Programs
Hoffman et al./2009	X			X	
Hornsby et al./2017	X			X	
Inserra/1998	X				
Issurin/2008	X	X			
Issurin/2010	X			X	
Jones et al./2017	X	X			
Keenan et al./2017		X	X		
Kentta & Hassmen/1998	X	X	X	X	
Kerksick et al./2018	X	X			
Lauder et al./2000		X			
Linenger et al./1992	X	X	X		
Longe/2012		X			
Longe/2012		X			
Lorenz & Morrison/2015	X	X			
Lovalekar et al./2017		X			
Lovalekar et al./2017		X	X		
Lowery, Edel, & McBride/2012			X	X	
Lowery & Forsythe/2006	X	X	X	X	
Lowery/2004	X	X			
Miranda et al./2011	X				
Nagai et al./2017	X	X			X
NASM/2018			X		X
Newton/2012		X	X		
Nindl et al./2013	X	X			
Nindl & Sharp/2015	X	X			
Nindl et al./2017	X				X
Nindl et al./2017	X				
NSCA/2018					
Ode et al./2007					
Painter et al./2012	X				
Phipps/2011		X		X	
Pierce et al./2017	X				
Prestes et al./2009	X				
Prestes et al./2009	X		X		
Quatromoni/2008				X	
Rappole et al./2017	X	X		X	
Riewald/2008					
Ronnestad et al./2016	X				
Ronnestad, Hansen, & Ellefsen/2014	X			X	
Santtila, Kyrolainen, & Hakkinen/2009	X	X			
Schuh-Renner et al./2017	X	X			
Taunton, McKenzie, & Clement/1988	X	X			X
TRADOC/2017					X
USACHPPM/2008		X		X	
US Army/2012					X
Wardle & Greeves/2017	X	X		X	
Wellens et al./1995			X	X	
Westphal et al./1995		X		X	
Wetter & Economos/2004					
Williams et al./2017	X	X			

* See references for full citation

A. INJURY PREVENTION

The greatest asset that the Marine Corps has is the individual Marines that make up the whole. For Marines to contribute to the Force's mission, however, they each must be whole. Research shows that musculoskeletal injuries send service members to the hospital more than 1.3 million times and account for more than 10 million limited duty days each year (Jones, Hauret, Dye, Hauschild, Rossi, & Richardson, 2017, p. S17). Hauret et al. (2015) showed that in 2006, service members made approximately one million medical visits for lower extremity overuse injuries (p. 2646). To better protect Marines and minimize the occurrence and effects of injury in the Marine Corps, we, as Marines, need to identify what overuse injuries are, what the most common types of military injuries are, and what the factors for injuries are, and also identify the flaws in our study of injury prevention in the military.

1. Overuse Injury

An overuse injury is defined as "injuries that occur because of tissue damage caused by repetitive activities associated with occupational, recreational (including physical activity, exercise, and sport), or other types of habitual activities" ("Overuse Injury," 2012, p. 649) that are "beyond the abilities of that specific structure or system to withstand or adapt to such a force" (Taunton, McKenzie, & Clement, 1988, p. 113). They are considered preventable through proper programming, periodized training that provides adequate recovery and helps to avoid overtraining, and strengthening ("Overuse Injury," 2012, p. 652; Phipps, 2011, pp. 1388, 1390). These injuries are extremely common in joggers (46% of 4,358 joggers experienced during preceding year), runners (the cause of 45% of overuse injuries), adventure racers (73% of 223 races studied in 2003 over 16 months), and service members ("Overuse Injury," 2012, pp. 649–650; Hauret et al., 2015, p. 2652). Running is one of the main causes of overuse injury, especially in the lower extremity, due to the significant force that it exerts on the runner's body. The average runner takes between 1,000 and 1,200 steps per mile with ground reactive forces between 1.5 and three times their body weight (Taunton et al., 1988, p. 114). This is equivalent to upwards of 972,000 kg of force for a 90 kg Marine over the course of a three-mile PFT. This is a key factor for

the findings Hauret and associates (2015) had in which more than 50% of the 1,891 Marines in their study had injuries associated with running (pp. 2647–2648).

2. Common Injuries and Factors

The research is mixed with respect to the most common military injuries. Nagai and associates identified knee injuries as the most common, while Lovalekar and associates found SEAL operators had more shoulder injuries, and Kraemer identified lower back injuries as the most common (Nagai et al., 2017, p. S13; Lovalekar et al., 2017b, p. S54; Friedl et al., 2015, p. S19). However, the factors for many injuries are very similar. Linenger and associates placed persistent high intensity training and sudden increases in intensity as key factors for the high rate of overuse injuries in their study of Naval Special Warfare students (Linenger et al., 1992, p. 232). Taunton et al. (1988) identified age and inadequate strength as contributing factors (p. 109). Wardle and Greeves (2017) identified physical training as a whole as a factor for musculoskeletal injuries (MSI) in service members (p. S3). Keenan, Wohleber, Perlsweig, Baldwin, and Beals (2017) also identified age, as well as "being over body fat standards, lower aerobic fitness, and previous history of injury increased the risk of MSI in military personnel" (p. S35). Overtraining that leads to overuse injuries is another significant factor identified ("Overuse Injury," 2012, p. 652). Several other researchers identified lack of aerobic capacity or high BMI as a risk factor for MSI during their studies; however, they failed to identify that both of these results showed mediating factors rather than simple correlation (Rappole, Grier, Anderson, Hauschild, & Jones, 2017; Jones et al., 2017). Typically, in the military, individuals that are below average on their endurance tests or those noncompliant with height and weight standards are placed on "remediation programs." These programs are designed to increase the fitness or lower the weight of the individual. This has the possibility of being a direct cause of overuse injuries because it increases the amount of running the service member does in comparison to their peers. The additional mileage is, more than likely, the cause of the injury rather than the lack of aerobic capacity.

3. Injury Prevention Studies in the Military

In September 2004, the Military Training Task Force was formed to "to evaluate military physical training (PT) injury prevention programs, policies, and research and develop cross-Service recommendations to reduce PT-related injuries during and after initial entry training (IET)." (U.S. Army Center for Health Promotion and Preventive Medicine [USACHPPM], 2008, ES-1) In July 2008, the Joint Services Physical Training Injury Prevention Work Group (JSPTIPWG) submitted its report on "Recommendations for Prevention of Physical Training (PT)-Related Injuries: Results of a Systematic Evidence-Based Review by the Joint Services Physical Training Injury Prevention Work Group (JSPTIPWG)" (USACHPPM, 2008). Many of the authors combined to describe the details behind the methodologies and results from the working group in 2010 (Bullock, Jones, Gilchrist, & Marshall, 2010). The working group identified four essential elements of an injury prevention program (three were identified before the group meeting, and the fourth was added after the face-to-face meeting):

- educate military service members, especially leaders, on injury prevention principles and strategies;
- encourage leadership enforcement of unit injury prevention policies and programs;
- unit injury surveillance reports; and
- invest greater resources in research and program evaluation of training-related injury prevention interventions (USACHPPM, 2008, pp. 22, 25–26, 28).

The group also identified six intervention strategies based on sufficient scientific evidence and objective criteria:

- prevent overtraining;
- perform multiaxial, neuromuscular, proprioceptive, and agility training;

- wear mouthguards during high-risk activities;
- wear semirigid ankle braces for high-risk activities;
- consume nutrients to restore energy balance within one hour following high-intensity activity; and
- wear synthetic-blend socks to prevent blisters (USACHPPM, 2008, p. 29; Bullock et al., 2010, p. S164).

They also identified an additional 23 intervention strategies that require more scientific research and analysis before recommending (USACHPPM, 2008, pp. 83–166; Bullock et al., 2010, p. S164).

One of the fundamental flaws of this working group's recommendations begins with the essential elements of an injury prevention program. The first three "essential elements" that were identified as required for injury prevention programs were not based on evidence because "the literature does not specifically address the impact of leadership responsibility. … The working group agreed that military commanders could influence their injury rates, … or it is difficult to precisely measure the effect of education alone on injury rates" (USACHPPM, 2008, pp. 25, 27; Bullock et al., 2010, p. S162). The fourth was added because "it was discovered that 23 (62 percent) of the interventions studied did not have sufficient evidence in the literature from which to make broad Service-wide recommendations" (USACHPPM, 2008, p. 28). The document stated that the basis for the program's design was the members' agreement and feelings, not scientific evidence.

The second fundamental flaw comes from the six intervention strategies designed for all four military services. One of the admitted limitations of the working group was the research abilities of all members. The follow-on write-up to the report details that research members read the abstracts; if they felt that the abstracts provided "sufficient information" to complete their scoring tables, only the abstracts were used. The reviewers would also report the confidence intervals or p-values, but not make "a judgement as to the strength of the intervals or values when completing the quality scoring instrument" (Bullock et al., 2010, p. S172). Judging research articles solely on the abstract and then not identifying

solid data when scoring rendered the entire working group effort as questionable at best. This calls into question the validity of the intervention strategies. Compounding this issue is the fact that the sixth intervention strategy, "wear synthetic blend socks to prevent blisters," was added after the group scoring (USACHPPM, 2008, p. 29). Of note, the table associated with the intervention strategy has scores associated so it is unknown if these scores were added without the full working group approval or the select few that responded to editors' requests for reviews of topics after the working group dispersed (Bullock et al., 2010, p. S172). When defining "overtraining" for the first intervention strategy, which was the only strategy to receive a "strongly recommended" rating, the working group used a definition far more in line with an overuse injury: "physiology of musculoskeletal overuse due to exercise or physical training" (Bullock et al. 2010, p. S165). However, many of the aspects of the intervention strategy support the prevention of both overtraining and overuse injuries. This positive aspect cannot be overlooked but should be used to envelop two of the additional 23 intervention strategies: "Participate in a standardized, graduated marching (aka hiking) program" and "Gradually increase load-bearing during marching" (USACHPPM, 2008, pp. ES-4, 112–114). The working group also identified the mediating factor associated with punitive or "remediation programs" providing additional physical training leading to possible overtraining (USACHPPM, 2008, p. 37). The Prevent Overtraining intervention strategy also tied aspects of proper periodization and programming by identifying the requirement for overload training to cause a physical adaptation balanced by the requirement for recovery (USACHPPM, 2008, p. 37).

B. TRAINING AND PERFORMANCE

1. Periodization and Programming

Physical performance is one of the most critical aspects for the U.S. military. Literature states that the components of physical fitness are cardiorespiratory endurance (aerobic fitness), muscle endurance, muscle strength, flexibility, and body composition. Each of these components is required at varying degrees for performance of military tasks. Periodization is defined as a "logical method of organizing training into sequential phases and cyclical time periods in order to increase the potential for achieving specific

performance goals while minimizing the potential for overtraining" (Williams et al., 2017, p. 6). There are two main forms of periodization: parallel and sequential. A parallel model of periodization trains multiple focus areas of fitness simultaneously, whereas a sequential model focuses on one training goal per phase. Literature describes the breakdown of training time, with respect to periodization, as macrocycles (long-term/length cycle), mesocycles (medium term/length cycle), microcycle (short term/length cycle), and the training session. Programming is defined as "structuring the training variables (load, sets, repetitions, and exercise selection) within the phases to enhance the training effect" (Williams et al., 2017, p. 6). The adjustment of training variables is often confused for periodization, which leads to the loose terms of linear/classical/traditional periodization, block periodization, or daily/weekly/biweekly undulating periodization. These terms are more in line with the changes in training variables rather than the sequencing of training. The block model, as described by Issurin (2008), has three distinct blocks that build upon each other sequentially, using residual effects: accumulation, transformation, and realization (p. 70). The model was designed for athletes that compete multiple times per year and require peaking for each competition. Accumulation block builds volume, hypertrophy, and general skills and has the longest residual effect length. Transformation block begins focusing on specific skills and maximal strength and has shorter residual effect length. The realization block focuses on peaking for competition and power with the shortest residual effect. There is one focus that has built on adaptations from previous blocks. This method is most in line with Marine Corps training based on the building block approach that is used; training that builds from individual skills, to squad, platoon, company, and so on. It can also be designed around a Training Exercise Employment Plan (TEEP) as blocks are set up to best prepare for Field Exercises (FEX), Deployment for Training (DFT), Service Level Exercises (SLE), or even leave blocks. One known disadvantage to this form of training is that as focus shifts away from various fitness components, those skills atrophy at varying rates. Traditional programming (found in most literature as linear/classical/traditional periodization) adjusts intensity and volume inversely over the course of mesocycles as seen in a "wave-like" pattern. This pattern is consistent and predictable to both the athlete and the coach/trainer. Undulating

programming (found in most literature as daily/weekly/biweekly periodization) adjusts the intensity and volume more frequently for varying training adaptations. This undulating pattern allows for flexibility based on athlete recovery or increased adaptations (Lorenz & Morrison, 2015, pp. 736–737). This can be beneficial for Marine training because the training can be altered based on emergent support requirements or particularly difficult military training.

2. Overtraining

With minimizing the potential for overtraining as a primary reason for conducting periodized training, it is important to identify overtraining, its causes, and the methods for combating overtraining. Across the literature, overtraining has various definitions, but all revolve around "an accumulation of training and/or non-training stress" (Halson & Jeukendrup, 2004, p. 969) that leads to decreased performance, "fatigue whether exercising or not, mood state disturbances, and muscle stiffness or soreness" (Atkins, 2012, p. 648) even after "an appropriate regeneration period" (Fry, Morton, & Keast, 1991, p. 36). While it has been shown that non-training stressors, such as psychological, physiological, and social stressors, contribute to overtraining, the biggest training-related factor is the "failure to include enough recovery in the training programme" (Kentta & Hassmen, 1998, pp. 2, 7, 13). This scheduled recovery is the primary reason periodization minimizes overtraining. Kentta and Hassmen (1998) identified the fine line of sports performance optimization, "training volume below what can be considered optimal do not result in the desired adaptation … [whereas] training volumes above the optimum may among other things, lead to a condition usually referred to as the 'overtraining syndrome'" (p. 2). Each individual's ability to recover from the various stressors of life is different, and for this reason, so is their likelihood of becoming overtrained. The research for recovering from and avoiding overtraining consistently aligns with nutrition/hydration, sleep/rest, relaxation, and active rest (Kentta & Hassmen, 1998, pp. 2, 9; Atkins, 2012, p. 649; Diehl, 2018, p. 1023).

3. Model Comparison

There have been countless studies comparing the various forms of programming to identify the ideal or optimal method for training athletes. Ronnestad and associates compared aerobic capacity training using block methodology compared to traditional in cyclists and cross-country skiers (Ronnestad, Hansen, & Ellefsen, 2014; Ronnestad, Hansen, Thyli, Bakken, & Sandbakk, 2016). In both studies, they found that a focused approach to high intensity training (HIT) rather than a spread-loaded approach worked better for the short research period. Bartolomei and associates compared traditional and block methodologies on advanced-level strength athletes, as well as block versus weekly undulating models for strength training females (Bartolomei, Hoffman, Merni, & Stout, 2014; Bartolomei, Stout, Fukuda, Hoffman, & Merni, 2015). In the first study, the focus was on higher-level strength athletes, and the results followed closely with the training. The training plan was more upper-body–focused, and results were more conclusive for upper-body testing. The block model provided greater results for upper-body strength, no significant differences in lower-body strength, and no changes in body composition, which, as the researchers admit, is not unusual for high-level athletes (Bartolomei et al., 2014, p. 995). The second study found very different results: significant differences in lower-body strength, no significant differences in upper-body strength, body composition differences were not significant, and the results favored the weekly undulating model (Bartolomei et al., 2015, pp. 2683–2684). The training during this study was more lower-body–focused, which explains the change in results between upper- and lower-body; it does not, however, explain which model proved more effective. The differences between male and female training adaptations and the fact that males carry, and can maintain, more muscle than females during periods of low-volume training are hypothesized for block model being more successful for males than for females (Bartolomei et al., 2015, p. 2686). Buford and associates compared strength increases using linear, daily undulating, and weekly undulating models (Buford, Rossi, Smith, & Warren, 2007). This study focused on recreational lifters, not athletes, and concluded that all three models provided increases in strength (Buford et al., 2007, 1247). The results were also not statistically significantly different from one another, following the adage that “anything works for beginners.” These

studies represent only a small fraction of the literature studying the effects and comparisons of various models for performance optimization; however, Afonso and associates question the reliability of these results (Afonso, Nikolaidis, Sousa, & Mesquita, 2017). Some of the issues that the study brings up are the misuse of terminology within studies (*periodization* and *variation* being used interchangeably), not "considering global perspectives of performance" (only focusing on strength or aerobic capacity), lack of long-term studies, and not controlling for medicine, supplement, or nutritional information (Afonso et al., 2017, p. 30). They also discuss the lack of focus of the various responder categories (low-, high-, or non-responder); however, this can be disregarded given that the regression coefficients can be interpreted as an "on average" treatment. The key perspective is that all individuals are different and no specific training model is going to work for all; however, periodizing training will provide greater results across the full spectrum as evidenced by the meta-analysis conducted by Williams and associates (2017, pp. 12, 14–15). These results were so conclusive that an "1038 additional null effects from multiple studies of an average sample size would be needed to lower the mean ES to a non-significant value" or "null results from a study containing a minimum of 252 participants would be needed to reach a similar null conclusion" (Williams et al., 2017, p. 14).

4. Aerobic Capacity versus Muscular Strength for Optimal Performance

The current Marine Corps PFT and CFT test two components of physical fitness: aerobic endurance (three-mile timed run, Movement to Contact, and Maneuver Under Fire) and muscular endurance (pull-up repetitions, crunch repetitions, and ammo can lifts). The debate, both in the Marine Corps and outside of it, is which training should be focused on for performance in the military: muscular strength or aerobic capacity. Friedl and associates (2015) identify that "military tasks have both aerobic and strength demands, with general categories involving carrying, lifting, pushing, and pulling" (p. S11). The debate was put to a roundtable discussion, as well as the systematic review conducted by Hauschild et al. (2016). The Hauschild et al. (2016) review focused on the physical fitness attributes of

> Cardiorespiratory Endurance (Ability to sustain low-intensity muscle contractions for extended period of time. AKA aerobic fitness, aerobic capacity, stamina), Muscular Strength (Ability to exert maximal force

> against a fairly immovable object for very brief period), Muscular Endurance (Ability to conduct high-intensity muscle contractions repeatedly for relatively short periods), and Flexibility (Ability to Flex or lengthen various parts of the body). (p. 145)

The common occupational tasks were: lift and lower (single), lift and lower (repeated), lift and carry, stretcher carry, push-pull, casualty drag, dig, march/walk (with a load), move fast, climb, crawl, and multiactivity (Hauschild et al., 2016, p. 145). The researchers compared the fitness attributes, Cardiorespiratory Endurance, Muscular Strength (subcategorized into Upper-Body Strength, Lower-Body Strength, and Trunk Strength), Muscular Endurance (subcategorized into Upper-Body Endurance, Lower-Body Endurance, and Trunk Endurance), and Flexibility, across common occupational tasks and tabled the pooled correlations. These results do not effectively match the current testing components. Cardiorespiratory Endurance and Muscular Strength each received 2 in the "Very Strong Correlations" (equal to $r>0.70$), while Muscular Endurance and Flexibility received 0. In the "Strong Correlations" (equal to $0.50>/=r<0.70$), Muscular Strength led with 8, Muscular Endurance had 7, Cardiorespiratory Endurance had 6, Flexibility again had 0. These results showed that Lower-Body Strength, an attribute not tested on any of the Marine Corps' tests, was correlated with more of the common tasks than any other muscular attribute at the Strong or Very Strong level. Trunk Endurance, as tested with crunches, had 0 tasks correlated at the Strong or Very Strong level (Hauschild et al., 2016, p. 151). Friedl and associates (2015) argued that this debate is important because

> high levels of aerobic training can compromise resistance training gains and increase injury rates. Resistance training requires a greater commitment of time and resources as well as a greater understanding of the science to produce true strength gains that may be beneficial to military performance. (p. S10)

They highlight two significant mistakes in the thought process of many military trainers with respect to aerobic capacity and muscular strength. The first is that aerobic trainability is the same across all service members, divided by sex, and that with enough training and motivation anyone can be "trained to an acceptable level." The second is just the opposite with respect to muscular strength in that, no matter how good the training, some individuals, especially females, will never be strong so why try (Friedl et al., 2015, p. S11).

Both of these have been proven to be false through research, but the question remains: what is the right ratio of how fast and how strong military members should be? Five pairs of experts were asked to defend either the strength or aerobic side of importance. For aerobic capacity as the more important attribute, some of the reasons were that it

> results in an increased capacity for, and faster recovery from, long-term physical activity … more aerobically fit individuals can perform tasks for longer periods of time, fatigue less rapidly, recover faster, and have greater reserve capacity for subsequent tasks, … train the aerobic rate system so one has less dependence on the limited system, anaerobic capacity … [it allows for] more reserve to handle unknown stressors … physical training to improve and maintain aerobic fitness is easy to conduct for individuals and large groups. (Friedl et al., 2015, pp. S12, S14, S18)

For strength as the more important attribute, Friedl et al.'s (2015) reasoning included the following:

- Resistance training improves body composition and power production, as well as occupational task performance.
- The highest prevalence of military injuries typically involving the running component of physical training unrelated to occupational strength demands.
- Elevations in external load relative to body mass, lift height, and carry duration are associated with significant and marked increases in the risk of injury, so the requirement to become stronger to mitigate the additional equipment service members currently carry.
- The sex differences for aerobic fitness range from 20 to 30%, whereas for strength fitness, they range from 30 to 50. Thus, it is clear that efforts should be more focused in strength and power development to best successfully prepare women for physically demanding combat-centric military duties.

- Greater emphasis on strength and power fitness could also have a profound effect on mitigating musculoskeletal injury risk among military women.

- A training paradigm shift away from long-distance running and more toward strength fitness training will have the dual advantage of enhancing physical performance and reducing injury.

- Once a baseline aerobic fitness level is established, it appears that an emphasis on strength and power training may be preferable to exhibit additional neuromuscular training adaptations while also protecting against injury risk.

- A common belief is that soldiers will "train to the test." If this is true, and given the lack of pure strength tests within military physical fitness assessments, a significant gap and concern remains about the extent to which soldiers and military leaders may be incentivized to strength train.

- Strength and power capacity are vital to the warfighter's long-term health and resilience because stronger soldiers are not only better able to withstand and recover from the physical demands of the profession but also have decreased injury rates because of the protective effects resistance exercise confers on tendon, ligament, and bone. (Friedl et al., 2015, pp. S13, S14, S16, S18, S20)

Through proper training that is periodized, can the Marine Corps balance the aerobic demands to continue training or operating for long periods of time under multiple stressors and the requirement to physically be strong enough to withstand increasing carriage loads and protect from injuries?

C. BODY COMPOSITION

1. Military Body Composition Program

Department of Defense (DoD) Instruction 1308.3 is the guiding directive on physical fitness and body fat programs for all of the military services. This instruction explains the methods for measuring body fat of service members identified as overweight per the weight-for-height charts. These charts are based on the Body Mass Index (BMI), which is measured as kilograms per meter squared (kg/m2). The literature describes a BMI greater than or equal to 25 kg/m2 and less than 30 kg/m2 as overweight and anything greater than or equal to 30 kg/m2 as obese. The DoD instruction places the limits for service members between 27.5 and 25, and restricts any service from setting a screening weight at less than 25 (DoD, 2002, p. 11). If a service member exceeds the weight-for-height chart, they are subject to the circumference-based method of body fat testing. This method is the only allowed method of assessment because it has been "carefully evaluated for applicability to Service members and represents the best approach, which can be applied by service members with minimal error (plus or minus 1 percent)" (DoD, 2002, p. 13). The research, however, does not support these statements, and the most recent research studies by Hodgdon and Beckett, that established the current body fat calculation equations, are highly flawed.

Hodgdon and Beckett (1984a) conducted studies on U.S. Navy personnel in order to achieve better results than the Wright, Dotson, and Davis method based on U.S. Marine Corps personnel from 1980 (p. 3). They conducted the initial study on male personnel and a subsequent study on female personnel, building two separate and distinct equations that are still in use today. The research utilized eight skinfold sites (biceps, triceps, subscapular, chest, midaxillary, anterior suprailiac, abdominal, and front thigh) and 12 circumference sites (neck [sloping slightly downward], shoulders, chest I and II, Abdomen I and II, hip, thigh, calf, arm extended, arm relaxed, forearm, and wrist; Hodgdon & Beckett, 1984a, pp. 4-6). In its factor analysis, the researchers combined, for males, the midaxillary, subscapular, and anterior suprailiac sites into "trunk skinfolds," extended and relaxed arm sites into "arm circumference," abdomen I and II into "abdomen circumference," and dropped the hip circumference because of the high correlation to the abdomen and thigh

measurements (Hodgdon & Beckett, 1984a, p. 8-9). For the females, the variables that were combined were the Midaxillary, Subscapular, and Anterior Suprailiac sites into "trunk skinfolds," Extended and Relaxed Arm sites into "arm circumference," Abdomen I and II into "abdomen circumference," but Thigh and Chest I were dropped because of high correlations to the Hip and Shoulder and Hip circumference remained (Hodgdon & Beckett, 1984b, p. 9). From these combinations, the researchers were able to conduct the factor analysis and began the regressions using body density as the dependent variable. They added variables to the equation in a "forward, stepwise fashion" until the square of the correlation coefficient was less than 0.01 (Hodgdon & Beckett, 1984a, p. 7). The current term for this procedure is "p-hacking" in which a researcher adds or subtracts variables until they achieve the result of statistical significance they desire. While I do not believe this was done maliciously, but rather to find "the best possible result," it demonstrates a highly flawed empirical strategy. At this point, the researchers only took the circumferences, height, body weight, and age variables from the best regression because they felt they were the "most reliably made in the field by personnel with minimal training," but ultimately body weight and age were dropped from the final equation (Hodgdon & Beckett, 1984a, p. 12). The researchers compared six underwater weighings, considered the most accurate form of body composition assessment, and found a correlation coefficient of 0.90 with a Standard Error (SE) of 3.52% body fat units for males (Hodgdon & Beckett, 1984a, p. 12) and 0.85 with a SE of 3.72% body fat units for females (Hodgdon & Beckett, 1984b, p. 12). When the male research subjects were cross validated, the mean values of predicted versus measured body fat percentage were found to be significant at the $p<0.05$ level with a SE of 2.7% body fat units (Hodgdon & Beckett, 1984a, p. 14). The females were cross validated with both U.S. personnel, not significant at the $p<0.05$ level with SE of 4.04% body fat units, and Canadian personnel, significant at the $p<0.05$ level with SE of 4.36% body fat units (Hodgdon & Beckett, 1984b, p. 14). While these standard errors do not seem overly problematic, when a confidence interval of 95% is considered, the numbers increase dramatically. This places the actual male body fat percentage, with 95% confidence, 6.90% above or below the equation and the actual female body fat percentage, with 95% confidence, 7.92% above or below the equation. These

flaws have brought several studies to find that "CBEs (circumference-based equations) overestimate body fat percentages in larger men" compared to dual-energy X-ray absorptiometry by Friedl and associates (2015); "14.7% false-positive rate in classifying personnel as noncompliant with body fat standards" compared to bioelectrical impedance analysis of Air Force personnel; "false positive results of 6.8% to 18% in noncompliance ratings" by Shake et al. on Navy personnel (Babcock, Kirby, McCarroll, & Devor, 2006, p. 60). When Babcock and associates (2006) compared CBEs to skinfold measurements on 1,191 firefighters, the Marine Corps equation was the closest in the sample, but still considerably higher (skinfold 18.4 +/- 6.1, USMC 19.6 +/- 5.8) (p. 61). Based on the resultant scatter plot, there was a "trend for overestimation of body fat with CBEs" (Babcock et al., 2006, p. 62).

2. Call for Change

While the circumference-based equations currently used in the military are easy and simplistic, they do not provide the best picture for service member body fat. Because the Marine Corps looks at its personnel as "tactical athletes," using BMI designed for the general population is a mistake. Riewald describes this in the article written on the Ode, Pivarnik, Reeves, and Knous (2007) study, "using the same BMI classification system that is used with the general population may paint an incorrect picture for an athlete. … athletes are not like everyone else" (Riewald, 2008, p. 81). The Ode study found the False Positive rates (overweight and normal fat), which should be considered the worse Marine Corps error, to be 67% of male basketball, wrestling, hockey, and non-linemen football athletes and 31% of female basketball, crew, and softball athletes (Ode et al., 2007, p. 405). This was compared to a False Negative (normal weight and overfat) of 0% for both male and female athletes (Ode et al., 2007, p. 406). The non-athletes in the study had a False Positive rate of 25% and 7% for males and females, respectively, compared with a False Negative rate of "small proportion" and 44% for males and females, respectively (Ode et al., 2007, pp. 405–406). These results caused a low sensitivity among the female non-athlete population studied, which the researchers stated could be "attributable to slightly greater body fat and/or less fat-free mass that results from minimal strength training"; however, this identified population can be reduced within the Marine Corps based on required

strength training (Ode et al., 2007, p. 407). This coincides with the Grier et al. study on 110 Army soldiers in which 19 soldiers were identified as False Negative, for this study was considered Over BMI and passed body fat (Grier, Canham-Chervak, Sharp, & Jones, 2015, p. 487). The True Positive and True Negative numbers accounted for only 83% of the population (Grier et al., 2015, p. 487). The False Positive, Under BMI and failed body fat, was not reported in the study. For these reasons, researchers such as Babcock et al. (2006), Inserra (1998), and Jones et al. (2017) have recommended a reexamination of the current body composition program within the military.

3. BMI versus Performance

Another significant flaw in the current body composition system identified from the research is the potential to force service members into a less than advantageous weight for performance. The literature shows that increasing standards of BMI can decrease injuries with little effect on overall performance. For example, the Jones et al. (2017) study identified that military members with a higher BMI were less likely to incur musculoskeletal injuries or considered "musculoskeletally resilient" and "current military policies may place too much emphasis on and encourage lower BMIs" (p. S18). They stated that the potential "for a higher BMI to have a protective effect against injury" was hypothetically based "in part from greater absolute amounts of muscle among soldiers with higher BMIs" (p. S20). Jones et al. (2017) even went as far as to recommend that "strength training programs may be a means to reduce injuries in trainees and soldiers with extremely low BMIs" (p. S21). Pierce et al. (2017) compared performance, based on the Army Physical Fitness Test (APFT) and military relevant tasks, against BMI and found "BMI stratification did not reveal differences in military-specific task performance" (p. S81). The tests were conducted for muscular strength (hex-bar deadlift and bench press), muscular power (sled drag, sled push, and medicine ball throw), muscular endurance (bench press endurance, and goblet kettlebell squat endurance), and speed/agility (400-m run, 300-yd shuttle run, Illinois Agility Test) (Pierce et al., 2017, p. S80). Additionally, Common Soldiering Tasks (CST) and Warrior Tasks and Battle Drills (WTBD) were conducted to simulate actual military tasks. In the study, the higher BMI, male and female, soldiers performed better on events of lower- and upper-body muscular strength and lower-body

muscular power (Pierce et al., 2017, p. S81). While their speed and agility scores were lower, and identified as statistically significant, they are not considered economically significant: 300-yd shuttle run difference of three seconds for males and six seconds for females, Illinois Agility Test difference of 0.6 seconds for males and 0.7 seconds for females (2017, p. S80). While not statistically significant, the difference for the 400-m run time was three seconds for males and five seconds for females. Additional statistically significant differences were identified for male two-mile run time, 31 seconds per mile slower for high BMI tertile, and female sit-ups, 17 fewer sit-ups for high BMI tertile (Pierce et al., 2017, p. S81). As Lowery states, "performance, rather than body composition, however, is of primary interest to the competitive athlete (aside from bodybuilders), and thus weight control approaches must not unduly interfere" (Lowery, 2004, p. 110).

D. NUTRITION

Nutrition is the cornerstone of athletic performance. The adage that "a person cannot out-train a poor diet" holds especially true for service members. One of the biggest problems that occurs for the military is the lack of knowledge and education relating to nutrition for sport performance. The standard Recommended Daily Allowances (RDA) for the general population, similarly to the use of BMI, cannot be forced on the active lifestyle of military members. Some of the misconceptions that have fueled miseducation stem from excessive amounts of protein that cause osteoporosis or kidney damage, the belief that all high protein diets are inherently high fat diets, or that protein is the only required macronutrient or dietary concern for athletes. The International Society of Sports Nutrition (ISSN) Research Committee submitted its latest official review and position in 2018. In its review, the committee stated that athletes that do not have sufficient calories (energy) and/ or right combination of macronutrients will not adapt optimally to their training, or worse, will lose muscle mass, strength, and bone mineral density; be susceptible to illness and injury; and lessen immune, endocrine, and reproductive function (Kerksick et al., 2018, p. 9).

1. Nutrition and Injury

While nutrition is seen as important for building muscle, increasing body composition, or optimizing performance, one of the key factors with respect to the Marine Corps is the injury prevention aspect. Proper nutrition and hydration are two of the main factors in minimizing the onset of overtraining because they are critical to the recovery process. Kentta and Hassmen addressed them as the first of their four main categories for recovery, identifying that those that do not have the necessary carbohydrate (glycogen stores) for the energy demands develop staleness and the requirement of 3g of water per g of carbohydrate to bind muscle glycogen (Kentta & Hassmen, 1998, p. 9). Atkins (2012) also described how to minimize the possibility of overtraining by "eating nutritious foods after exercising … [and] drinking plenty of water" (p. 649). Phipps (2011) recommended that dietary information be included in the training logs as a tracking method (p. 1022). This tracking method can assist to identify whether a Marine is not keeping his intake commensurate with expenditure and runs the risk of under-recovery. In addition to this, research has shown that performance can drop dramatically with as little as a 2% drop in body weight from sweat. For this reason, the ISSN recommends not relying on thirst as a hydration reminder and to make replacing lost fluid and electrolytes a primary goal post exercise (Kerksick et al., 2018, p. 19).

2. Macronutrients

As the Marine Corps looks at its Marines as "tactical athletes," a good comparison group consists of the men and women in college athletics; the vast majority are the same age, in similar circumstances (away from home), and on a regimented physical training program. Quatromoni (2008) stated that "nutritional concerns are easily magnified in college athletics, when competitive pressures mount, financial resources are limited, and life skills are not fully developed;" this is equally true of young Marines (p. 689). These similarities continue when we consider that they, Marines and young college athletes, have "misinformed beliefs about their nutritional needs, only a limited variety of foods in their daily diet, or an overly restrictive diet" (Quatromoni, 2008, p. 692). The study found that many had various forms of eating disorders and all those that scored in the highest risk

category were freshmen or sophomores, very similar in age to the vast majority of junior Marines. For these reasons, it is especially important to discuss the various macronutrients required for performance optimization.

One of the most researched macronutrients is protein. Given that protein is the building block for muscle building, its prominence in macronutrient research and anecdotes comes as no surprise. The inevitable question is to determine the correct amount of protein needed for strength or sport performance. Many athletes have been told that protein, as Lowery et al. (2006) caution against, is "overrated," "risky," or "typically over-consumed" (p. 47). This ISSN official stance states that for "most exercising individuals" the overall daily protein intake should be between 1.4 and 2.0 grams of protein per kilogram of body mass (g/kg) (Kerksick et al., 2018, p. 12). This aligns with the meta-analysis findings of Morton and associates that 1.62 g/kg per day may be an "ideal place to start" (Kerksick et al., 2018, p. 12) and of Lowery and associates (2012), who stated that "approximating the traditional 'one gram per pound' are not unreasonable for healthy athletes" (p. 29). There are several circumstances that have shown to either require or benefit from an increased dosage of daily protein such as hypocaloric periods (2.3 to 3.1 g/kg fat-free mass/day), increasing body composition (in excess of 3.0 g/kg body weight/day), or athletes conducting high volume, high intensity training (1.7 to 2.2 g/kg body weight/day) (Kerksick et al., 2018, pp. 12–13). It is important to note that individuals exceeding these amounts or meeting them, without the prescribed requirements, while wasteful, are not necessarily in danger of health concerns based on the increased protein intake. As Lowery and associates described, research using a quasi-experimental design of self-reported intakes over more than a decade of approximately 3.2g/kg of body mass showed no differences in kidney function or damage (Lowery et al., 2012, p. 27). Of note, some research has shown that with more experienced lifters, the amount of protein required for training adaptations goes down. Research does show that one of the critical elements of protein intake is the content of leucine because it is "accepted to be the primary drive of acute changes in protein translation" (Kerksick et al., 2018, p. 23).

Research has shown that public health initiatives on fat reduction diets pushed through the 1980s and 1990s lowered cardiovascular deaths but are also tied to an "over-

consumption of dietary carbohydrate and the obesity epidemic facing Western culture" (Lowery, 2004, p. 106). The ISSN stated that athletes require the same or slightly more dietary fat than the general population in order to maintain health (Kerksick et al., 2018, p. 13). Research has shown that very low-fat diets reduce sex hormone production and can lower the ability to absorb fat-soluble vitamins and essential fatty acids. Concurrently, higher-fat diets appear to help "maintain circulating testosterone concentrations" and may support against the "documented testosterone suppression which can occur during volume-type overtraining" (Kerksick et al., 2018, p. 13). Lowery noted that dietary fat should encompass approximately 20–35% of dietary calories, which aligns with the ISSN stance of approximately 30% (Lowery, 2004, p. 109; Kerksick et al., 2018, p. 13). Caveats to these recommendations are athletes conducting high-volume training (up to 50% of dietary energy) or athletes attempting to reduce body fat (down to 20% of dietary energy) (Kerksick et al., 2018, p. 13). The second instance has shown mixed research results based on reduction of dietary fat causing an easier energy shortage while "carbohydrate reduction reduces insulin concentration, facilitating lipolysis" (Lowery, 2004, p. 110). The ISSN recommends more human research on high-fat diets, such as ketogenic, use for athletes (2018, p. 13). This recommendation for research is of valuable importance to the military services because of the abundance of adolescent and animal studies of ketogenic diet benefits for Traumatic Brain Injury (TBI), but a significant lack in adult human studies.

Research has shown the known dependence of athlete energy on carbohydrate sources, but the carbohydrate levels vary based significantly on intensity levels. ISSN guidance for athletes that train at "moderate amounts of intense training," equating to two to three hours per day of intense exercise five to six times per week, are recommended 5 to 8 g/kg per day. This is compared to athletes training at high volume of intense training, equating to three to six hours per day of intense training either single or two-a day style workouts five to six days per week, are recommended 8 to 10 g/kg per day (Kerksick et al., 2018, p. 11). These levels are set to simply maintain the liver and muscle glycogen stores and would equate to 450 to 720 g per day and 720 to 900 g per day for a 90 kg athlete, or Marine. These numbers are based on training volumes that are significantly higher than typical Marine Corps training, and research shows that before carbohydrate provides an

ergogenic increase, exercise must reach approximately 90 minutes. For this reason, Marine Corps training falls into a more "general training" requiring approximately three to five grams per day, equating to 270 to 450 g per day for a 90 kg Marine. Marines that focus too highly on protein in their diet and fail to adequately maintain carbohydrate numbers run the risk of damaging immune function and muscle metabolism, which is contrary to the intended efforts (Lowery & Forsythe, 2006, p. 44).

3. Nutrient Timing

In addition to nutritional content, the timing and composition of meals is critical for the optimization of performance, "training adaptations, preventing overtraining," and body composition (Kerksick et al., 2018, p. 13). Examples of the benefits of timing occur around the pre- and post-workout window. Research on the pre-workout timeline shows that a light snack of approximately 50g carbohydrate and 5 to 10 g of protein taken 30 to 60 minutes before exercise allows for greater carbohydrate availability during the end of intense exercise (Kerksick et al., 2018, p. 14). Research has also shown that resistance training allows for a muscle-protein "window of opportunity" post-workout in which the athlete should consume approximately 1 g/kg carbohydrate and 0.5 g/kg of protein within the first 30 minutes with diminishing returns over time (Kerksick et al., 2018, pp. 13–14). Understanding the digestion speed of the various proteins, for example whey, casein, egg, or beef, is also important during this window. Whey would be a better option because of the increased digestion time compared to a beef protein which takes longer to digest based on its solid nature (Lowery et al., 2012, p. 28). While there is research that identifies that the addition of carbohydrates is no more effective than protein alone, the ISSN does not want to distract from the "fact that optimal carbohydrate delivery will absolutely support glycogen recovery, aid in mitigating soreness and inflammation and fuel other recovery demands" (Kerksick et al., 2018, p. 36). Ultimately the timing and composition of meals "should be individualized to each athlete's needs according to the goals of the training cycle and bout" (Kerksick et al., 2018, p. 14).

4. Dietary Supplements

The use of dietary supplements is a highly contentious subject. However, these supplements can in some cases be beneficial to an athlete's performance. The focus here will be on supplements in which the literature demonstrates "Strong Evidence and Apparently Safe." Convenience supplements, such as meal replacement shakes or Ready to Drinks (RTD), are examples of dietary supplements that aid in times when an athlete does not have the time for a meal or, in the case of larger athletes, is unable to comfortably eat the required amount of macronutrients. As previously described, at 2.2 g/kg of protein and 5 g/kg of carbohydrates, a 110 kg Marine may not be able to eat the required amounts of food but can effectively supplement with meal replacements or RTDs on top of their normal diet. The ISSN states, "The most effective nutritional supplement available to athletes to increase high intensity exercise capacity and muscle mass during training is creatine monohydrate" (Kerksick et al., 2018, p. 21). This is based on the research that shows its safety, with the "only clinically significant side effect" being potential for weight gain and reported "therapeutic benefits in healthy and diseased populations ranging from infants to the elderly" (Kerksick et al., 2018, p. 21). While most research demonstrates the importance with respect to resistance training, inferences have been made to the ability for creatine monohydrate to benefit endurance training as well. Research has demonstrated the highly effective nature of caffeine for both aerobic and anaerobic exercise. While doses on the higher end of the 3 to 5 mg/kg spectrum "lowered ratings of perceived exertion and decreased perception of muscle pain," caffeine loses its effectiveness for individuals that use it on a regular basis (Kerksick et al., 2018, p. 30).

E. SIMILAR PROGRAMS

The literature shows there are 16 different agencies with National Commission for Certifying Agencies (NCCA) accreditation for programs in the personal trainer or strength and conditioning field. There are far more personal trainer certification programs in the marketplace; however, only the certifications accredited by the NCCA were examined. These standards were based on the Standards for Educational and Psychological Testing and "provides impartial, third-party validation that your program has met recognized

national and international credentialing industry standards for development, implementation, and maintenance of certification programs" (Institute for Credentialing Excellence [ICE], 2018).

1. Civilian Programs

Some certifications are more directly applicable such as the National Strength and Conditioning Association's (NSCA's) Certified Strength and Conditioning Specialist (CSCS) or Tactical Strength and Conditioning Facilitator (TSAC-F) certifications. Others are a combination of certification such as the American Council on Exercise's (ACE) Personal Trainer certification with Fitness Nutrition and Sports Performance specialty certifications. The focus of this review is on the certifications that have the most direct applicability. The CSCS certification is one of the most widely known and respected in the strength and conditioning field; however, one of the prerequisites for the program is a "Bachelor's degree or higher granted by an accredited institution, or a Degree in Physical Therapy or Chiropractic Medicine" and the degree must be in an Exercise Science–related field such as Exercise Science, Kinesiology, and Athletic Training among others (NSCA, 2018, pp. 13–14). The NSCA's recommended timelines of preparation before taking the certification tests for individuals without an Exercise Science–related degree, for applicable programs, and the lack of an internship or practical experience is greater than six months (NSCA, 2018, p. 11). This is contrasted with the National Academy of Sports Medicine (NASM) Personal Trainer certification, which advertises a compressed timeline of 10–12 weeks of preparation but requires the additional Performance Enhancement Specialist course (NASM, 2018). These courses, however, do not have a nutrition component built in to the certification. The cost of these certifications also varies. The NSCA TSAC-F cost, for test-taking alone, is $435; the ACE Personal Trainer certification ranges from $699 to $999 based on level of experience; and the NASM Personal Trainer certification costs from $524 to $1,499, also based on level of experience (ACE, 2018; NASM, 2018; NSCA, 2018, p. 17). These costs only increase with the additional courses required in nutrition, performance enhancement, sports performance, and so on required to meet the extensive topics within the Force Fitness Instructor curriculum.

2. Military Programs

There are also similar programs within other branches of the U.S. military. The United States Army established a Master Fitness Trainer course initially in 1983 as a four-week, 137-hour course to train Non-Commissioned Officers (NCOs) to

> assess individual and unit fitness status, analyze unit tasks and develop supporting programs, train other leaders how to conduct productive and challenging PT, and provide the PT leader an understanding of the human body, its various systems, and how it functioned during exercise. (U.S. Army Training and Doctrine Command [TRADOC], 2018)

The Master Fitness Trainer course now resides in the U.S. Army Physical Fitness School, Leader Trainer Brigade, Training and Doctrine Command. The current course trains both NCOs and commissioned officers and is comprised of two phases: Distance Learning and Resident. The Distance Learning Phase consists of 46 hours over 17 courses with prerequisites of Army Physical Fitness Test (APFT) score of 240 or above and a GT score of 110 or higher. The 96-hour Resident Phase requires completion of Phase I within 120 days, APFT score of 240 or above at the start of the phase, compliant with height and weight requirements, not be on temporary profile (permanent profile requires a waiver) (TRADOC, 2018).

F. FORCE FITNESS INSTRUCTOR PROGRAM OF INSTRUCTION

1. Design

The Force Fitness Instructor (FFI) Program of Instruction (POI) is built around five subsections: Performance Nutrition, Force Fitness Training Techniques, Fitness Program Development, Coaching, and Injury Prevention (USMC, 2018, p. I-1). The total course encompasses 237.25 hours over 30 training days including 42 individual classes, not including practical application and evaluations. The course is categorized in three main annexes: Nutrition, Force Fitness Techniques (individual skills and lifting techniques), and Classes (program design, injury prevention, coaching, unit program development, etc.) (USMC, 2018, p. IV-20). FFIC1000 Role of the Force Fitness Instructor identifies the FFI's role as threefold: as a Marine Corps Asset; as a Unit Subject Matter Expert; and as a Teacher, Trainer, and Coach (USMC, 2018, pp. 3–4). The aspect of being a Marine Corps

asset is designed around the idea that "everyone in the Marine Corps Total Forces will be trained by the FFI … [that] will use a single, modern training methodology with a multi-faceted approach … [and] act as unit liaison with SMEs (nutritionists, athletic trainers, Semper Fit, etc.)" (USMC, 2018, p. 3). The fundamentals of Unit Subject Matter Expert are that the FFI belongs to the Commander, builds specialized physical fitness plans based on the Commander's intent, and administer the PFT/CFT and weigh-ins. As a Teacher, Trainer, Coach, the FFI is expected to assess each Marine's fitness level, instruct him or her on proper exercise technique and nutrition in order to set and achieve goals, and "facilitate guided discussions to develop resilient warriors" (USMC, 2018, p. 3).

A significant issue in most of the courses is that Enabling Learning Objectives give the standard of "without error." For example, "*Without the aids of references*, identify the three major energy systems in the body without error" (0919-NUTR-2001h from FFIA1030 Energy Systems; USMC, 2018, p. 2, emphasis added). This implies that either every student has graduated the course with a perfect score or that some students have graduated without meeting the standards.

Another significant issue is the inconsistent references provided in the lesson plans. The same class FFIA1030 Energy Systems, previously discussed, shows very detailed and technical details in the lesson plan, but only two references, and neither of these sources contains the actual information (2018, p. 6). Another example of this is in the FFIC1015 Force Fitness Instructor Programming class, where the only method of programming taught is the linear/traditional, but one of the references is the Bartolomei and associates comparing traditional to block methodologies (USMC, 2018, p. 11; Bartolomei et al., 2014). The irony of using that particular study is that the findings showed that block methodologies were more effective than traditional methods with trained athletes, but the block model is not mentioned in any of the classes (Bartolomei et al., 2014, p. 995). To this point, no model except for linear/traditional is discussed, indicating the lesson appears to be selective and biased.

Finally, an issue arises around the question of true expertise. If the FFI is considered the "unit subject matter expert", why would they require the services of other SMEs? If the FFI has the required expertise, why would the Marine Corps continue to pay for the

additional SMEs? The follow on to this question leads to which is a worse option, a mediocre fitness training plan built on a solid understanding of the Commander's intent or a solid fitness training plan built on a mediocre understanding of the Commander's intent?

2. Nutrition

The Nutrition Annex, and associated classes, utilizes information written in the Joint AR 40-25/BUMEDINST 10110.6/AFI 44-141 Nutrition Standards and Education, also known as the Military Dietary Reference Intakes (MDRI), which was published in 2001. One of the issues is that MDRI woefully underrepresents the macronutrient requirements because they are all based on the Recommended Daily Allowances (RDA) for the general population. For example, the MDRI states that protein should encompass 10 to 15% of daily energy needs and "range from 0.8 to 1.5 gram (g) protein per kg body weight" with intense activity (Departments of the Army, Navy, and Air Force, 2001, p. 4). The top of this range does not even reach the minimums recommended throughout the literature for protein requirements for athletes (Kerksick et al., 2018; Lowery et al., 2012).

The MDRI recommendation that "menu planners will establish menus with 30% or less of total calories from fat" does align with the literature numbers of 25 to 35% for normal athletes, but possibly higher for individuals with increased intense activity levels (Departments of the Army, Navy, and Air Force, 2001, p. 4; Kerksick et al., 2018; Lowery et al., 2012). On the other hand, the MDRI recommends that carbohydrates be in the range of 50 to 55% of the total calories, which is algebraically inconsistent. All three macronutrients are required to be at the peak of their range in order to achieve 100% of the calories (15% protein + 30% fat + 55% carbohydrate; Departments of the Army, Navy, and Air Force, 2001, p. 4). FFIA1005 Performance Nutrition provides four different percentage breakdowns for either strength, hypertrophy, power, or endurance (2018, p. 6). This is compounded in FFIA1010 Dietary Guidelines in which Marines are taught, "Aim to fill about ½ of your plate with carbohydrate-rich foods, ¼ with protein-rich foods, and ¼ with fats or fat-containing foods" (2018, p. 4). While good starting point advice for the general population, these statements are wholly lacking for Marines that are expected to perform optimally as "tactical athletes." The overall level of instruction with respect to nutrition is

lacking the detail required to state any level of expertise for the Marines graduating from the course.

3. Training and Performance

The importance of periodization has been demonstrated repeatedly. The systematic approach to training in order to achieve goals in a building block approach, focused by time period, and minimizing risk—which is the definition of periodization—is very normal to most Marines because that is the way their operational training is built. A time block of training, typically a three-month quarter, has a very specific focus and Training and Readiness (T&R) tasks are trained from the 1000 level, 2000 level, and so on. In the following quarter or time block, a new focus of training is set, increasing on the skills gained from the previous quarter, and T&R tasks for the new focus are, again, trained from the 1000 level and up. The Marine Corps spends a considerable amount of time at various schools to teach leadership and to build a cohesive training plan to prepare Marines for all operations, not just combat ones. Why would we then not put the same amount of time and effort into training the sole subject matter expert (SME) on the proper way to build a cohesive training plan (periodization) for physical training?

Apart from issues in the timing of training, the content of the training itself ignores periodization. In FFIC1015 Force Fitness Programming, the single part of the class that discusses periodization, only two slides are devoted to periodization and one is only a quote. The lesson plan provides a paragraph of what periodization is and the time phase focus for goal attainment, but there is nothing on how to build a formal physical training plan. As previously mentioned, the only methodology discussed is linear/traditional; nothing is discussed with respect to a focus or goal orientation to the training. No time phases of the linear model aside from a mesocycle being approximately four weeks is ever shown (2018, p. 11). Unless an FFI student has significant previous experience in Exercise Science, the lack of direction and focus of the cornerstone of the plan is not preparing the Marines for success. They are already extremely limited by only providing a single methodology, but to not even provide a detailed approach to utilizing that methodology is extremely problematic for the program as a whole.

These issues are compounded further by the breakdowns of programming blocks in the media portion of the class. Each of the programming blocks (hypertrophy/foundational, strength, power, and endurance) is broken down into Beginner, Intermediate, and Advanced for the training variables. However, the power block has no information in the Beginner column. This is to assume that beginner lifters should not be trained in a power phase. With respect to resistance training, most Marines would be classified as beginner to intermediate. This power phase is essential for these Marines to build the neural adaptations that are achieved from high velocity training, but this is not taught. The overall level of instruction with respect to periodization and programming is lacking the detail required to state any level of expertise for the Marines graduating from the course.

A key aspect of the FFI in a unit is his or her ability to train or coach a Marine in proper technique of the individual lifts. This is reinforced by the fact that the entire Annex B of the POI is dedicated to the foundational movements and various techniques associated with them. However, these classes lack any documents aside from informal documents that allow a single page per exercise. This does not provide the necessary instruction for technical lifts such as a kettlebell swing, squat, bench press, clean high pull, and other common lifts. There may be additional instruction that is provided during these classes, but there is no formal documentation associated with it. Fundamentally, the overall level of instruction with respect to technique and coaching lacks the detail required to qualify some level of expertise for the Marines graduating from the course.

4. Injury Prevention

Preventing injury and thus increasing the readiness of the unit is of critical concern for the FFI. The predominance of the injury classes are highly detail-oriented, arguably beyond the basic scope for a non-medical based individual, and tie directly with the biomechanics and kinesiology classes taught. These classes provide a solid background and understanding of how the body moves and common injuries associated with the movements.

However, in order to prevent injuries, the FFI is taught to build, or modify if one already exists, an injury prevention program. The five elements for the content are

> proper dynamic warm up and cool down; structured to address key deficits identified in initial human performance assessments; safe design and progression of the physical fitness program by incorporating rest and recovery periods; open communication with medical about injury trends and mechanisms in order to develope (sic) a fitness program to mitigate these factors; adherence to individul (sic) limitations imposed by medical. These limitations are imposed by medical experts in order to safely rehabilitate an injury. Not following the limitations can make the injury worse, and prolong limited duty status, and impact the Marine's ability to do his or her job. (USMC, 2018, pp. 6–7)

At best, this is only a "wave top" approach to planning an injury prevention program. At worse, this leaves too much inference and discretion to what the instructor's point is to be meaningful.

As such, if the third step of the injury prevention program is to conduct periodized training, which should be the overall intent, why is so little attention paid to instruction of building a periodized training plan?

G. SUMMARY

To summarize, the academic literature shows the following: periodization of training is paramount to achieving optimal performance while minimizing injury risks; military members, and Marines in particular, are highly susceptible to overuse injuries; the nutritional and body composition standards for Marines are not the same as those for the general population, nor should they be. The current FFI POI appears to be largely inconsistent with these findings. Specifically, the course does not incorporate classes on training periodization; the nutritional information taught to inform Marines is antiquated and not applicable to Marines as athletes; and there is no mention of ways to impact body composition or the importance of body composition outside of the Marine Corps Body Composition and Military Appearance Programs. There is significant information in the POI on injury identification, but as previously mentioned, the most successful method to minimize the risk of overuse injury, periodized training, is not taught. The subsequent chapters examine the impacts of the programs relative to their stated goals.

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IV. DATA AND METHODOLOGY

In this chapter, I describe the sources of data, the sample inclusion and exclusion criteria, the data management process, and known limitations of the data. I conclude this chapter with an explanation on the methodology utilized for empirical analysis.

A. DATA SOURCES

I began data collection from the Force Fitness Division, Training and Education Command (FFD, TECOM). FFD provided the graduation dates and unit codes for all FFI graduates, which would be used as the treatment group. This information was required to begin assigning like-type units as the control group. Each unit that received an FFI graduate was categorized by their Marine Air Ground Task Force (MAGTF) element or as Supporting Establishment, and then a comparable unit was assigned as a control. Once the full list was identified, data from Total Force Data Warehouse (TFDW) was collected for individuals within those units during the calendar years 2015 to 2017 for demographics, PFT scores, CFT scores, BCP/MAP assignments, deployable status, and operational experience.

Table 2 shows the variables received from TFDW and the description of the variables. Not all variables were utilized in the statistical analysis based on level of confidence or fidelity of the information's accuracy. For instance, BCP and MAP variables were not used because start and end dates were identical, and the statuses did not give enough definitive description to be useful. Deployability was not used because it was only a "snapshot in time" when the data was accessed and did not represent the full three-year window.

Table 2. Definitions of Variables, TFDW Data Source

Demographics	
Variable Name	**Variable Description**
RUC	Unit's RUC
MCC	Unit's MCC
UNIT_NAME	Unit's Name
COMPANY_CODE	Company Code
PLATOON_NUMBER	Platoon Code
HT	Height
WT	Weight
HT_WT_EFF_DT	Date of Weigh In
AGE	Age
PRESENT_GRADE_CODE	Present Grade
GENDER	Gender
PEBD	Pay Entry Base Date
YEARS_OF_SERVICE	Years of Service
PMOS	Primary MOS
PRESENT_UNIT_JOINED_DATE	Date Joined Unit
EAS	End of Active Service

PFT	
SEX	Sex
PFT_SCORE	PFT Score
PULL_UP	Pull Up Repetitions
FLEX_ARM	Flex Arm Hang Time
PUSH_UP	Push Up Repetitions
CRUNCH	Crunch Repetitions
RUN_TM	3-Mile Run Time
ROW_TM	5,000 Meter Row Time
PFT_DT	PFT Date
PFT_CLASS	PFT Class

CFT	
CBT_FITNESS_SCORE_QY	CFT Score
MTC_TM	Movement to Contact Time
AMMO_LIFT	Ammo Can Lift Repetitions
MANUF_TM	Manuever Under Fire Time
CFT_CLASS	CFT Class
CBT_FITNESS_TEST_DT	CFT Date

BCP	
WEIGHT_CONTROL_ASSIGNMENT_QY	Number of Assignments to BCP
WEIGHT_CONTROL_STATUS	BCP Status
MIN_DATE	BCP Start Date
MAX_DATE	BCP End Date

MAP	
MILITARY_APPEARANCE_ASSIGN_QY	Number of Assignments to MAP
MILITARY_APPEARANCE_STATUS_CD	MAP Status
DESCRIPTION	Description of Current MAP Status

DEPLOYABLE	
DEPLOYABILITY	Availability for Deployment

OPERATIONAL	
OPERATION_HISTORY_DESC_TX	Operation Name
OPERATION_HISTORY_LOC_TX	Operation Location
OPERATION_HISTORY_FROM_DT	Operation From Date
OPERATION_HISTORY_TO_DT	Operation To Date
OPERATION_DESCRIPTION_TEXT	Operation Description

B. DATA MANAGEMENT

I used the "Demographic" data set as the primary data set, which consisted of 182,581 observations from 228 different MCCs. Upon closer examination, I identified multiple areas in the data set that eliminated observations: duplicates based on multiple weigh-in dates, present grade codes of "Z," and missing significant information such as age and gender. This data management brought my final data set to 181,959 unique identifiers and 545,877 observations for analysis. I conducted the same process for the PFT and CFT data sets. This led to the deletion of 12,513 instances of multiple PFTs and 28,446 CFTs; only the scores from the most recent PFT and CFT dates were used for analysis. Once all data sets were cleaned, I established three observations for all 181,959 individual Marines to coincide with the years 2015–2017 and merged the data sets.

Once the primary data set was generated, I proceeded with the build of the variables that would be required for the statistical analysis. The first variables created were the age brackets that would be required for scoring the individual events of the PFT and CFT. These were age brackets for 2017 PFTs, 2015/2016 CFTs, and 2017 CFTs. The next set of variables consisted of indicator variables for units in the Operating Forces (OpFor), Supporting Establishment (SE), Ground Combat Element (GCE), Logistics Combat Element (LCE), Aviation Combat Element (ACE), Marine Expeditionary Force Information Group (MIG), and Command Element (CE). CE and MIG were combined due to small number of observations. To identify treatment effects during future analysis, I constructed indicator variables for different timeframes of having access to an FFI. These indicator variables identified whether an individual had an FFI 30 days or greater from his or her PFT date, 60 days or greater, 90 days or greater, 120 days or greater, or ever which was considered one day or greater. This was repeated for the CFT dates. Demographic variables were built for Female and age squared.

Using the age brackets previously constructed and the scoring tables for 2015/2016 and 2017 PFT and CFT scoring (Amos, 2012; USMC, 2008, pp. 2-6–2-8, 3-9–3-32; USMC, 2018, pp. 2-8–2-20, 3-10–3-32), I built scoring variables for pull-ups, push-ups, flex arm hang, crunches, three-mile timed run, 5,000 meter row, Movement to Contact (MTC), ammo can lift, and Maneuver Under Fire (MUF). These scoring variables are to

be used for my subsequent statistical analysis as dependent variables. I built an Upper Body Endurance (UBE) variable that was a composite of the pull-up, push-up, and flex arm hang scores, as well as an Aerobic Capacity (AC) variable that was a composite of the three-mile timed run and 5,000-meter row. These variables allow for analysis across all UBE and AC events, respectively, while still allowing for a sample size that can have sufficient power to detect statistical significance.

A second set of the scoring variables was constructed based on an age lapse. Because the age given in the data set was the age of the individual at the time of the data collection, this age may not coincide with the age of the individual at the time of either the PFT or CFT. I compared the approved PFT scores to the addition of the individual UBE, crunch, and AC scores and found discrepancies in 16,154 observations. The same technique was used for the CFT and discrepancies were found in 19,462 observations. By including the age lapse, effectively dropping those individuals back one age bracket, I reduced the discrepancies to 1,079 for females and 1,370 for males in the PFT. The CFT discrepancies were 723. I then identified that most of the female scores were 100 points different and identified that the cause was most likely due to pull-up repetitions being assigned as a flex arm hang score during the years 2015 and 2016. By correcting for this, the number of discrepancies dropped to 311 of the 40,740 observations or 0.0076%. Finally, I estimated the correlation between the approved PFT/CFT scores and the individual event scoring variables, and I found the correlation was 0.9997 for PFT and 0.996 for the CFT. This means that my constructed scoring variables were the units used for the approved PFT and CFT with 99.97% degree of overlap.

I concluded the variable build with a treatment year indicator variable for the year 2017 and interaction variables for each of the FFI time periods with the treatment year of 2017. I also built an indicator variable for female FFIs and an interaction variable for female FFIs on female Marines. These will be used in analyzing whether there are effects by having a same gender FFI. The female FFIs affected 39,135 of the total sample population while only 5,496 female Marines had a female FFI.

C. KNOWN DATA LIMITATIONS

As previously identified, there are known discrepancies in the individual event scores compared to the approved scoring. This has been identified as the difference between normal scoring and running a PFT or CFT at altitude. The individual events that this affects are the three-mile timed run and 5,000-meter row for the PFT and the MTC and MUF for the CFT. The effect of these discrepancies is considered extremely minimal based on the aforementioned correlation of 0.9997 for PFT and 0.996 for the CFT in the overall scores. I identified that the CE observation numbers were too small to show any significance so they were merged with the MIG observations. While these two are certainly not identical, they are close enough in type to provide a useful combination of observations for statistical tests.

D. METHODOLOGY AND REGRESSION MODELS

To truly assess the qualitative influence that an FFI has on the Marines in their units, causation is required. My econometric model infers the causal effect of an FFI on Marine outcomes by estimating a difference-in-difference model. While a standard Ordinary Least Squares (OLS) model could identify the impact of an FFI, it would be inaccurate because of the simultaneous changes in scoring for the PFT and CFT as well as the addition of the FFI to their units. FFIs were only able to influence the PFT scores for Marines in their units starting in 2017, the treated year, but this was also the first year for higher, stricter standards for the PFT and CFT. These simultaneous events could confound the statistical relationship between having an FFI and the unit's PFT and CFT scores.

An OLS model predicting scores with FFI as the key variable, when scores on average decreased, would incorrectly estimate a negative effect of an FFI. The difference-in-difference model gets around these issues by taking into account the decrease in scores during the treated year, which every unit in the Marine Corps was affected by, so that the only difference between the treated and control groups was the addition of an FFI. In other words, the difference-in-difference estimator holds constant as many of the confounding variables as possible as if to mimic an experiment. My regression model compares the difference in outcomes among Marines who were in units with an FFI versus those in units

who did not have an FFI, in the years before versus after the FFI program; thus it holds standards constant. By holding the type of Marines constant, through using treatment and control from like type units, and holding standards constant, through the difference-in-difference methodology, the only change between the Marines' scores is the addition of an FFI within the treatment group.

More specifically, the difference-in-difference regression model estimates the following equation:

$$Y = \beta_0 + \beta_1 T + \beta_2 P + \beta_3 T * P + \beta_4 C + \varepsilon$$

where,

> Y= outcomes such as PFT Score, Upper Body Endurance (UBE) Score, Crunch Score, Aerobic Capacity (AC) Score, CFT Score, Movement to Contact (MTC) Score, Ammo Can Lift Score, or Maneuver Under Fire (MUF) Score
>
> T= 1 if the Marine was in a Treated Unit (had an FFI 30 days or greater, FFI 60 days or greater, FFI 90 days or greater, FFI 120 days or greater, or ever had an FFI)
>
> P= 1 if the outcome was in the Treated Time Period (2017)
>
> C= Control Variables (GCE, ACE, LCE, MIG, Female FFI, Female FFI and Female Marine, Female, Age, Age Squared).

The coefficient on *T,* β_1, shows the level difference in outcomes between Marines in units with an FFI relative to those without an FFI, while the coefficient on *P* is an estimate of the change in outcomes before vs. after the FFI program, coinciding with the change in standards. My parameter of interest is the difference-in-difference estimator β_3, which is the change in outcomes over time among those who had an FFI versus those who were not treated with an FFI.

V. RESULTS

In this chapter, I describe the empirical results of my regressions. I begin with the results for regressions based on the entire sample population. The next subchapter investigates the differences between the various unit types within the Operating Forces as well as the Supporting Establishment. I finish an examination of the outcomes by identifying the different FFI treatment effects by gender. This chapter concludes with the implications that these various treatment effects have on the Marine Corps as a whole.

A. OUTCOMES

1. Total Sample Population Outcomes

For the total sample population, I estimated the effect of having an FFI over the various defined time periods on each of the dependent variables, with and without covariates. The difference-in-difference results, reported in Tables 3 to 7, are overwhelmingly statistically significant and negative for both PFT and CFT scores. The only exception is for PFT while having an FFI for 60 days or more, which is not uniformly statistically significant at the 0.01 level (99% level of confidence). At conventional levels and for some outcomes, the FFI effect is also negative. Across these regressions, I show that, on average, having an FFI for any time period greater than one day results in a decrease in the individual Marine's PFT score between -1.489 to -2.449 and a decrease in the individual Marine's CFT score between -1.205 to -6.529. At the individual event level, a Marine, on average, can have statistically significant expectation to increase both his or her upper body endurance and crunch scores, while seeing a more dramatic decrease in their aerobic capacity scores. Coefficients for the Movement to Contact and Maneuver under Fire scores, while statistically significant, are overall economically insignificant. It is notable that for the ammo can lift, the CFT's upper body endurance component, the difference-in-difference coefficient is negative. This is in stark contrast to the PFT's upper body endurance component that is positive, suggesting an FFI might have differential effects even on similar events.

Table 3. Total Sample Population with FFI 30 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-4.788***	-5.497***	3.605***	3.854***	0.553***	0.161	-5.190***	-5.387***								
	(0.310)	(0.306)	(0.132)	(0.131)	(0.103)	(0.103)	(0.0937)	(0.0928)								
PFT FFI 30 day	1.049***	0.818***	-0.980***	-0.918***	-1.257***	-1.462***	0.469***	0.511***								
	(0.232)	(0.232)	(0.0978)	(0.0987)	(0.0759)	(0.0770)	(0.0701)	(0.0706)								
Diff-in-diff	-2.034***	-2.449***	1.167***	1.120***	1.226***	1.474***	-2.619***	-2.900***	-5.667***	-4.324***	-0.334***	-0.280***	-1.807***	-1.425***	-0.451***	-0.673***
	(0.423)	(0.418)	(0.181)	(0.180)	(0.140)	(0.141)	(0.128)	(0.127)	(0.489)	(0.482)	(0.0974)	(0.0970)	(0.147)	(0.145)	(0.0840)	(0.0836)
Officer		29.71***		11.62***		3.285***		8.586***		15.14***		4.163***		2.722***		2.574***
		(0.370)		(0.158)		(0.124)		(0.112)		(0.333)		(0.0671)		(0.101)		(0.0578)
Female		-7.760***		5.692***		-5.797***		-0.443***		-9.291***		0.568***		-4.353***		1.432***
		(0.396)		(0.173)		(0.133)		(0.120)		(0.356)		(0.0716)		(0.107)		(0.0617)
Female Officer		-2.587**		-3.313***		1.509***		5.415***		-4.649***		1.203***		-1.068***		0.0974
		(1.268)		(0.558)		(0.425)		(0.385)		(1.154)		(0.232)		(0.348)		(0.200)
Female FFI		-5.550***		-1.340***		-0.825***		-2.145***		-2.897***		-0.819***		-0.339***		-0.680***
		(0.392)		(0.167)		(0.131)		(0.119)		(0.354)		(0.0712)		(0.107)		(0.0613)
Female FFI & Female Marine		0.770		0.774*		0.779**		-0.233		1.571		0.276		0.421		0.160
		(1.063)		(0.462)		(0.356)		(0.323)		(0.961)		(0.193)		(0.290)		(0.167)
Age		1.809***		2.472***		0.0487		-0.780***		0.827***		0.0770***		0.193***		0.487***
		(0.122)		(0.0525)		(0.0409)		(0.0371)		(0.110)		(0.0221)		(0.0331)		(0.0190)
Age Squared		-0.0587***		-0.0440***		-0.00651***		0.00713***		-0.0386***		-0.00173***		-0.00963***		-0.00685***
		(0.00200)		(0.000860)		(0.000671)		(0.000607)		(0.00180)		(0.000363)		(0.000544)		(0.000313)
GCE		3.475***		-1.034***		-0.561***		1.165***		5.540***		0.657***		1.119***		1.219***
		(0.311)		(0.133)		(0.104)		(0.0945)		(0.279)		(0.0562)		(0.0842)		(0.0484)
LCE		-0.104		-2.339***		0.250**		0.691***		2.346***		-0.903***		0.976***		0.0299
		(0.354)		(0.151)		(0.118)		(0.108)		(0.318)		(0.0640)		(0.0959)		(0.0551)
ACE		-6.478***		-2.579***		-0.430***		-2.294***		-1.779***		-0.899***		-0.0537		-0.889***
		(0.324)		(0.139)		(0.108)		(0.0984)		(0.291)		(0.0586)		(0.0878)		(0.0505)
MIG		1.993***		-1.746***		-0.263*		0.779***		2.003***		-1.147***		0.830***		0.137**
		(0.419)		(0.179)		(0.140)		(0.127)		(0.376)		(0.0757)		(0.113)		(0.0652)
CFT Treated Year									-15.41***	-17.70***	-9.281***	-9.281***	-1.232***	-1.860***	-8.692***	-8.393***
									(0.428)	(0.422)	(0.0853)	(0.0849)	(0.128)	(0.127)	(0.0736)	(0.0731)
CFT FFI 30 day									-0.148	-0.482**	0.231***	0.173***	-0.0725	-0.159**	0.0381	0.105***
									(0.204)	(0.204)	(0.0408)	(0.0411)	(0.0614)	(0.0617)	(0.0352)	(0.0354)
Constant	243.9***	236.7***	79.22***	46.53***	94.38***	98.20***	73.36***	87.78***	281.4***	284.4***	93.89***	92.97***	97.35***	98.56***	95.70***	87.38***
	(0.137)	(1.812)	(0.0577)	(0.778)	(0.0448)	(0.607)	(0.0414)	(0.550)	(0.124)	(1.625)	(0.0246)	(0.327)	(0.0371)	(0.490)	(0.0212)	(0.282)
Observations	384,296	384,296	378,062	378,062	379,058	379,058	383,734	383,734	339,620	339,620	339,620	339,620	339,620	339,620	339,620	339,620
R-squared	0.002	0.044	0.006	0.032	0.001	0.016	0.031	0.060	0.034	0.072	0.161	0.178	0.008	0.038	0.191	0.211
Mean control t(0)	243.9	236.7	79.22	46.53	94.38	98.20	73.36	87.78	281.4	284.4	93.89	92.97	97.35	98.56	95.70	87.38
Mean treated t(0)	244.9	237.6	78.24	45.61	93.12	96.74	73.83	88.29	281.3	283.9	94.12	93.15	97.28	98.40	95.74	87.49
Diff t(0)	1.049	0.818	-0.980	-0.918	-1.257	-1.462	0.469	0.511	-0.148	-0.482	0.231	0.173	-0.0725	-0.159	0.0381	0.105
Mean control t(1)	239.1	231.2	82.82	50.38	94.93	98.36	68.17	82.39	266	266.7	84.60	83.69	96.12	96.70	87.01	78.99
Mean treated t(1)	238.1	229.6	83.01	50.59	94.90	98.38	66.02	80	260.2	261.9	84.50	83.59	94.24	95.12	86.60	78.42
Diff t(1)	-0.985	-1.631	0.187	0.202	-0.0306	0.0128	-2.150	-2.389	-5.815	-4.806	-0.103	-0.108	-1.879	-1.584	-0.412	-0.568

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 4. Total Sample Population with FFI 60 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-5.888***	-6.568***	3.508***	3.728***	0.483***	0.115	-5.393***	-5.593***								
	(0.299)	(0.294)	(0.127)	(0.127)	(0.0989)	(0.0988)	(0.0902)	(0.0894)								
PFT FFI 60 day	0.974***	0.777***	-0.984***	-0.930***	-1.288***	-1.490***	0.429***	0.483***								
	(0.232)	(0.233)	(0.0979)	(0.0989)	(0.0759)	(0.0771)	(0.0702)	(0.0707)								
Diff-in-diff	-0.185	-0.702*	1.351***	1.360***	1.362***	1.571***	-2.394***	-2.690***	-3.673***	-2.809***	0.0707	0.0969	-1.540***	-1.280***	0.00322	-0.252***
	(0.419)	(0.414)	(0.179)	(0.178)	(0.139)	(0.139)	(0.126)	(0.126)	(0.444)	(0.440)	(0.0886)	(0.0885)	(0.133)	(0.133)	(0.0764)	(0.0762)
Officer		29.70***		11.62***		3.284***		8.586***		15.10***		4.160***		2.713***		2.570***
		(0.370)		(0.158)		(0.124)		(0.112)		(0.333)		(0.0671)		(0.101)		(0.0578)
Female		-7.774***		5.692***		-5.799***		-0.459***		-9.293***		0.567***		-4.352***		1.429***
		(0.396)		(0.173)		(0.133)		(0.120)		(0.356)		(0.0716)		(0.107)		(0.0617)
Female Officer		-2.564**		-3.310***		1.511***		5.425***		-4.603***		1.208***		-1.058***		0.102
		(1.268)		(0.558)		(0.425)		(0.385)		(1.154)		(0.232)		(0.348)		(0.200)
Female FFI		-5.557***		-1.345***		-0.836***		-2.150***		-2.592***		-0.804***		-0.259**		-0.668***
		(0.392)		(0.167)		(0.131)		(0.119)		(0.354)		(0.0713)		(0.107)		(0.0614)
Female FFI & Female Marine		0.718		0.754		0.765**		-0.216		1.518		0.270		0.412		0.156
		(1.063)		(0.462)		(0.356)		(0.323)		(0.961)		(0.193)		(0.290)		(0.167)
Age		1.811***		2.474***		0.0511		-0.780***		0.824***		0.0758***		0.193***		0.486***
		(0.122)		(0.0525)		(0.0409)		(0.0371)		(0.110)		(0.0221)		(0.0331)		(0.0190)
Age Squared		-0.0588***		-0.0440***		-0.00655***		0.00712***		-0.0386***		-0.00171***		-0.00963***		-0.00684***
		(0.00200)		(0.000860)		(0.000671)		(0.000607)		(0.00180)		(0.000363)		(0.000544)		(0.000313)
GCE		3.382***		-1.048***		-0.565***		1.169***		5.485***		0.652***		1.110***		1.217***
		(0.311)		(0.133)		(0.104)		(0.0945)		(0.279)		(0.0562)		(0.0842)		(0.0484)
LCE		-0.158		-2.352***		0.245**		0.708***		2.268***		-0.911***		0.961***		0.0239
		(0.354)		(0.151)		(0.118)		(0.108)		(0.318)		(0.0640)		(0.0959)		(0.0551)
ACE		-6.528***		-2.587***		-0.428***		-2.280***		-1.951***		-0.908***		-0.0964		-0.896***
		(0.324)		(0.139)		(0.108)		(0.0984)		(0.291)		(0.0586)		(0.0879)		(0.0505)
MIG		1.855***		-1.763***		-0.268*		0.758***		1.900***		-1.170***		0.824***		0.119*
		(0.419)		(0.179)		(0.140)		(0.127)		(0.376)		(0.0757)		(0.114)		(0.0652)
CFT Treated Year									-17.85***	-19.69***	-9.620***	-9.611***	-1.695***	-2.202***	-9.072***	-8.777***
									(0.372)	(0.367)	(0.0742)	(0.0739)	(0.112)	(0.111)	(0.0640)	(0.0637)
CFT FFI 60 day									1.046***	0.710***	0.243***	0.213***	0.261***	0.163***	0.0276	0.137***
									(0.207)	(0.208)	(0.0412)	(0.0418)	(0.0621)	(0.0626)	(0.0356)	(0.0360)
Constant	243.9***	236.8***	79.22***	46.52***	94.38***	98.18***	73.38***	87.79***	281.0***	284.1***	93.89***	92.99***	97.23***	98.46***	95.71***	87.40***
	(0.137)	(1.812)	(0.0576)	(0.778)	(0.0447)	(0.607)	(0.0413)	(0.550)	(0.122)	(1.625)	(0.0243)	(0.327)	(0.0366)	(0.490)	(0.0209)	(0.282)
Observations	384,296	384,296	378,062	378,062	379,058	379,058	383,734	383,734	339,620	339,620	339,620	339,620	339,620	339,620	339,620	339,620
R-squared	0.002	0.044	0.006	0.032	0.001	0.016	0.031	0.060	0.034	0.072	0.161	0.178	0.008	0.038	0.191	0.211
Mean control t(0)	243.9	236.8	79.22	46.52	94.38	98.18	73.38	87.79	281	284.1	93.89	92.99	97.23	98.46	95.71	87.40
Mean treated t(0)	244.9	237.6	78.23	45.59	93.10	96.69	73.81	88.27	282.1	284.8	94.13	93.20	97.49	98.63	95.73	87.53
Diff t(0)	0.974	0.777	-0.984	-0.930	-1.288	-1.490	0.429	0.483	1.046	0.710	0.243	0.213	0.261	0.163	0.0276	0.137
Mean control t(1)	238	230.2	82.73	50.25	94.87	98.29	67.98	82.20	263.2	264.4	84.26	83.38	95.54	96.26	86.63	78.62
Mean treated t(1)	238.8	230.3	83.09	50.67	94.94	98.37	66.02	79.99	260.5	262.3	84.58	83.69	94.26	95.14	86.67	78.50
Diff t(1)	0.789	0.0744	0.367	0.430	0.0742	0.0806	-1.965	-2.207	-2.626	-2.099	0.314	0.310	-1.278	-1.116	0.0308	-0.115

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 5. Total Sample Population with FFI 90 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-5.369***	-6.130***	3.597***	3.815***	0.525***	0.167*	-5.545***	-5.767***								
	(0.291)	(0.286)	(0.124)	(0.123)	(0.0962)	(0.0960)	(0.0877)	(0.0869)								
PFT FFI 90 day	0.974***	0.776***	-0.984***	-0.930***	-1.288***	-1.490***	0.429***	0.479***								
	(0.232)	(0.233)	(0.0979)	(0.0989)	(0.0759)	(0.0771)	(0.0702)	(0.0707)								
Diff-in-diff	-1.081***	-1.492***	1.210***	1.223***	1.288***	1.481***	-2.228***	-2.497***	-1.555***	-1.205***	0.257***	0.274***	-0.963***	-0.834***	0.180**	-0.0793
	(0.416)	(0.411)	(0.178)	(0.177)	(0.138)	(0.138)	(0.126)	(0.125)	(0.422)	(0.418)	(0.0841)	(0.0841)	(0.127)	(0.126)	(0.0726)	(0.0725)
Officer		29.71***		11.62***		3.284***		8.585***		15.09***		4.159***		2.708***		2.568***
		(0.370)		(0.158)		(0.124)		(0.112)		(0.333)		(0.0671)		(0.101)		(0.0578)
Female		-7.772***		5.692***		-5.799***		-0.459***		-9.304***		0.565***		-4.354***		1.428***
		(0.396)		(0.173)		(0.133)		(0.120)		(0.356)		(0.0716)		(0.107)		(0.0617)
Female Officer		-2.572**		-3.312***		1.510***		5.430***		-4.588***		1.212***		-1.056***		0.104
		(1.268)		(0.558)		(0.425)		(0.385)		(1.154)		(0.232)		(0.348)		(0.200)
Female FFI		-5.565***		-1.342***		-0.836***		-2.174***		-2.585***		-0.805***		-0.256**		-0.668***
		(0.392)		(0.167)		(0.131)		(0.119)		(0.354)		(0.0713)		(0.107)		(0.0614)
Female FFI & Female Marine		0.751		0.761*		0.769**		-0.226		1.496		0.267		0.407		0.153
		(1.063)		(0.462)		(0.356)		(0.323)		(0.961)		(0.193)		(0.290)		(0.167)
Age		1.810***		2.474***		0.0509		-0.780***		0.821***		0.0756***		0.192***		0.486***
		(0.122)		(0.0525)		(0.0409)		(0.0371)		(0.110)		(0.0221)		(0.0331)		(0.0190)
Age Squared		-0.0587***		-0.0440***		-0.00655***		0.00712***		-0.0386***		-0.00171***		-0.00962***		-0.00684***
		(0.00200)		(0.000860)		(0.000671)		(0.000607)		(0.00180)		(0.000363)		(0.000544)		(0.000313)
GCE		3.429***		-1.040***		-0.560***		1.155***		5.467***		0.642***		1.113***		1.214***
		(0.311)		(0.133)		(0.104)		(0.0945)		(0.279)		(0.0562)		(0.0843)		(0.0484)
LCE		-0.120		-2.348***		0.249**		0.712***		2.240***		-0.917***		0.957***		0.0202
		(0.354)		(0.152)		(0.118)		(0.108)		(0.318)		(0.0640)		(0.0959)		(0.0551)
ACE		-6.494***		-2.583***		-0.424***		-2.280***		-1.961***		-0.913***		-0.0957		-0.897***
		(0.324)		(0.139)		(0.108)		(0.0985)		(0.291)		(0.0586)		(0.0879)		(0.0505)
MIG		1.913***		-1.751***		-0.262*		0.731***		1.808***		-1.189***		0.807***		0.108*
		(0.419)		(0.179)		(0.140)		(0.127)		(0.377)		(0.0758)		(0.114)		(0.0653)
CFT Treated Year									-19.56***	-21.00***	-9.749***	-9.732***	-2.184***	-2.586***	-9.205***	-8.912***
									(0.343)	(0.338)	(0.0683)	(0.0681)	(0.103)	(0.102)	(0.0590)	(0.0587)
CFT FFI 90 day									1.046***	0.706***	0.243***	0.213***	0.261***	0.163***	0.0276	0.137***
									(0.207)	(0.208)	(0.0412)	(0.0418)	(0.0621)	(0.0626)	(0.0356)	(0.0360)
Constant	243.9***	236.8***	79.22***	46.52***	94.38***	98.17***	73.38***	87.79***	281.0***	284.2***	93.89***	93.00***	97.23***	98.48***	95.71***	87.40***
	(0.137)	(1.812)	(0.0576)	(0.778)	(0.0447)	(0.607)	(0.0413)	(0.550)	(0.122)	(1.625)	(0.0243)	(0.327)	(0.0366)	(0.490)	(0.0209)	(0.282)
Observations	384,296	384,296	378,062	378,062	379,058	379,058	383,734	383,734	339,620	339,620	339,620	339,620	339,620	339,620	339,620	339,620
R-squared	0.002	0.044	0.006	0.032	0.001	0.016	0.031	0.060	0.034	0.072	0.161	0.178	0.008	0.038	0.191	0.211
Mean control t(0)	243.9	236.8	79.22	46.52	94.38	98.17	73.38	87.79	281	284.2	93.89	93	97.23	98.48	95.71	87.40
Mean treated t(0)	244.9	237.6	78.23	45.59	93.10	96.68	73.81	88.27	282.1	284.9	94.13	93.21	97.49	98.64	95.73	87.54
Diff t(0)	0.974	0.776	-0.984	-0.930	-1.288	-1.490	0.429	0.479	1.046	0.706	0.243	0.213	0.261	0.163	0.0276	0.137
Mean control t(1)	238.5	230.7	82.81	50.33	94.91	98.34	67.83	82.03	261.5	263.2	84.14	83.27	95.05	95.89	86.50	78.49
Mean treated t(1)	238.4	229.9	83.04	50.62	94.91	98.33	66.03	80.01	261	262.7	84.64	83.76	94.35	95.22	86.71	78.55
Diff t(1)	-0.106	-0.716	0.226	0.293	0.000211	-0.00900	-1.799	-2.018	-0.508	-0.499	0.500	0.487	-0.702	-0.672	0.207	0.0576

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 6. Total Sample Population with FFI 120 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-5.096***	-6.016***	3.649***	3.843***	0.591***	0.240***	-5.592***	-5.859***								
	(0.279)	(0.274)	(0.119)	(0.118)	(0.0922)	(0.0920)	(0.0841)	(0.0832)								
PFT FFI 120 day	0.974***	0.773***	-0.984***	-0.929***	-1.288***	-1.491***	0.429***	0.474***								
	(0.232)	(0.233)	(0.0979)	(0.0989)	(0.0759)	(0.0771)	(0.0702)	(0.0707)								
Diff-in-diff	-1.636***	-1.795***	1.128***	1.199***	1.155***	1.332***	-2.321***	-2.522***	-1.457***	-1.397***	0.527***	0.501***	-1.108***	-1.044***	0.262***	-0.0234
	(0.415)	(0.408)	(0.177)	(0.176)	(0.138)	(0.137)	(0.125)	(0.124)	(0.405)	(0.401)	(0.0806)	(0.0807)	(0.122)	(0.121)	(0.0696)	(0.0695)
Officer		29.71***		11.62***		3.285***		8.584***		15.09***		4.156***		2.712***		2.568***
		(0.370)		(0.158)		(0.124)		(0.112)		(0.333)		(0.0671)		(0.101)		(0.0578)
Female		-7.771***		5.692***		-5.799***		-0.458***		-9.303***		0.564***		-4.353***		1.428***
		(0.396)		(0.173)		(0.133)		(0.120)		(0.356)		(0.0716)		(0.107)		(0.0617)
Female Officer		-2.577**		-3.312***		1.508***		5.424***		-4.592***		1.216***		-1.061***		0.105
		(1.268)		(0.558)		(0.425)		(0.385)		(1.154)		(0.232)		(0.348)		(0.200)
Female FFI		-5.580***		-1.340***		-0.840***		-2.197***		-2.584***		-0.805***		-0.255**		-0.668***
		(0.392)		(0.167)		(0.131)		(0.119)		(0.354)		(0.0713)		(0.107)		(0.0614)
Female FFI & Female Marine		0.761		0.763*		0.775**		-0.232		1.506		0.256		0.419		0.151
		(1.063)		(0.462)		(0.356)		(0.323)		(0.961)		(0.193)		(0.290)		(0.167)
Age		1.808***		2.474***		0.0503		-0.783***		0.822***		0.0754***		0.192***		0.486***
		(0.122)		(0.0525)		(0.0409)		(0.0371)		(0.110)		(0.0221)		(0.0331)		(0.0190)
Age Squared		-0.0587***		-0.0440***		-0.00654***		0.00716***		-0.0386***		-0.00171***		-0.00962***		-0.00684***
		(0.00200)		(0.000860)		(0.000671)		(0.000607)		(0.00180)		(0.000363)		(0.000544)		(0.000313)
GCE		3.441***		-1.037***		-0.553***		1.143***		5.479***		0.629***		1.127***		1.211***
		(0.311)		(0.133)		(0.104)		(0.0945)		(0.279)		(0.0562)		(0.0843)		(0.0484)
LCE		-0.0988		-2.348***		0.257**		0.727***		2.241***		-0.919***		0.957***		0.0194
		(0.354)		(0.152)		(0.118)		(0.108)		(0.318)		(0.0640)		(0.0959)		(0.0551)
ACE		-6.475***		-2.584***		-0.417***		-2.266***		-1.957***		-0.918***		-0.0905		-0.899***
		(0.324)		(0.139)		(0.108)		(0.0985)		(0.291)		(0.0586)		(0.0879)		(0.0505)
MIG		1.920***		-1.745***		-0.254*		0.703***		1.830***		-1.213***		0.832***		0.102
		(0.419)		(0.179)		(0.140)		(0.127)		(0.377)		(0.0758)		(0.114)		(0.0653)
CFT Treated Year									-19.66***	-20.88***	-9.917***	-9.870***	-2.114***	-2.469***	-9.254***	-8.949***
									(0.318)	(0.314)	(0.0633)	(0.0631)	(0.0954)	(0.0947)	(0.0546)	(0.0544)
CFT FFI 120 day									1.046***	0.707***	0.243***	0.212***	0.261***	0.163***	0.0276	0.137***
									(0.207)	(0.208)	(0.0412)	(0.0418)	(0.0621)	(0.0626)	(0.0356)	(0.0360)
Constant	243.9***	236.8***	79.22***	46.51***	94.38***	98.18***	73.38***	87.84***	281.0***	284.2***	93.89***	93.02***	97.23***	98.47***	95.71***	87.41***
	(0.137)	(1.812)	(0.0576)	(0.778)	(0.0447)	(0.607)	(0.0413)	(0.550)	(0.122)	(1.625)	(0.0243)	(0.327)	(0.0366)	(0.490)	(0.0209)	(0.282)
Observations	384,296	384,296	378,062	378,062	379,058	379,058	383,734	383,734	339,620	339,620	339,620	339,620	339,620	339,620	339,620	339,620
R-squared	0.002	0.044	0.006	0.032	0.001	0.016	0.031	0.060	0.034	0.072	0.161	0.178	0.008	0.038	0.191	0.211
Mean control t(0)	243.9	236.8	79.22	46.51	94.38	98.18	73.38	87.84	281	284.2	93.89	93.02	97.23	98.47	95.71	87.41
Mean treated t(0)	244.9	237.6	78.23	45.58	93.10	96.69	73.81	88.32	282.1	284.9	94.13	93.23	97.49	98.63	95.73	87.54
Diff t(0)	0.974	0.773	-0.984	-0.929	-1.288	-1.491	0.429	0.474	1.046	0.707	0.243	0.212	0.261	0.163	0.0276	0.137
Mean control t(1)	238.8	230.8	82.87	50.35	94.98	98.42	67.78	81.98	261.4	263.3	83.97	83.15	95.12	96	86.45	78.46
Mean treated t(1)	238.1	229.8	83.01	50.62	94.84	98.26	65.89	79.93	261	262.6	84.74	83.86	94.27	95.12	86.74	78.57
Diff t(1)	-0.662	-1.022	0.144	0.270	-0.133	-0.159	-1.892	-2.049	-0.410	-0.689	0.771	0.712	-0.846	-0.881	0.289	0.113

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 7. Total Sample Population with Ever Having an FFI

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-5.363***	-6.080***	3.456***	3.743***	0.508***	0.0977	-5.356***	-5.558***								
	(0.324)	(0.319)	(0.138)	(0.137)	(0.107)	(0.107)	(0.0977)	(0.0968)								
PFT FFI Ever	1.118***	0.861***	-0.981***	-0.905***	-1.238***	-1.446***	0.510***	0.543***								
	(0.232)	(0.232)	(0.0977)	(0.0986)	(0.0758)	(0.0769)	(0.0700)	(0.0705)								
Diff-in-diff	-1.135***	-1.489***	1.382***	1.269***	1.286***	1.559***	-2.264***	-2.518***	-8.591***	-6.529***	-1.055***	-0.935***	-2.211***	-1.662***	-0.908***	-1.047***
	(0.430)	(0.425)	(0.183)	(0.183)	(0.142)	(0.143)	(0.130)	(0.129)	(0.584)	(0.575)	(0.116)	(0.116)	(0.176)	(0.173)	(0.100)	(0.0997)
Officer		29.71***		11.62***		3.285***		8.585***		15.13***		4.166***		2.715***		2.573***
		(0.370)		(0.158)		(0.124)		(0.112)		(0.333)		(0.0671)		(0.101)		(0.0578)
Female		-7.768***		5.691***		-5.797***		-0.446***		-9.282***		0.571***		-4.353***		1.433***
		(0.396)		(0.173)		(0.133)		(0.120)		(0.356)		(0.0716)		(0.107)		(0.0617)
Female Officer		-2.573**		-3.310***		1.509***		5.415***		-4.622***		1.201***		-1.056***		0.0996
		(1.268)		(0.558)		(0.425)		(0.385)		(1.153)		(0.232)		(0.348)		(0.200)
Female FFI		-5.540***		-1.335***		-0.817***		-2.137***		-2.887***		-0.835***		-0.326***		-0.691***
		(0.392)		(0.167)		(0.131)		(0.119)		(0.353)		(0.0711)		(0.107)		(0.0612)
Female FFI & Female Marine		0.726		0.774*		0.782**		-0.261		1.557		0.280		0.413		0.160
		(1.063)		(0.462)		(0.356)		(0.323)		(0.961)		(0.193)		(0.290)		(0.167)
Age		1.813***		2.471***		0.0465		-0.776***		0.830***		0.0781***		0.193***		0.488***
		(0.122)		(0.0525)		(0.0409)		(0.0371)		(0.110)		(0.0221)		(0.0331)		(0.0190)
Age Squared		-0.0588***		-0.0440***		-0.00648***		0.00707***		-0.0387***		-0.00174***		-0.00964***		-0.00686***
		(0.00200)		(0.000860)		(0.000671)		(0.000607)		(0.00180)		(0.000363)		(0.000544)		(0.000313)
GCE		3.412***		-1.040***		-0.565***		1.125***		5.479***		0.654***		1.098***		1.212***
		(0.311)		(0.133)		(0.104)		(0.0945)		(0.279)		(0.0562)		(0.0842)		(0.0484)
LCE		-0.145		-2.340***		0.249**		0.659***		2.341***		-0.897***		0.968***		0.0312
		(0.354)		(0.151)		(0.118)		(0.108)		(0.318)		(0.0640)		(0.0959)		(0.0551)
ACE		-6.520***		-2.584***		-0.435***		-2.325***		-1.817***		-0.894***		-0.0704		-0.888***
		(0.324)		(0.139)		(0.108)		(0.0984)		(0.291)		(0.0586)		(0.0878)		(0.0504)
MIG		1.910***		-1.758***		-0.269*		0.745***		1.961***		-1.134***		0.803***		0.134**
		(0.419)		(0.179)		(0.140)		(0.127)		(0.376)		(0.0757)		(0.113)		(0.0652)
CFT Treated Year									-12.55***	-15.55***	-8.603***	-8.664***	-0.808***	-1.609***	-8.259***	-8.013***
									(0.537)	(0.529)	(0.107)	(0.106)	(0.161)	(0.160)	(0.0924)	(0.0917)
CFT FFI Ever									0.0855	-0.250	0.207***	0.148***	0.0215	-0.0607	0.0505	0.0951***
									(0.202)	(0.202)	(0.0403)	(0.0406)	(0.0608)	(0.0608)	(0.0348)	(0.0350)
Constant	243.8***	236.7***	79.22***	46.56***	94.37***	98.24***	73.35***	87.74***	281.4***	284.3***	93.89***	92.96***	97.32***	98.54***	95.70***	87.38***
	(0.137)	(1.812)	(0.0578)	(0.778)	(0.0448)	(0.607)	(0.0414)	(0.551)	(0.125)	(1.625)	(0.0250)	(0.327)	(0.0377)	(0.490)	(0.0216)	(0.282)
Observations	384,296	384,296	378,062	378,062	379,058	379,058	383,734	383,734	339,620	339,620	339,620	339,620	339,620	339,620	339,620	339,620
R-squared	0.002	0.044	0.006	0.032	0.001	0.016	0.031	0.060	0.035	0.072	0.161	0.178	0.008	0.038	0.192	0.211
Mean control t(0)	243.8	236.7	79.22	46.56	94.37	98.24	73.35	87.74	281.4	284.3	93.89	92.96	97.32	98.54	95.70	87.38
Mean treated t(0)	245	237.6	78.24	45.65	93.13	96.79	73.86	88.28	281.4	284.1	94.10	93.11	97.34	98.48	95.75	87.47
Diff t(0)	1.118	0.861	-0.981	-0.905	-1.238	-1.446	0.510	0.543	0.0855	-0.250	0.207	0.148	0.0215	-0.0607	0.0505	0.0951
Mean control t(1)	238.5	230.6	82.68	50.30	94.88	98.33	67.99	82.18	268.8	268.8	85.29	84.30	96.51	96.93	87.44	79.36
Mean treated t(1)	238.5	230	83.08	50.66	94.93	98.45	66.24	80.21	260.3	262	84.44	83.51	94.32	95.21	86.58	78.41
Diff t(1)	-0.0175	-0.628	0.401	0.365	0.0481	0.113	-1.754	-1.975	-8.505	-6.779	-0.848	-0.786	-2.189	-1.723	-0.857	-0.952

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, having a Female FFI, and having a Female FFI and being a Female Marine.

From Tables 3 through 7, I show that PFT scores decreased in 2017, on average, approximately 6 points and the CFT scores decreased between 15 and 20 points. This decrease is most easily seen in the kernel densities presented in Appendix A. The individuals that received an FFI, on average, had PFT scores that were approximately one point higher than their counterparts in similar control units. The difference between the treatment and control groups, with respect to the CFT, were more varied ranging from treatment having 0.482 points lower to 0.710 points higher than their control counterparts. Officers, on average, had significantly higher scores across all outcomes, while females and female officers had much lower scores than their male counterparts. One aspect that requires further investigation is the significantly negative implications of having a female FFI. My regressions do not show causality to having a female FFI on scores decreasing. However, there is a statistically significant correlation between having a female FFI and a decrease of approximately 5.5 points on the PFT and approximately 2.6 points on the CFT.

For the total sample population, while the increased standards can be associated with the decrease in scores based on the treated year, the addition of an FFI to an individual's unit causes an additional decrease in PFT and CFT scores. I hypothesize, and the data supports, that the addition of an FFI increases the scores of the poor performers and decreases the scores of the high performers. This effectively draws the two tails of the curve toward "average." This phenomenon, reducing the variance in PFT and CFT scores with the introduction of an FFI, explains the overall decrease in mean scores and an approximately two-point decrease in the mean standard deviation of PFT scores for the control compared to the treatment groups, 56 and 54 points, respectively, as illustrated in Table 8. Put another way, the Marine Corps personnel sampled, as a whole and with an FFI, are not becoming more athletic or "fitter" but are becoming more average based on our PFT standards. The mean standard deviations for CFT scores decreased approximately one point; however, this can be attributed to a higher overall mean in the CFT allowing for a smaller possible deviation.

Table 8. Mean Standard Deviations for PFT and CFT Scores

PFT FFI 30 day	mean(sdPFT)	CFT FFI 30 day	mean(sdCFT)
0	56.09698	0	45.74263
1	54.90593	1	45.40155
PFT FFI 60 day	mean(sdPFT)	CFT FFI 60 day	mean(sdCFT)
0	56.13943	0	45.78954
1	54.81135	1	45.32923
PFT FFI 90 day	mean(sdPFT)	CFT FFI 90 day	mean(sdCFT)
0	56.19257	0	45.95481
1	54.70396	1	45.12548
PFT FFI 120 day	mean(sdPFT)	CFT FFI 120 day	mean(sdCFT)
0	56.20040	0	46.05432
1	54.63386	1	44.97909
PFT FFI Ever	mean(sdPFT)	CFT FFI Ever	mean(sdCFT)
0	56.04904	0	45.57169
1	54.99894	1	45.57122

2. Unit Type Outcomes

To identify discrepancies between unit types, I regressed each of the outcome variables on FFI with and without covariates for each of the treatment time periods only for the specific subsets of the sample population. The regressions focused on identifying the effects of an FFI on the Marines within the specific unit type subset. I also conducted analysis comparing results within the Marine Air Ground Task Force (MAGTF): Ground Combat Element (GCE), Logistics Combat Element (LCE), Aviation Combat Element (ACE), and the MEF Information Group (MIG) and Command Element (CE) composite. I also compared the Operating Forces versus the Supporting Establishment. While results for the total sample population allowed me to compare results of each MAGTF element to the baseline Supporting Establishment, these regressions focused on the difference-in-difference effects only within the unit type subset.

Appendix B shows the outcome results for each of the unit types, and Appendix C shows the kernel density comparison models. Focusing on the PFT, an FFI causes a

statistically significant decrease during each of the treatment time periods except for one day or greater in the GCE. There is little evidence for either statistical or economic significance to the effects of an FFI on Marines in the ACE and LCE; however, these subsets see the greatest decrease in scores based on the treated year compared to the other MAGTF elements. The MIG/CE subset showed the highest level of decline from the addition of an FFI with effects ranging from a decrease of 9.932 to 11.810 points without controls and decrease of 5.537 to 8.429 points with controls. Consequently, the MIG/CE subset showed the smallest decrease based on the treated year with no statistical significance. Each of the difference-in-difference results in the MIG/CE subset has statistical significance at more than the 0.01 level (or less than 99% statistical confidence). We see similar results when looking at the Supporting Establishment. An FFI, on average, causes a decrease of 2.953 to 11.550 points without controls and a decrease of 1.279 to 9.001 points with the controls. There is still strong statistical significance among the Supporting Establishment results, but not across all individual outcomes. One significant difference within the unit type subsets compared to the overall sample population is the Female FFI coefficient for the ACE. Within the ACE, female FFIs provided a positive effect, and these results were statistically significant for each FFI time period. However, the negative trend remained for the other unit type subsets. The GCE, LCE, and ACE showed positive effects that were statistically significant in both upper body endurance and crunch results; however, they were contrasted by larger negative effects that were all statistically significant in the aerobic capacity results for all of the unit type subsets. MIG/CE and Supporting Establishment results in upper body endurance and crunch scores showed no statistical significance.

Focusing on the CFT, the results are extremely similar: The GCE has negative FFI effects with varied levels of statistical significance, the ACE and LCE subsets show little statistical or economic significance, the MIG/CE and Supporting Establishment subsets show large decreases in scores and high levels of statistical significance, and the ACE was the only subset to show positive and statistically significant effects of the Female FFI control variable. The treated year effects for the CFT, in contrast to the PFT, are extremely large, negative, and statistically significant across all unit type subsets. Overall, the results show that MIG/CE

units showed the highest level of decline from the addition of an FFI, followed by Supporting Establishment Units and then GCE.

3. Gender Outcomes

To identify discrepancies between genders, or the difference in effects an FFI has on males compared to females, I estimate the same regression models by gender. Appendix D shows the outcome results for each of the genders, and Appendix E shows the kernel density comparison models. The PFT results show the treated year affected female scores significantly more than the males, by as much as three times as negatively. These negative effects were also identified in the difference-in-difference coefficients. For results with statistical significance, the males were negatively affected between 0.716 and 2.224 points, whereas the females were negatively affected between 3.537 and 6.075 points on the PFT. Both males and females showed positive results for upper body endurance and crunch effects, but only male results had statistical significance. However, both genders showed negative effects that were statistically significant for the aerobic capacity numbers.

CFT results demonstrate a similar trend showing male effects being negative between 0.796 and 6.092 points and female effects being negative between 9.961 and 15.990 points on average. Movement to Contact and Maneuver under Fire results for males showed no economic significance. Female results had no economic significance for the Maneuver under Fire but showed negative results with statistical and economic significance for both ammo can lifts and the Movement to Contact.

To summarize, results show female Marines had a greater decline in PFT scores with the change in standards compared to males. While FFIs seem to have benefited females and males on upper body endurance and crunch scores, both genders have negative FFI effects on aerobic capacity. Female Marines also had higher declines in overall scores compared to males.

4. Robustness Check

The final set of regressions that I ran was a robustness check for the effects of an FFI on the individual event repetitions and times. The previous regressions identified the causal

effects of an FFI on the individual Marine's scores for the PFT, CFT, and their individual events; however, these regressions identify how an FFI increases or decreases the number of pull-ups or crunches a Marine can do or how fast they run. For these regressions, I used the total sample population except for the pull-up outcome variable which only included the male sample population. Only the male population was used because pull-ups were not required for females in 2015 and 2016 and those that would attempt them for their PFT scores are likely to be on the higher level for fitness. This self-selection bias would negatively impact the results of the regression. These regressions were done for each of the five FFI time periods; however, only the FFI of 120 days or greater is shown in detail for this section. Justification for this decision is that this time period is the best-case scenario for an FFI to have thoroughly trained a Marine among the five time periods. Table 9 shows these results. Results for the other four time periods are available upon request.

The results of the regressions were overall as expected for many of the outcome variables. With the increased PFT standards in pull-ups and crunches, the treated year variable shows increases of pull-ups (1.764 on average) and crunches (14.15 on average); however, there was also an increase in the three-mile run times (47.26 seconds on average). The increased CFT standards during the treated year demonstrate an increase in ammo can lifts (15.76 on average) and decreases in Movement to Contact and Maneuver Under Fire (1.068 and 2.890 seconds, respectively). Individuals in the treated group were faster (lower times on three-mile timed run, Movement to Contact, and Maneuver under Fire), but also had lower levels of muscular endurance (fewer pull-ups, crunches, and ammo can lifts). These treated population and treated year results directly correlate with the score results described earlier. The FFI causal effects follow the same trend as the previous regressions: more pull-ups and crunches (0.213 and 1.287, respectively), fewer ammo can lifts (1.101), slower three-mile run and Maneuver under Fire (15.400 and 0.917 seconds, respectively). Movement to Contact scores and times showed differing effects. The FFI effect for MTC scores was an increase of 0.501 points. The effects on MTC time was an increase of 0.0273 seconds, but not to any level of statistical or economic significance.

Table 9. Individual Events with FFI 120 Days or Greater

VARIABLES	(1) Pull Up	(2) Pull Up	(3) Crunch	(4) Crunch	(5) 3 Mile Run	(6) 3 Mile Run	(7) MTC	(8) MTC	(9) ACL	(10) ACL	(11) MUF	(12) MUF
PFT Treated Year	1.686***	1.764***	14.45***	14.15***	47.85***	47.26***						
	(0.0273)	(0.0270)	(0.0913)	(0.0909)	(1.323)	(1.308)						
PFT FFI 120 day	-0.183***	-0.176***	-1.285***	-1.508***	-12.27***	-12.16***						
	(0.0223)	(0.0225)	(0.0752)	(0.0762)	(1.096)	(1.103)						
Diff-in-diff	0.181***	0.213***	1.065***	1.287***	14.74***	15.40***	0.784***	0.0273	-1.553***	-1.101***	1.184***	0.917***
	(0.0407)	(0.0403)	(0.136)	(0.136)	(1.977)	(1.957)	(0.183)	(0.156)	(0.166)	(0.146)	(0.256)	(0.239)
Officer		2.527***		3.076***		-64.79***		-10.22***		2.703***		-3.007***
		(0.0350)		(0.122)		(1.768)		(0.131)		(0.122)		(0.200)
Female		0		-7.506***		151.9***		40.88***		-35.64***		44.84***
		(0)		(0.131)		(1.895)		(0.141)		(0.130)		(0.215)
Female Officer		0		1.954***		-88.51***		-10.82***		-0.722*		-20.36***
		(0)		(0.420)		(6.085)		(0.463)		(0.421)		(0.706)
Female FFI		-0.287***		-0.827***		19.17***		1.652***		-0.554***		0.351*
		(0.0370)		(0.129)		(1.868)		(0.139)		(0.129)		(0.211)
Female FFI & Female Marine		0		0.747**		8.044		0.225		-0.334		1.332**
		(0)		(0.351)		(5.074)		(0.380)		(0.351)		(0.581)
Age		0.794***		0.561***		0.991*		-1.954***		1.421***		-2.937***
		(0.0119)		(0.0404)		(0.591)		(0.0438)		(0.0400)		(0.0669)
Age Squared		-0.0136***		-0.0149***		-0.0210**		0.0450***		-0.0297***		0.0561***
		(0.000195)		(0.000663)		(0.00972)		(0.000724)		(0.000658)		(0.00110)
GCE		-0.250***		-0.594***		-17.12***		-1.955***		1.397***		-2.070***
		(0.0306)		(0.102)		(1.480)		(0.110)		(0.102)		(0.168)
LCE		-0.587***		0.264**		0.142		1.308***		1.012***		-1.603***
		(0.0356)		(0.117)		(1.685)		(0.125)		(0.116)		(0.191)
ACE		-0.633***		-0.467***		24.51***		1.861***		-1.045***		0.736***
		(0.0324)		(0.107)		(1.544)		(0.115)		(0.106)		(0.175)
MIG		-0.402***		-0.387***		-4.430**		1.903***		0.462***		-2.445***
		(0.0419)		(0.138)		(1.992)		(0.148)		(0.137)		(0.226)
CFT Treated Year							-1.647***	-1.068***	16.07***	15.76***	-2.866***	-2.890***
							(0.143)	(0.122)	(0.130)	(0.114)	(0.201)	(0.187)
CFT FFI 120 day							-1.343***	-0.642***	0.278***	-0.126*	-0.453***	-0.0506
							(0.0937)	(0.0811)	(0.0848)	(0.0757)	(0.131)	(0.124)
Constant	15.76***	4.993***	94.40***	91.06***	1,325***	1,308***	180.8***	197.5***	92.90***	79.09***	154.0***	188.6***
	(0.0132)	(0.177)	(0.0443)	(0.599)	(0.644)	(8.745)	(0.0552)	(0.646)	(0.0499)	(0.593)	(0.0773)	(0.986)
Observations	349,927	349,927	379,058	379,058	374,905	374,905	332,928	332,928	339,620	339,620	332,928	332,928
R-squared	0.021	0.052	0.114	0.132	0.008	0.040	0.002	0.286	0.104	0.317	0.001	0.152
Mean control t(0)	15.76	4.993	94.40	91.06	1325	1308	180.8	197.5	92.90	79.09	154	188.6
Mean treated t(0)	15.58	4.817	93.11	89.55	1312	1296	179.4	196.8	93.18	78.97	153.5	188.6
Diff t(0)	-0.183	-0.176	-1.285	-1.508	-12.27	-12.16	-1.343	-0.642	0.278	-0.126	-0.453	-0.0506
Mean control t(1)	17.45	6.757	108.8	105.2	1373	1356	179.1	196.4	109	94.85	151.1	185.7
Mean treated t(1)	17.45	6.793	108.6	105	1375	1359	178.6	195.8	107.7	93.63	151.8	186.6
Diff t(1)	-0.00154	0.0363	-0.220	-0.221	2.466	3.247	-0.559	-0.614	-1.275	-1.226	0.730	0.867

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are from total sample population, males only for Pull Up regressions. Results are repetitions for Pull Up, Crunch, and ACL. Results are seconds for 3-Mile Run, MTC, and MUF. Dependent variables are individual Marine repetitions or time in seconds Pull Ups, Crunches, 3-Mile Timed Run, Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, having a Female FFI, and having a Female FFI and being a Female Marine.

B. IMPLICATIONS

These results show several significant findings associated with the addition of an FFI. One of the most notable is the increased scores for Upper Body Endurance and Crunches and decreased scores for Aerobic Capacity across all time periods and sample subsets. This is the most notable finding for multiple reasons. First, the greatest amount of change in standards for PFT scores was in the upper body events, pull-ups and push-ups, and crunches. While there were some changes to the scoring in the three-mile timed run, they were relatively minimal. This observation coincides with the second reason, which is that we, again, cannot prove that increased standards have increased the fitness of Marines. There is no way to identify that a Marine who completed 20 pull-ups in 2016 was only capable of 20 and not 23. In fact, this was the reason for using scores in the analysis rather than individual repetitions as metrics for outcome variables. The increased requirements caused mean repetitions to increase because the limit was raised but tells us nothing about improvements in fitness or capacity.

The next notable finding is the extreme decreases in scores for Marines in the MIG/CE and Supporting Establishment. These decreases are concerning because most of the units in the sample population of Supporting Establishment units are either Formal Learning Centers (FLC) or Special Duty Assignment (SDA) billet units. These individuals include Marines screened and selected as Drill Instructors and Marine Combat Instructors, as well as Marines who train entry-level Marine students on a daily basis.

The last occurrence to note is the higher decrease in scores of female Marines compared to male Marines. This trend complicates the first finding, increased scores for Upper Body Endurance and Crunches, because the increases for female Marines for those outcome variables were neither statistically nor economically significant. The increases for male Marines, both statistically and economically significant, account for most of the increase in the total sample population. This is intuitive because of the high percentage of males in the sample population and the Marine Corps as a whole but does not help the case for the physical training of female Marines.

C. RECOMMENDATIONS

My first recommendation is for the FFI program to be paused until a full Course Content Review Board (CCRB) is completed and Program of Instruction (POI) is signed. The POI, as of September 2018, is still in draft form even though more than 400 FFIs have been graduated and are training Marines in their units. A CCRB can evaluate the proper amount of time required to train a Marine, with a low-level baseline of background on topics covered as established in the course prerequisites and find the proper amount of time associated to each curriculum aspect. This also has the ability to change the prerequisite requirements for a Marine to attend the course, adding the question of whether there is an added baseline of information a Marine should know about training or nutrition before attending the course.

The second recommendation is for a follow-on study to this thesis utilizing 2018 data to balance the pre- and post-treatment timelines. This would allow for 2015 and 2016 data as pre-trends and 2017 and 2018 data to be used in the post-treatment timelines. This addition to the study may normalize the treated year effects.

The final recommendation is for a cost–benefit analysis (CBA) on the various subject matter experts that are available to Marines. This CBA needs to look at the costs and overlap of duties. As the Marine Corps continues to employ trainers at Semper Fit, nutritionists, athletic trainers, and the addition of FFIs, an analysis of the cost of each program, what they provide the force, and the optimal mix going forward should be a high priority.

VI. CONCLUSION

> We may not find initial successes in all of our experimentation efforts, but our continued focus and persistence will lead to solutions that will enable our future force. This "disruptive" mindset must be pursued and fostered when found, or it will not sustain itself within our bureaucracy. We need creative leaders who think!
>
> —General Robert B. Neller
> 37th Commandant of the Marine Corps (2016)

The purpose of my analysis is to evaluate the FFI program and its effects on the Marines it was designed to support. By identifying and correcting the shortfalls in the program, we have the ability to better support the Marines of our force. As the Literature Review shows, our depth of knowledge in these areas, as an institution, is lacking compared to our counterparts in the private sector. The Marine Corps prides itself on training "tactical athletes" yet we have failed to implement the vast levels of information on training athletes from varied disciplines. Our focus is too myopic and has not produced results. This training information alone will not breed the level of success that we require without the added implementation of updated nutrition and body composition standards used by those athletes. Our nutritional standards are outdated, and the body composition program is flawed. Training injuries are always an inherent risk. Ensuring that the FFI program places a heavy focus on technique, programming, and recovery will help to minimize these risks, but the fact of the matter is that injuries occur during high intensity training, both physical and military, and can never be eliminated.

As the results show, the FFI program is not producing higher scores or "more fit" Marines. In fact, a substantial portion of the analysis shows we are producing just the opposite. While Marines in different unit types and females are seeing worse results, the whole of the Force is seeing a decline in physical preparedness from the FFIs. Just as strength coaches make strong athletes better prepared for their sport, if the program is to continue, the FFI should be focused to make strong Marines better prepared to conduct operations. These FFIs should be able to train Marines effectively regardless of

the element of the MAGTF in which they find their billet. The program, as it currently stands, does not provide this to our Marines and actually negatively impacts their overall physical performance and effectiveness. We owe it to our Marines to do better.

APPENDIX A. TOTAL SAMPLE POPULATION KERNEL DENSITIES

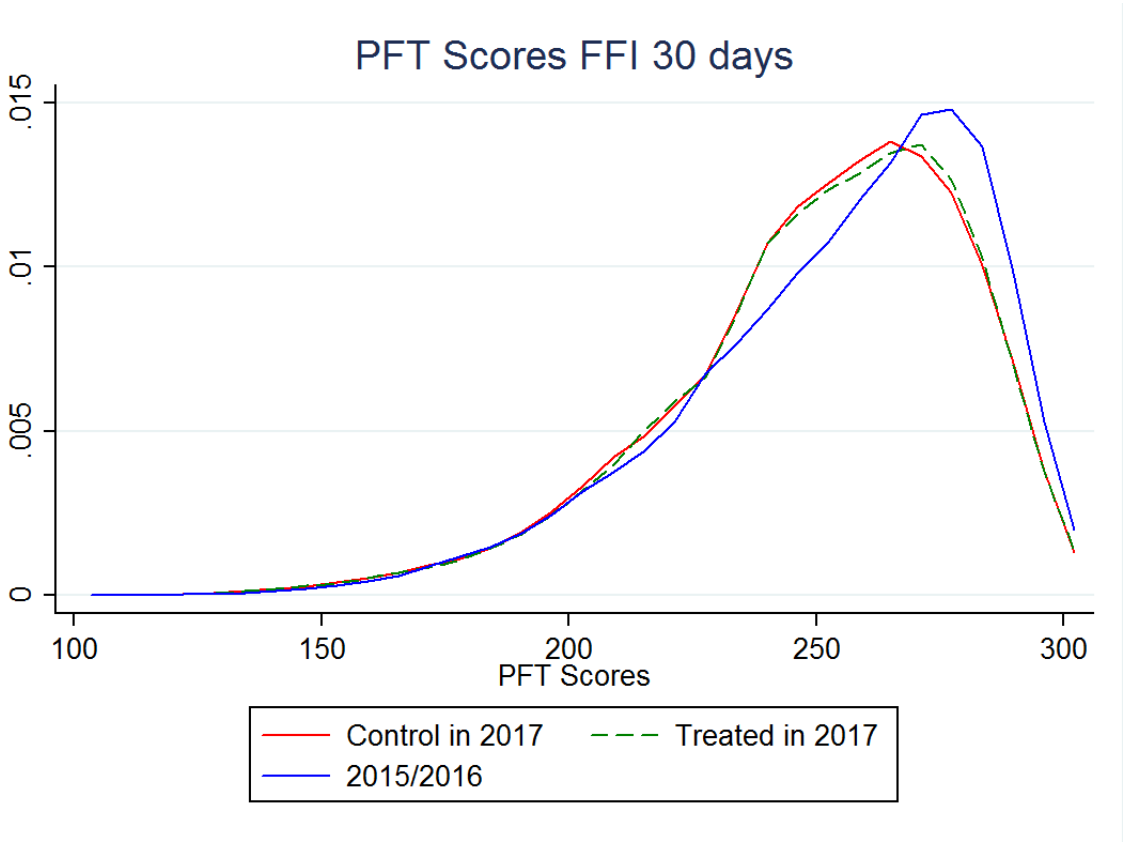

Figure 3. Kernel Density of Physical Fitness Test Scores with FFI 30 Days or Greater

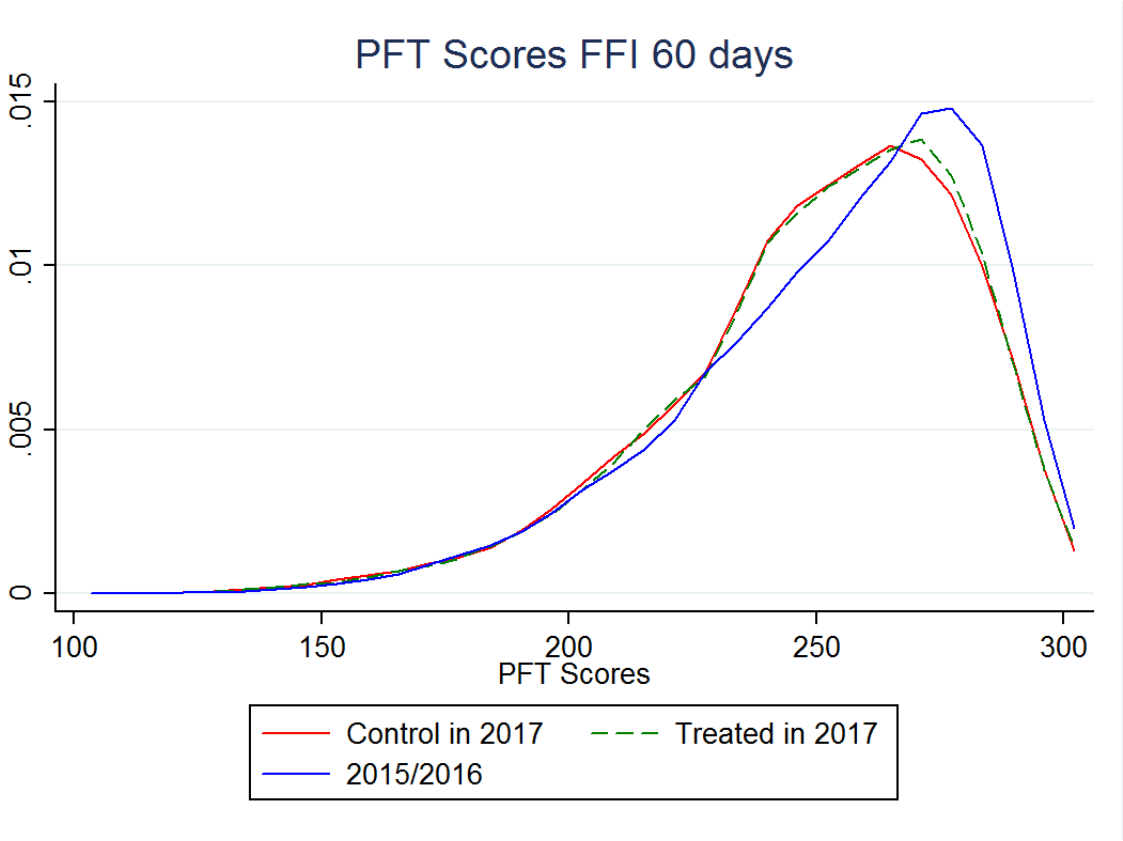

Figure 4. Kernel Density of Physical Fitness Test Scores with FFI 60 Days or Greater

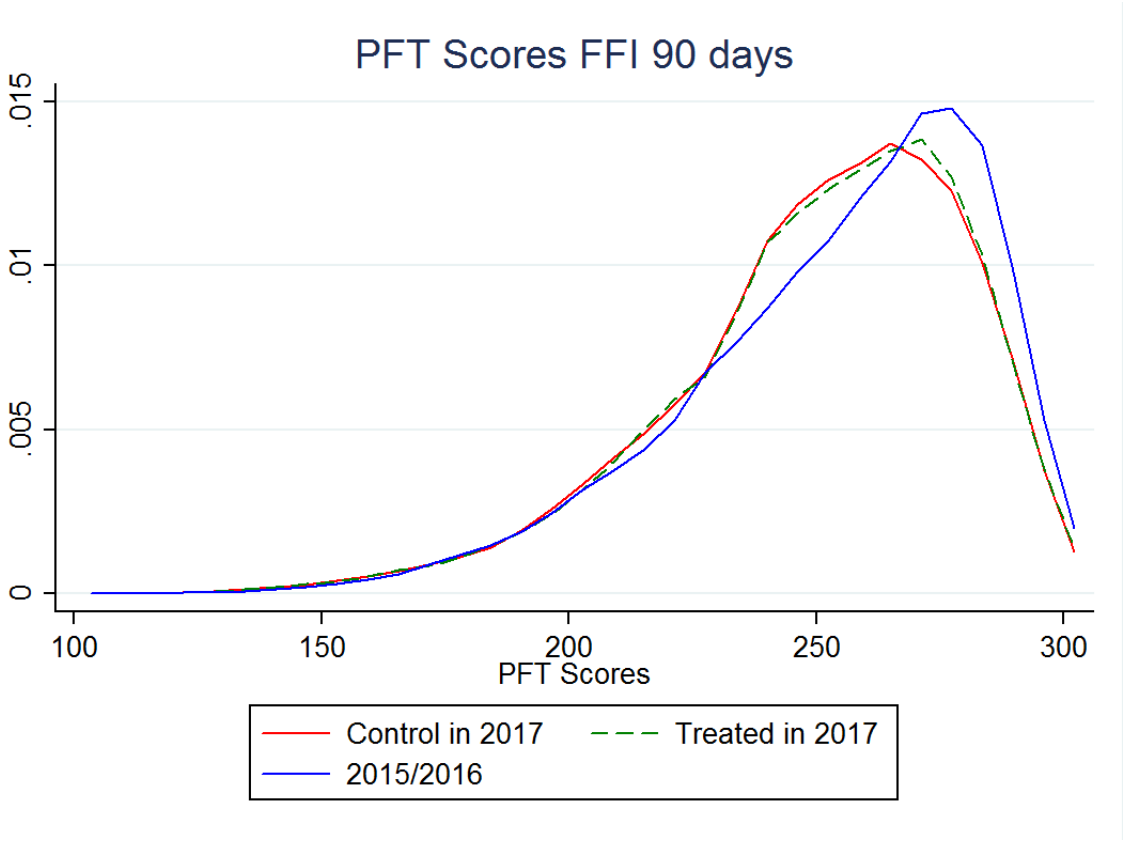

Figure 5. Kernel Density of Physical Fitness Test Scores with FFI 90 Days or Greater

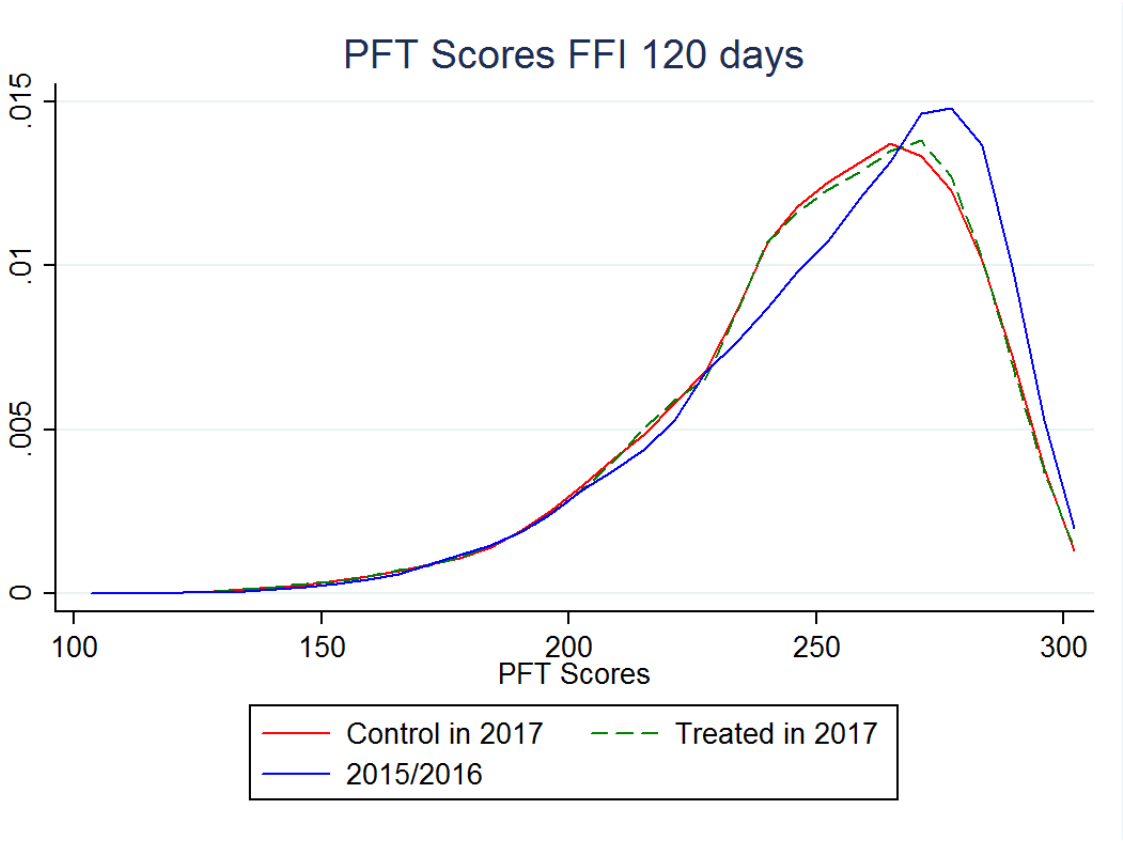

Figure 6. Kernel Density of Physical Fitness Test Scores with FFI 120 Days or Greater

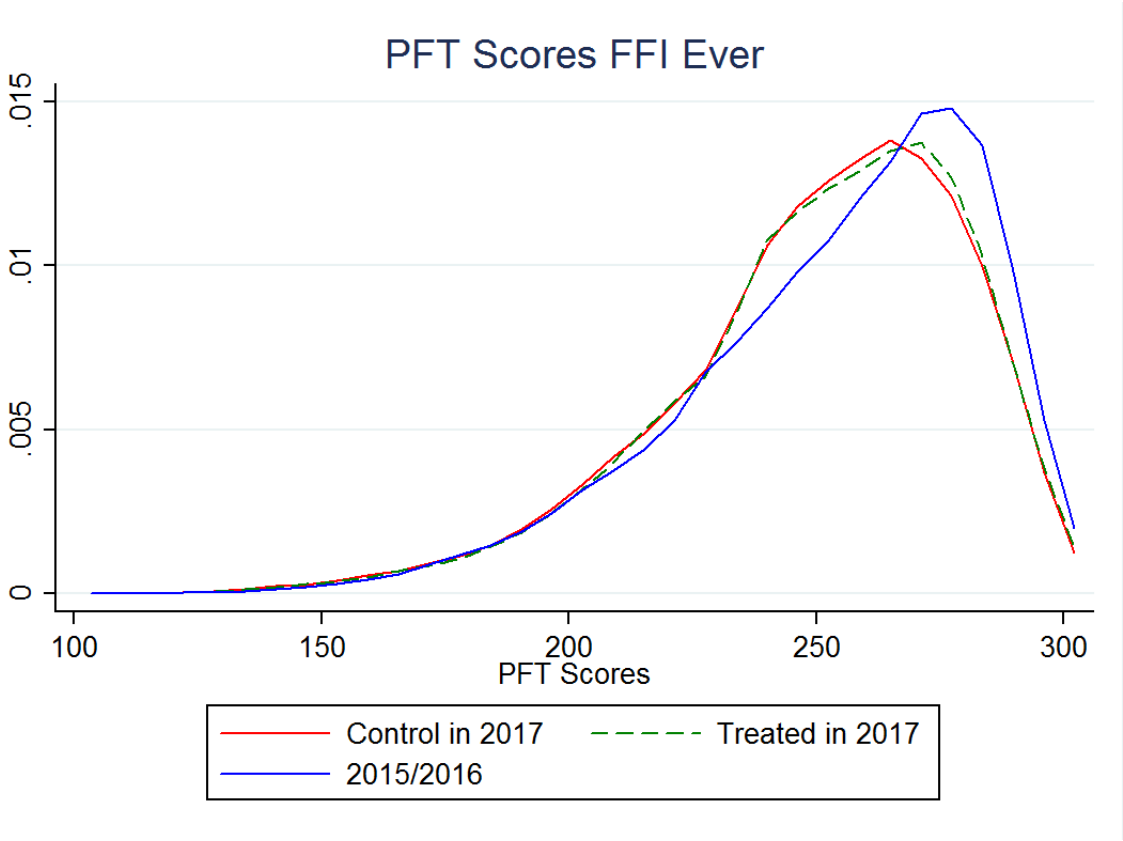

Figure 7. Kernel Density of Physical Fitness Test Scores Ever Having an FFI

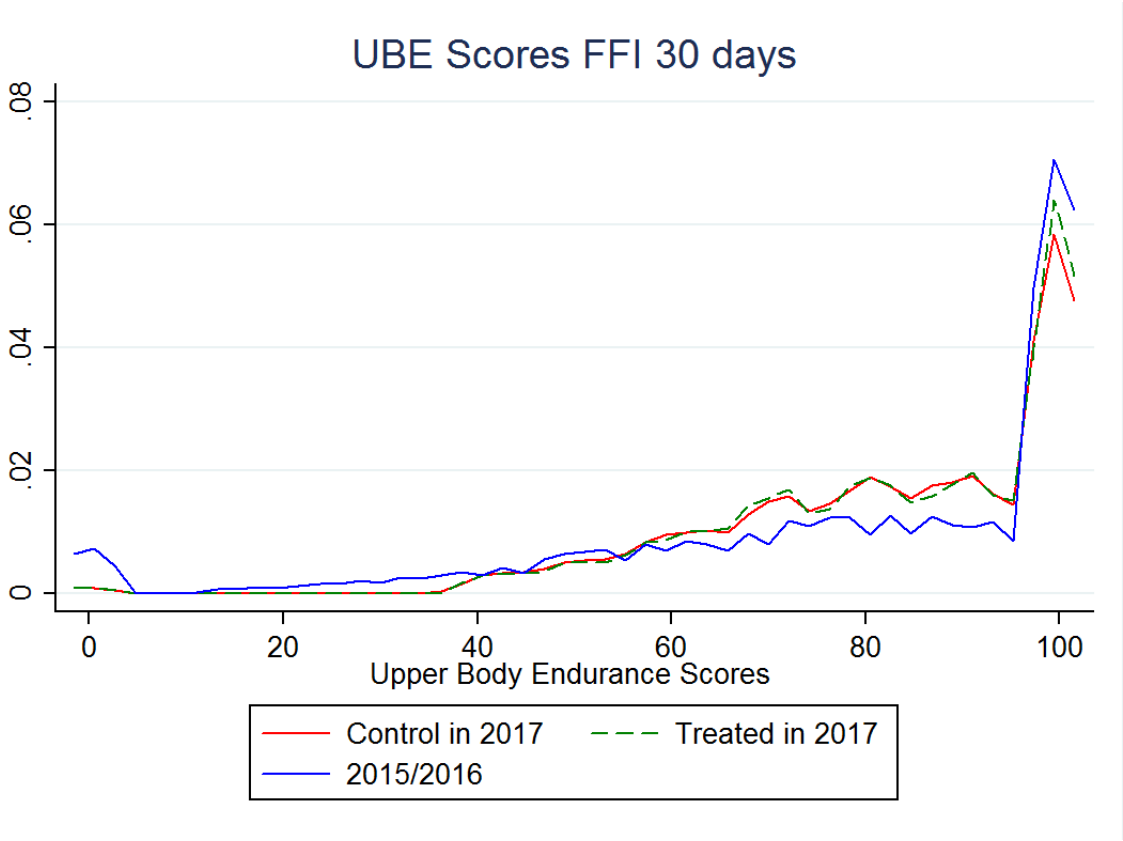

Figure 8. Kernel Density of Upper Body Endurance Scores with FFI 30 Days or Greater

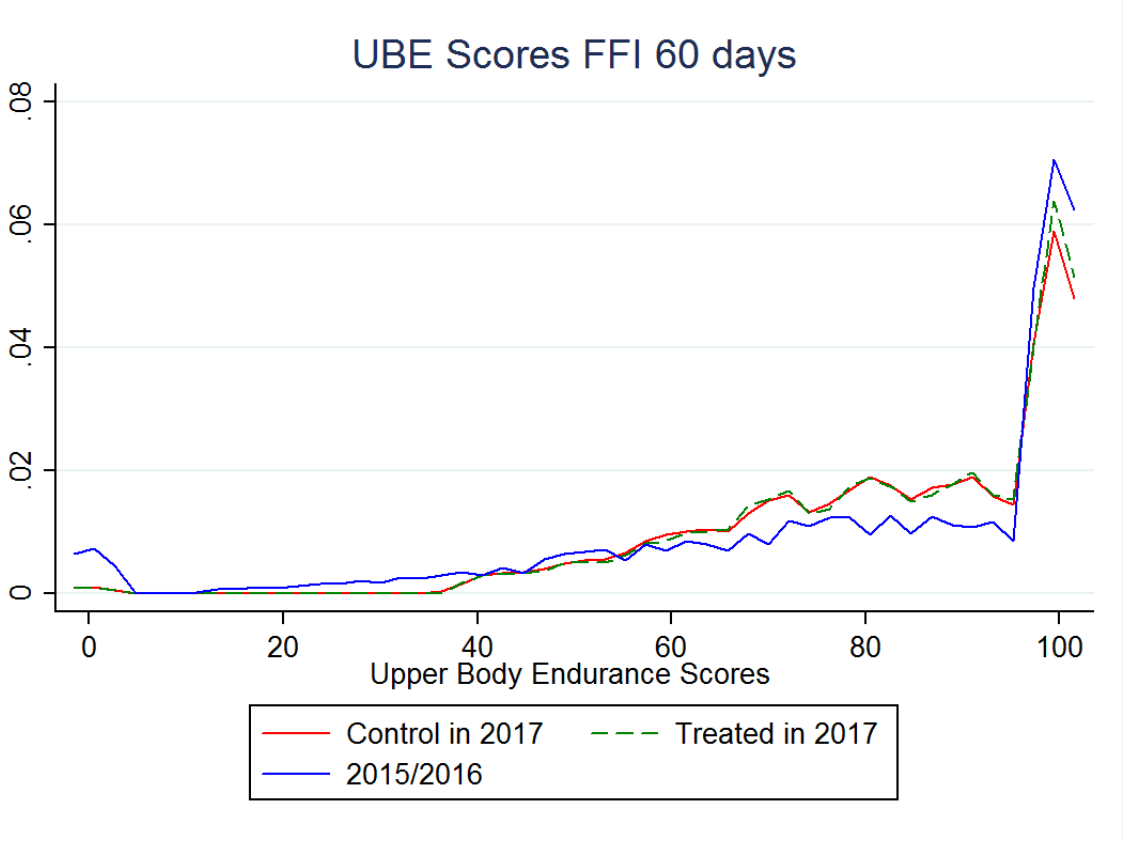

Figure 9. Kernel Density of Upper Body Endurance Scores with FFI 60 Days or Greater

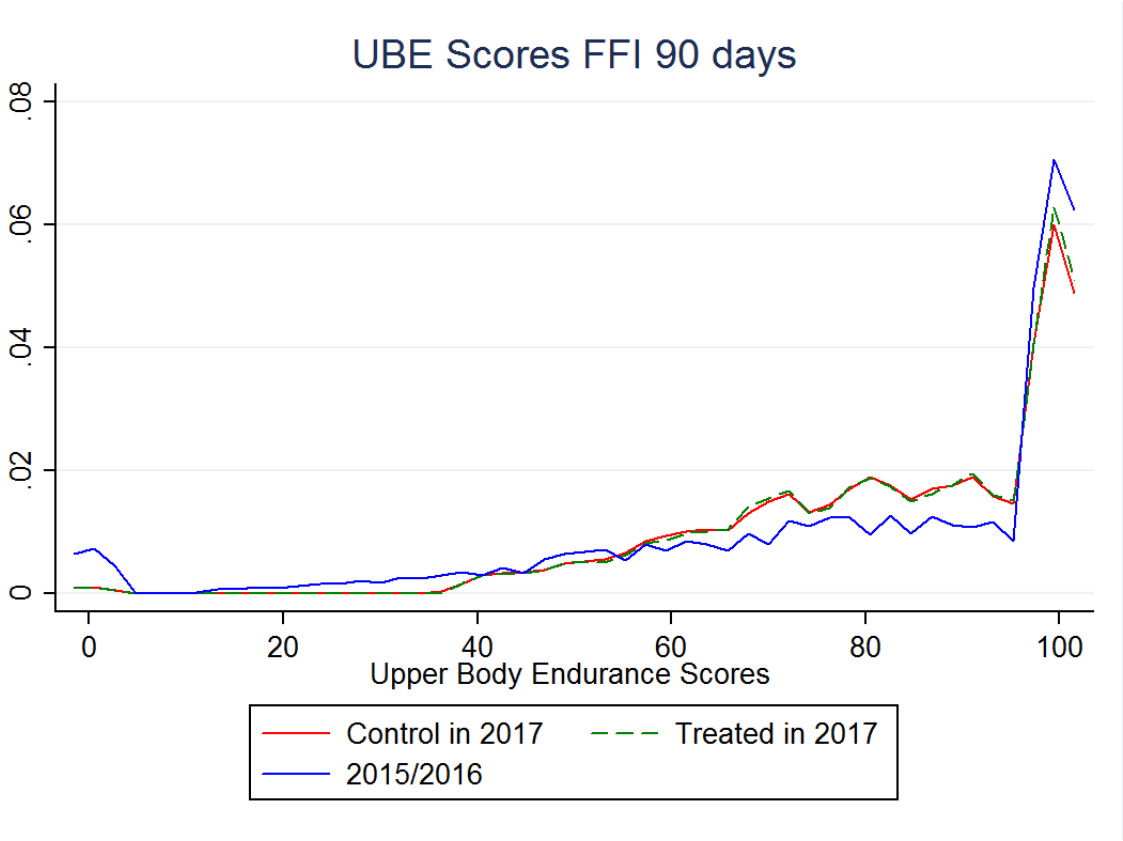

Figure 10. Kernel Density of Upper Body Endurance Scores with FFI 90 Days or Greater

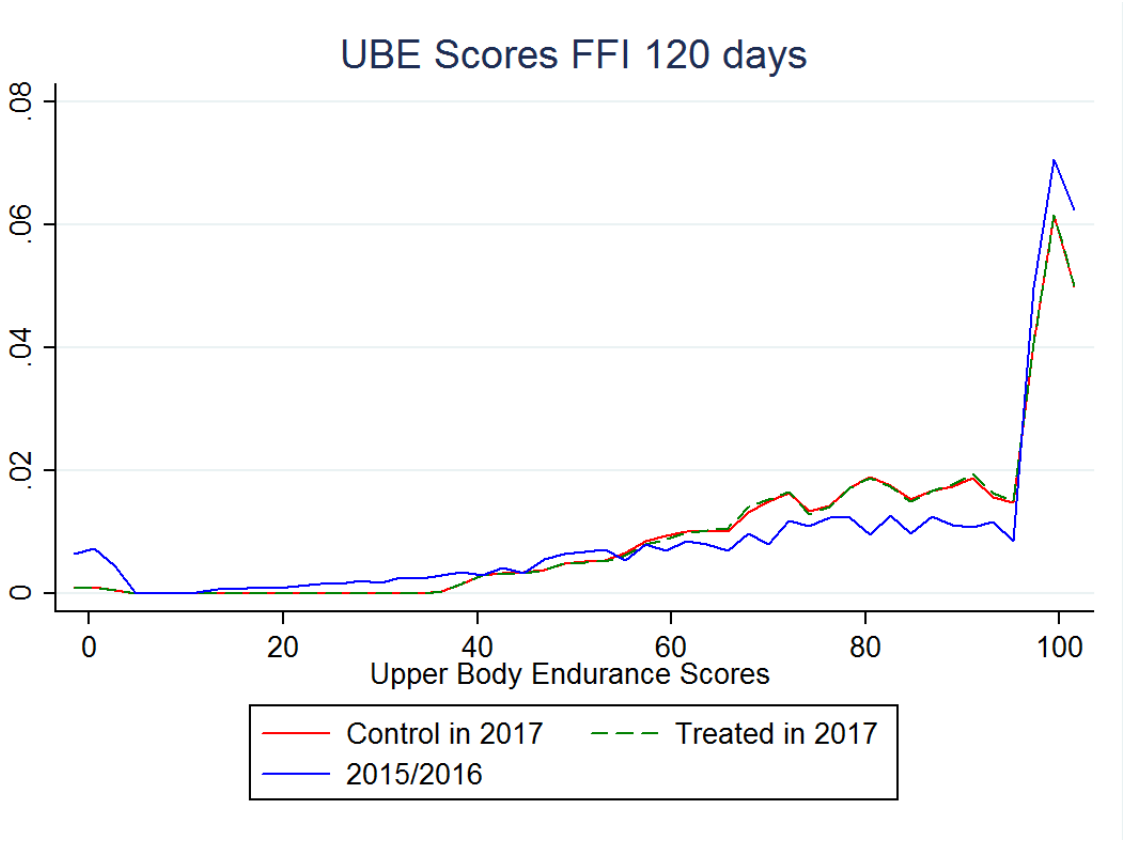

Figure 11. Kernel Density of Upper Body Endurance Scores with FFI 120 Days or Greater

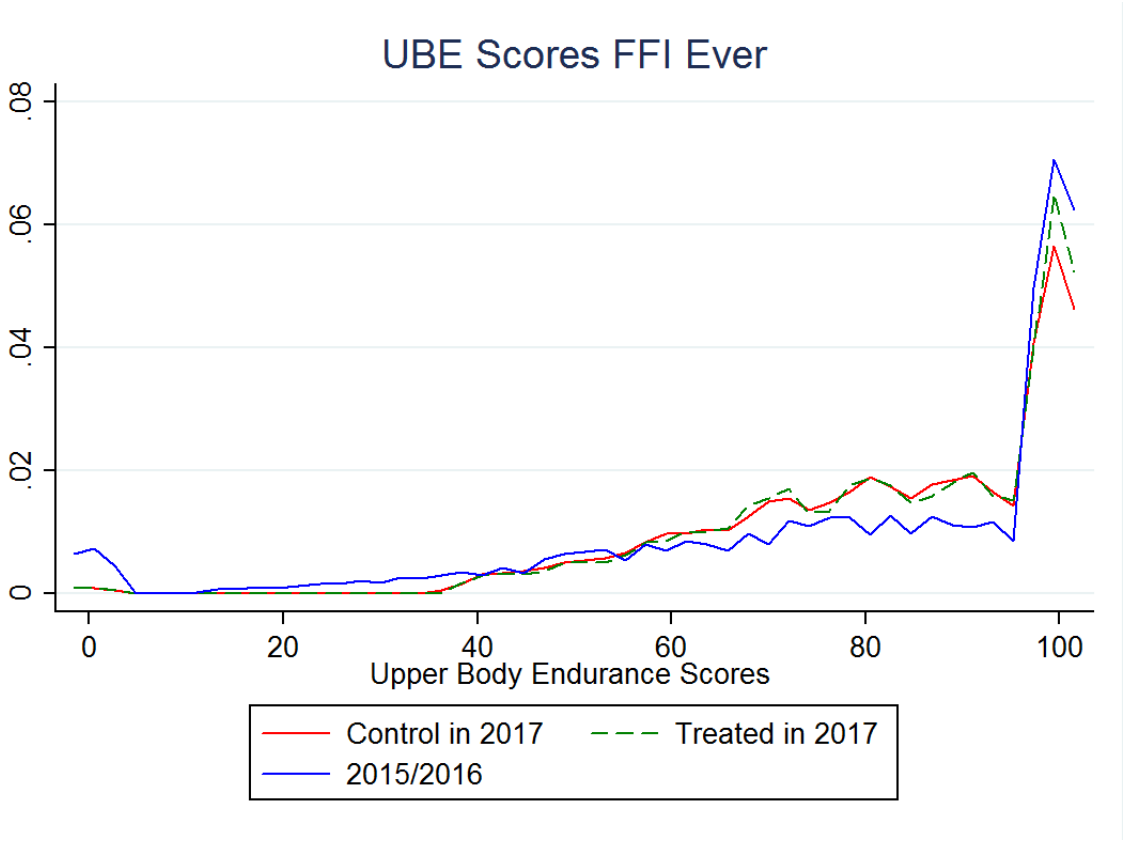

Figure 12. Kernel Density of Upper Body Endurance Scores Ever Having an FFI

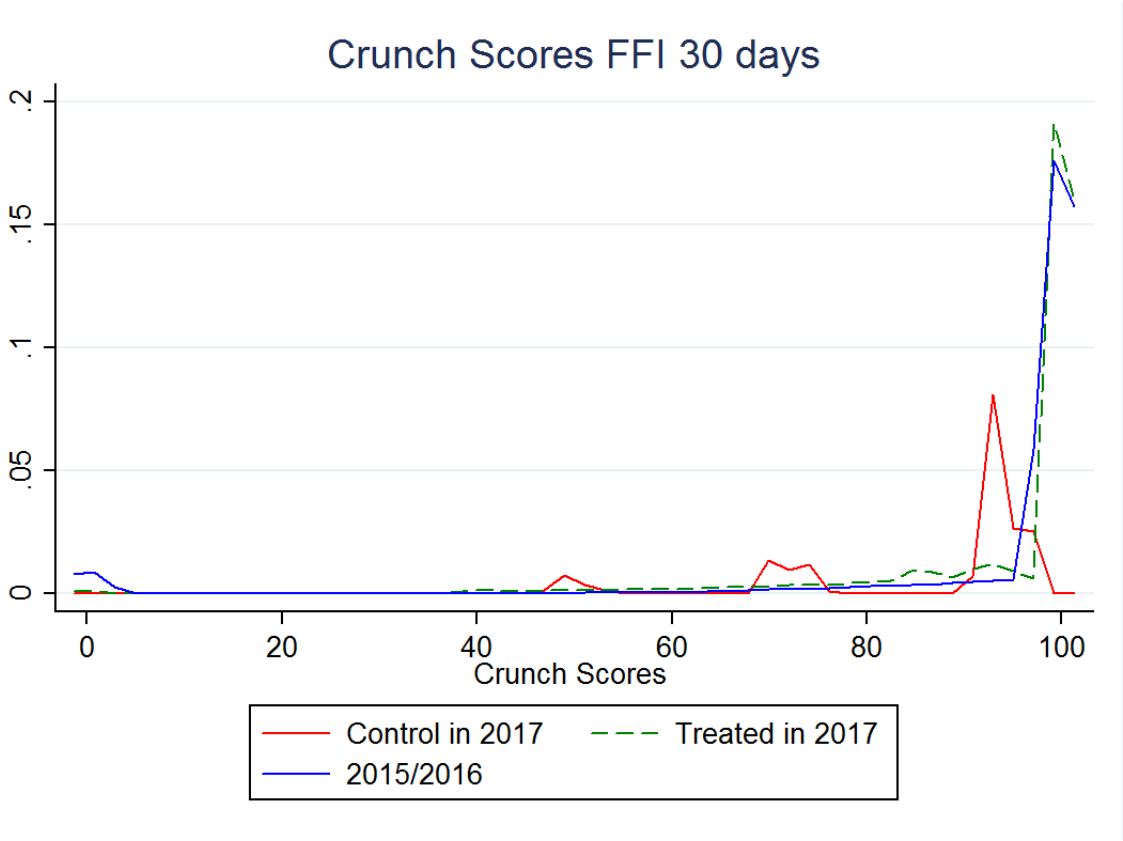

Figure 13. Kernel Density of Crunch Scores with FFI 30 Days or Greater

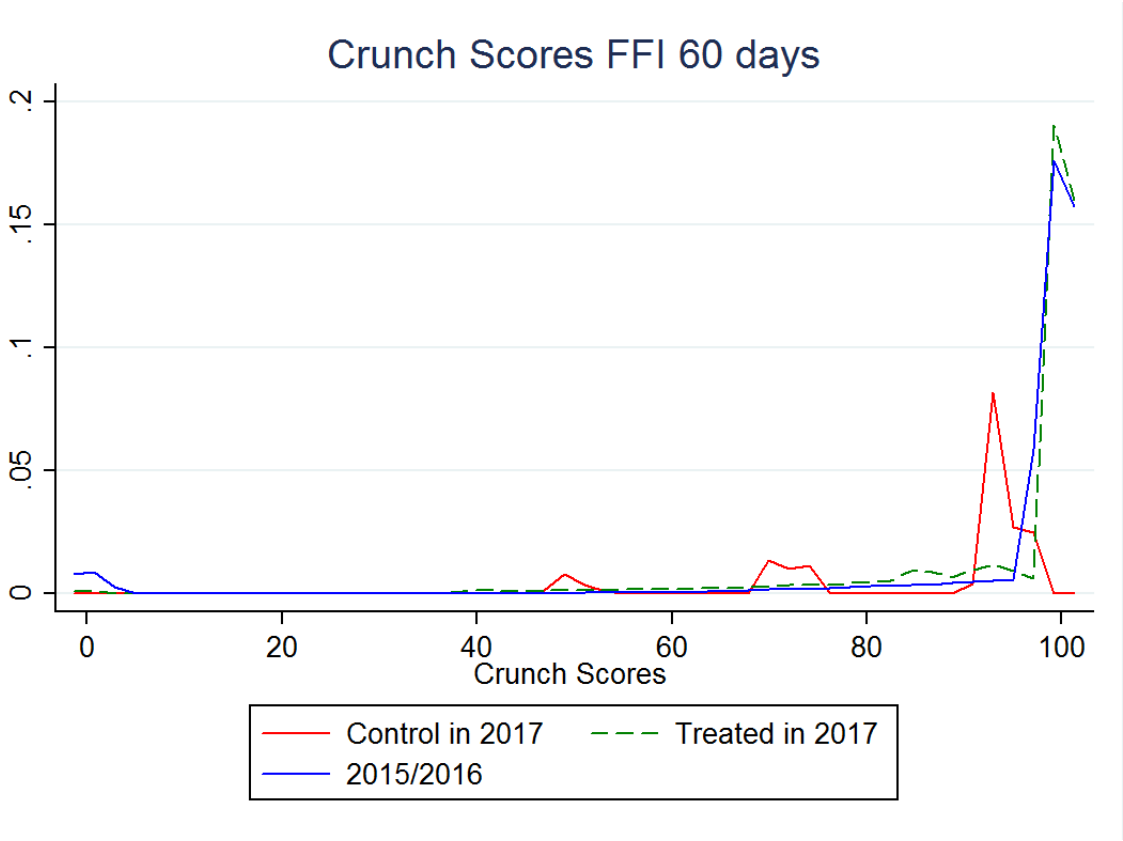

Figure 14. Kernel Density of Crunch Scores with FFI 60 Days or Greater

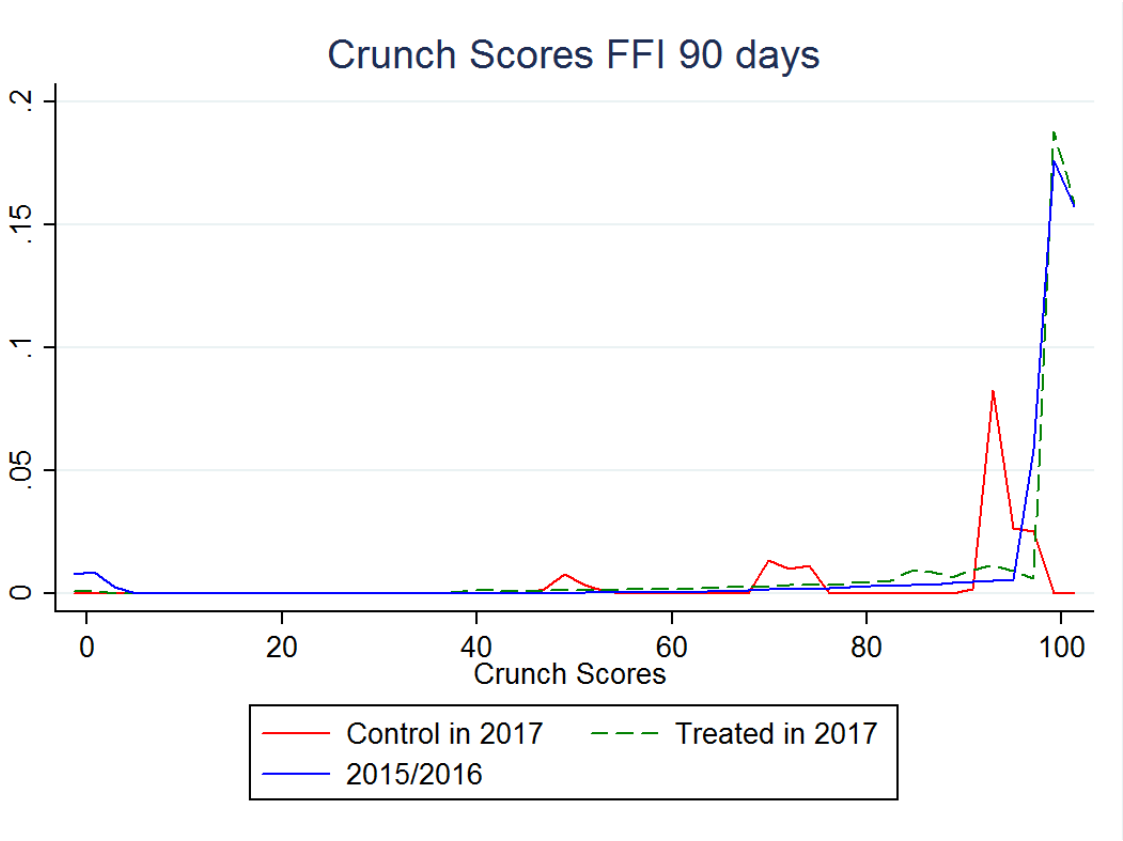

Figure 15. Kernel Density of Crunch Scores with FFI 90 Days or Greater

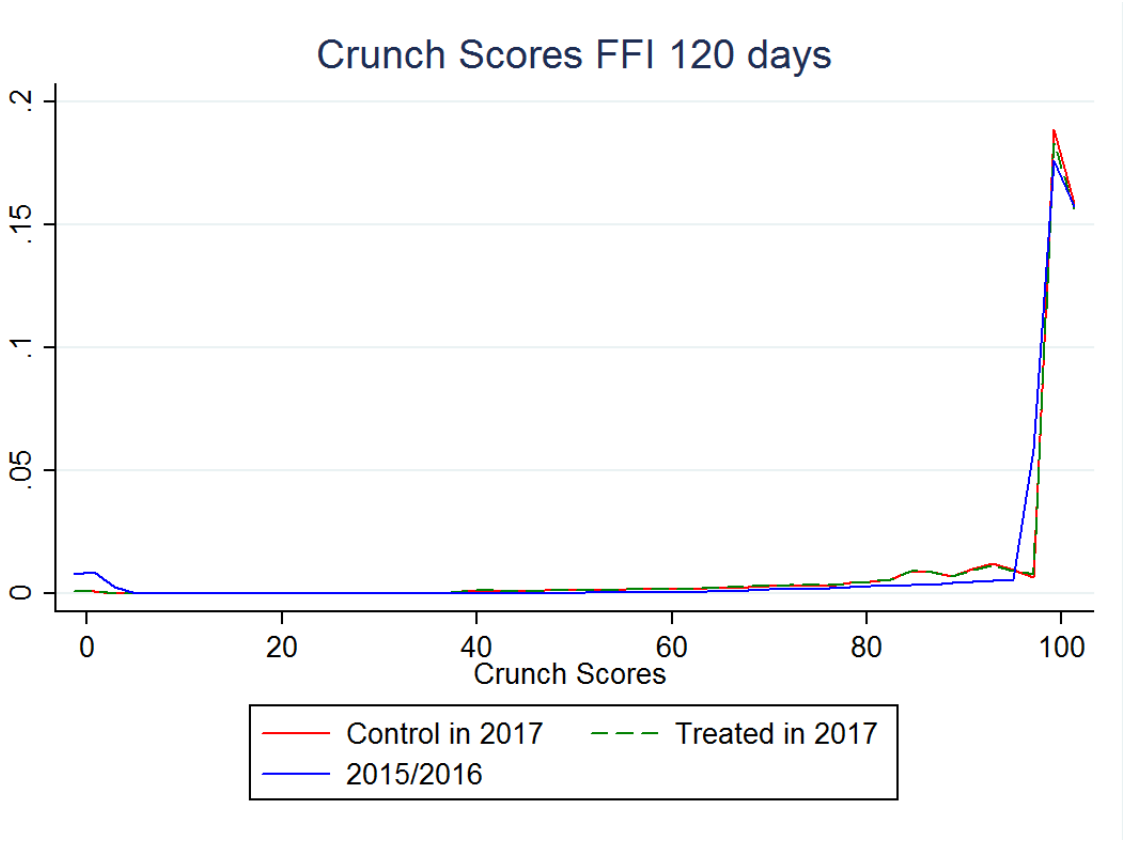

Figure 16. Kernel Density of Crunch Scores with FFI 120 Days or Greater

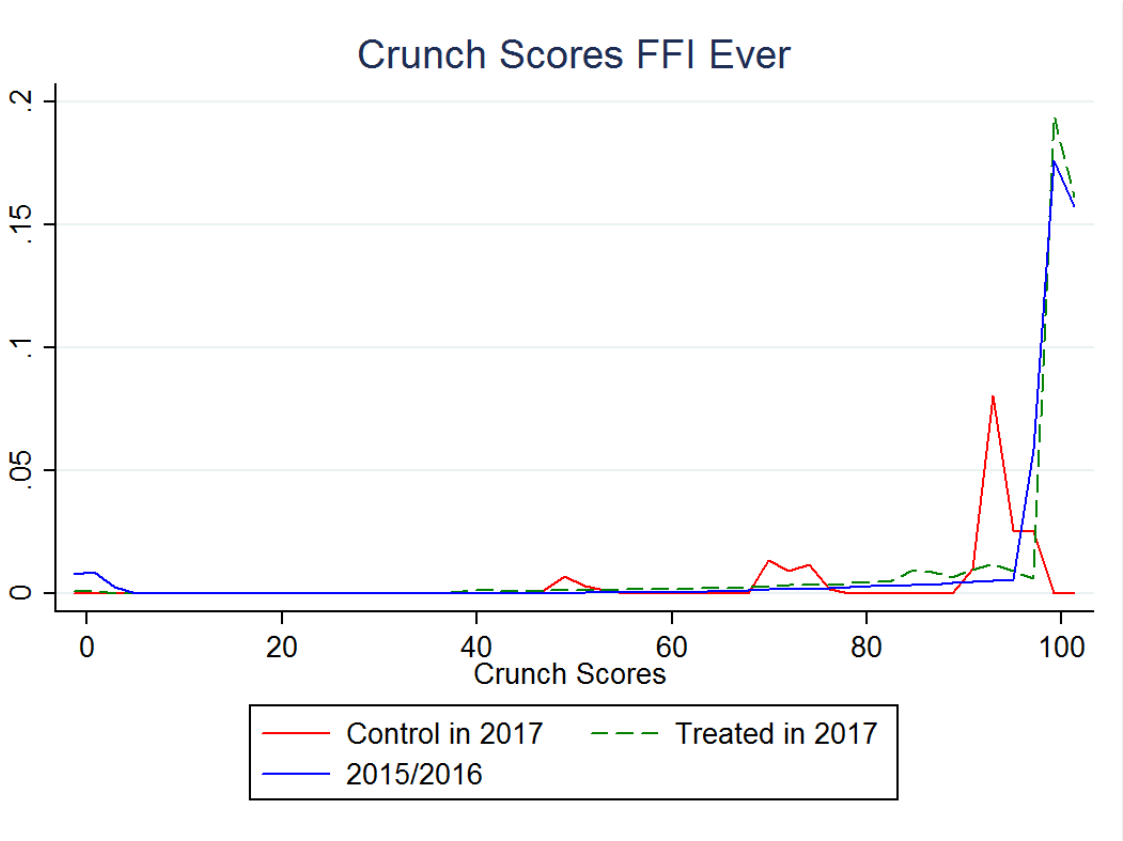

Figure 17. Kernel Density of Crunch Scores Ever Having an FFI

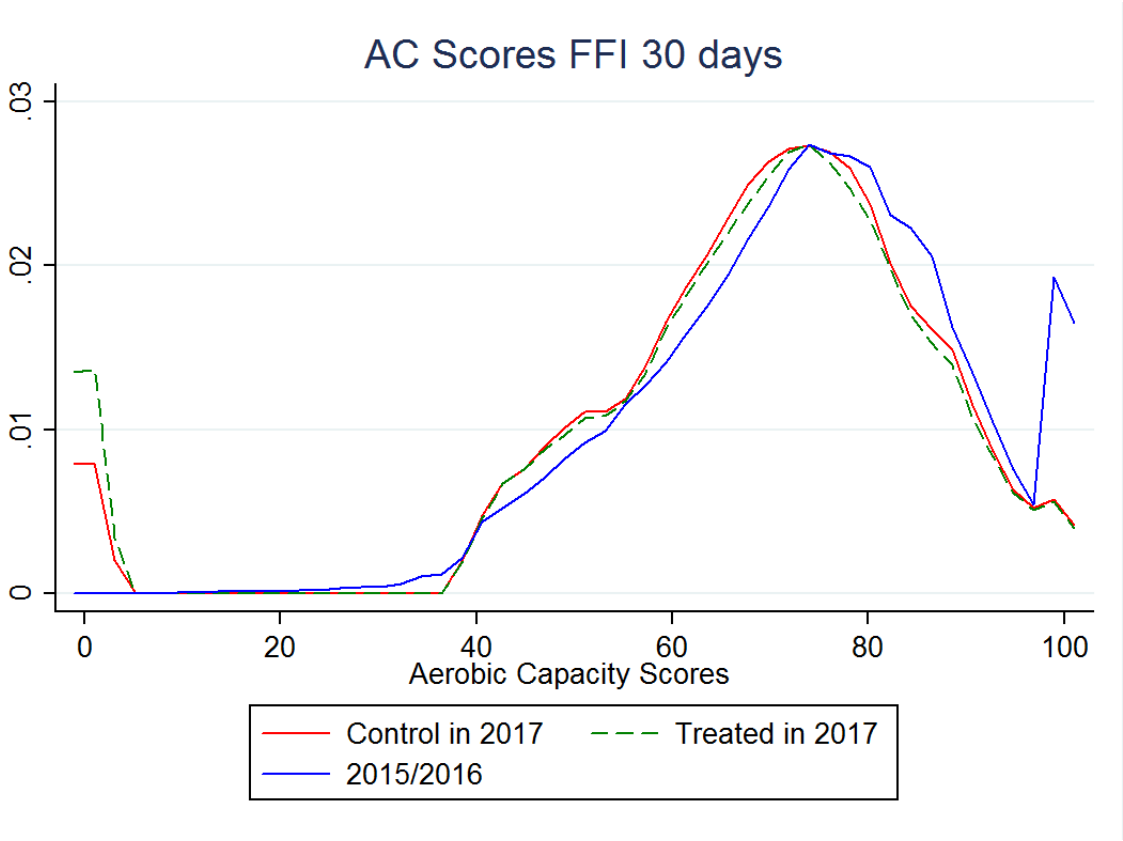

Figure 18. Kernel Density of Aerobic Capacity Scores with FFI 30 Days or Greater

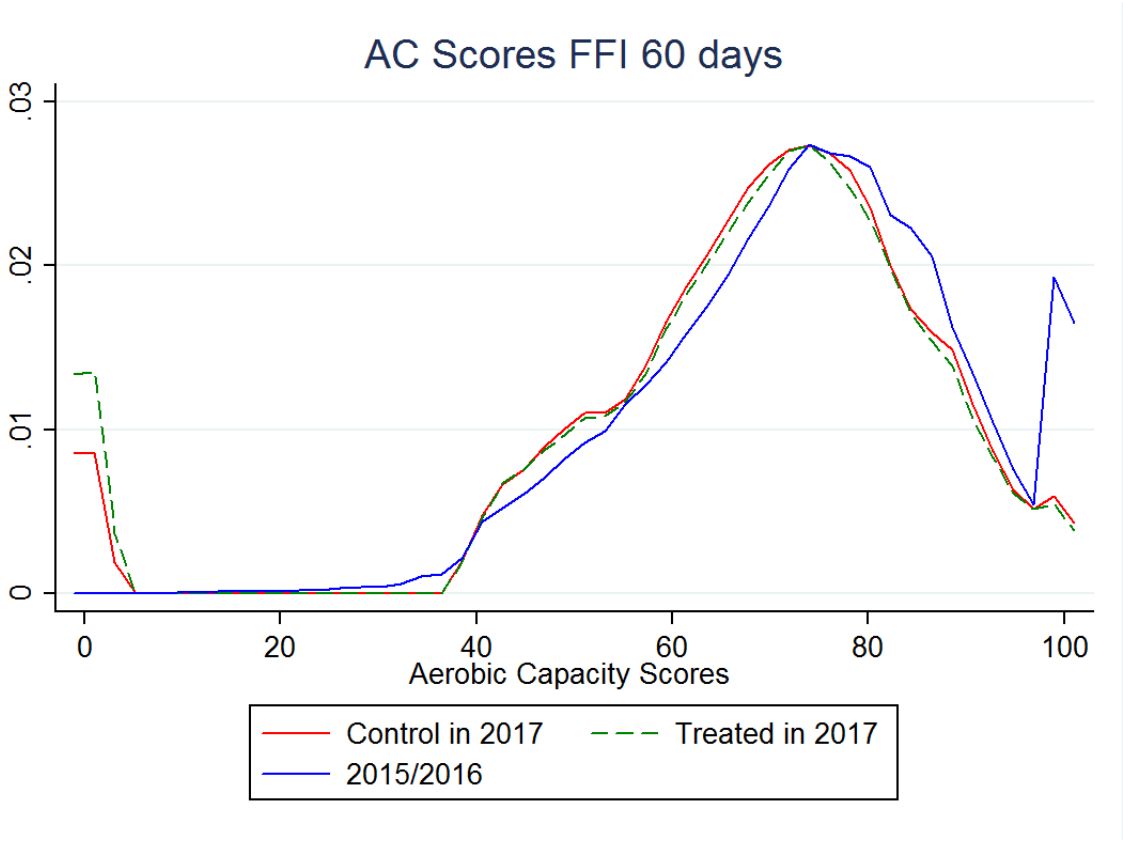

Figure 19. Kernel Density of Aerobic Capacity Scores with FFI 60 Days or Greater

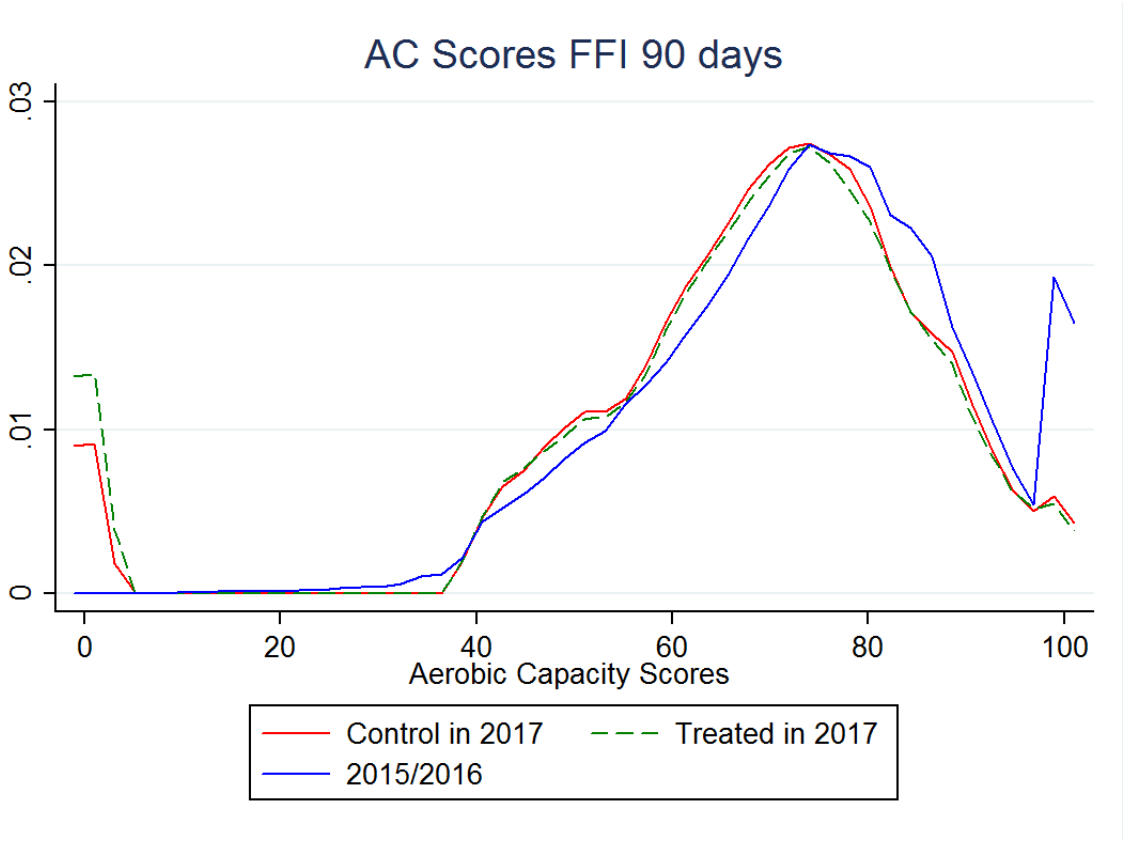

Figure 20. Kernel Density of Aerobic Capacity Scores with FFI 90 Days or Greater

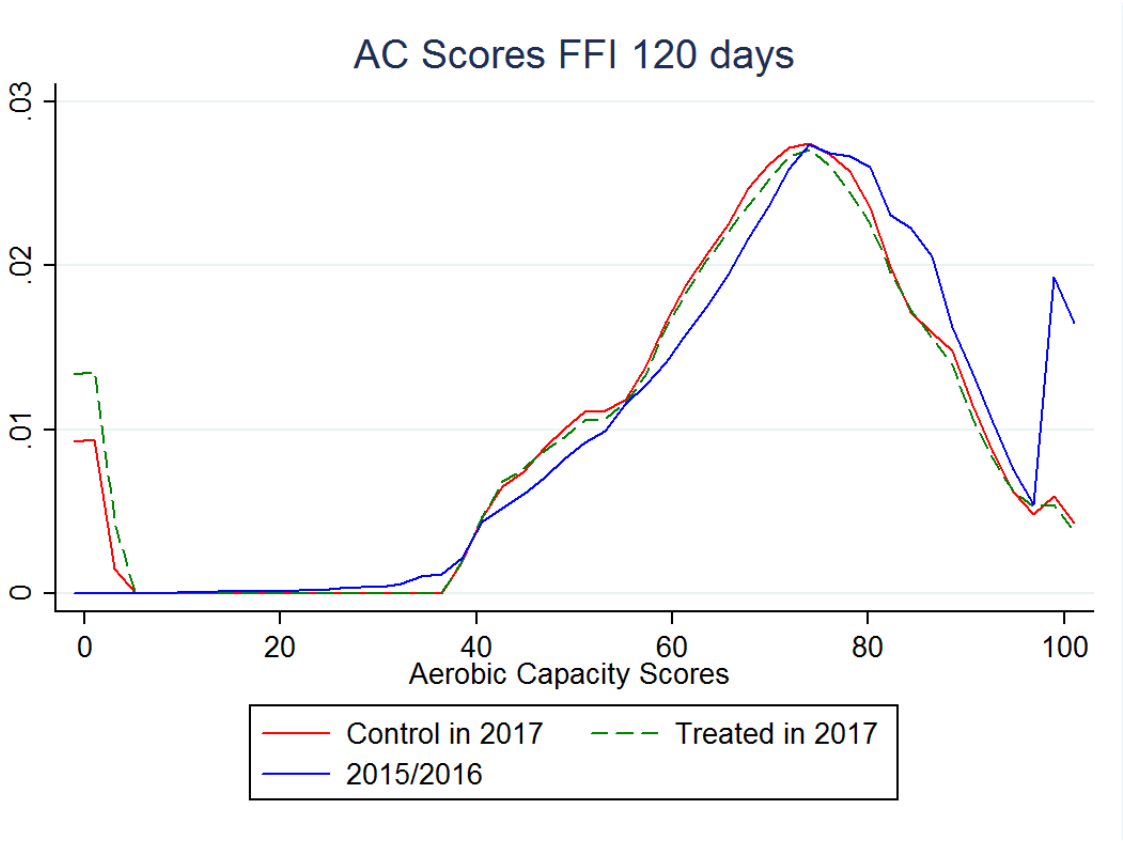

Figure 21. Kernel Density of Aerobic Capacity Scores with FFI 120 Days or Greater

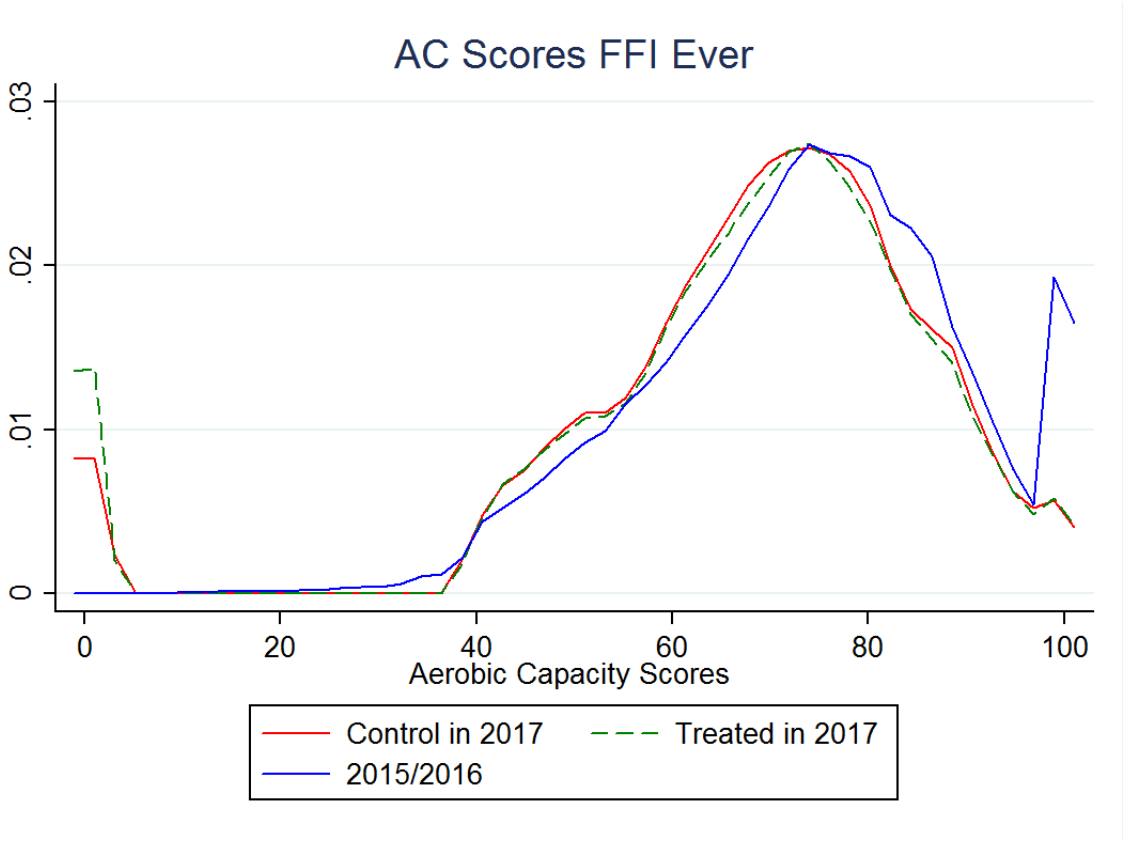

Figure 22. Kernel Density of Aerobic Capacity Scores Ever Having an FFI

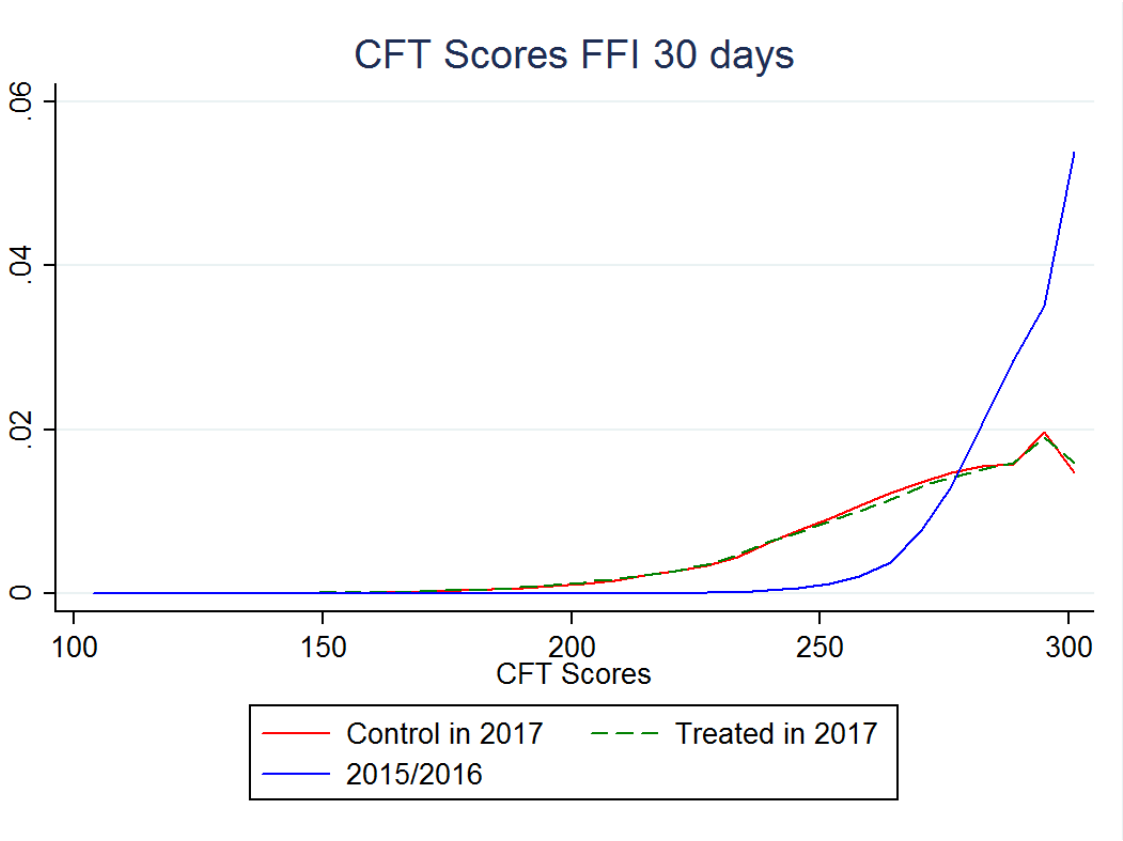

Figure 23. Kernel Density of Combat Fitness Test Scores with FFI 30 Days or Greater

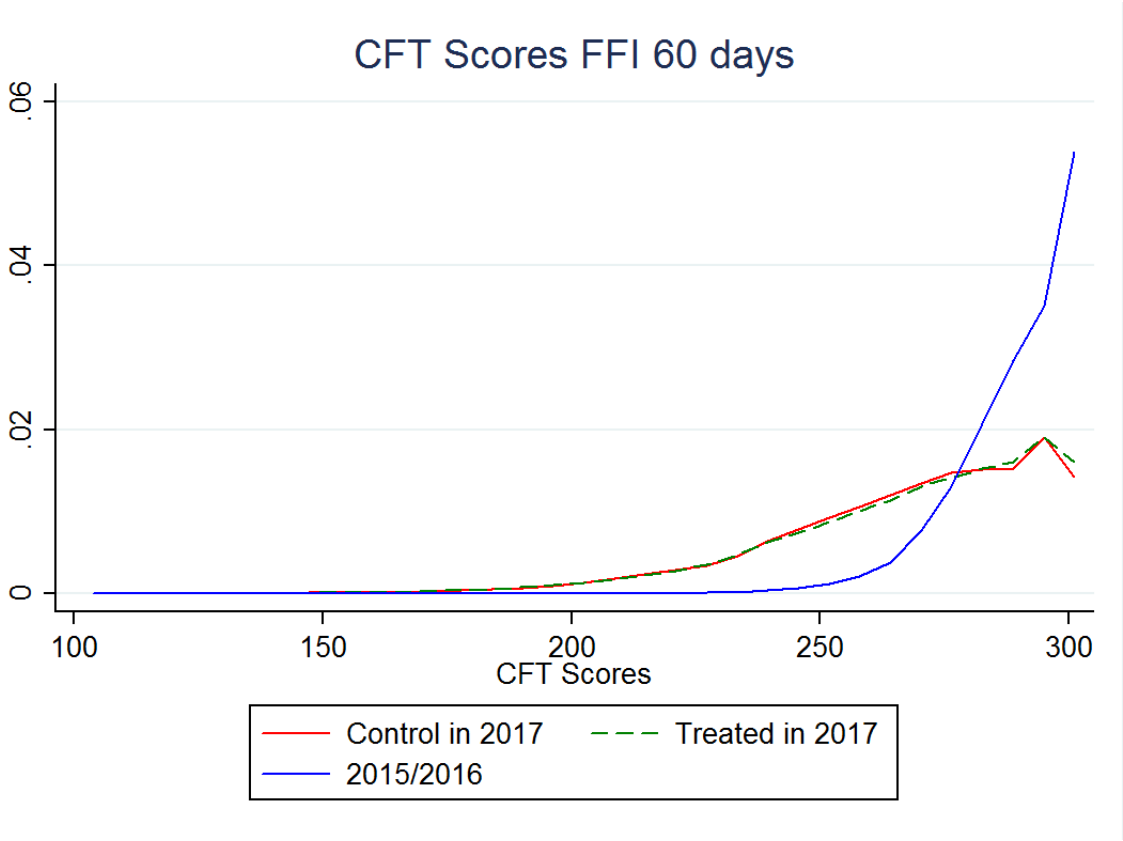

Figure 24. Kernel Density of Combat Fitness Test Scores with FFI 60 Days or Greater

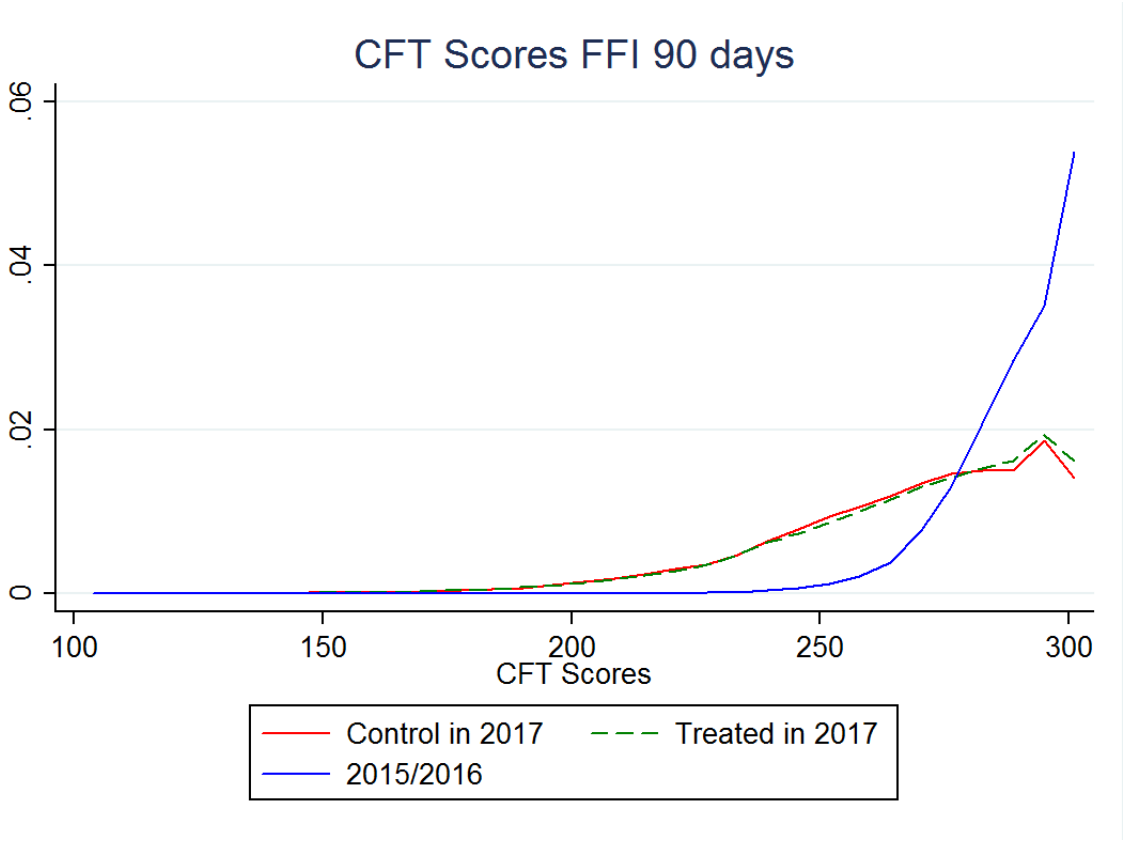

Figure 25. Kernel Density of Combat Fitness Test Scores with FFI 90 Days or Greater

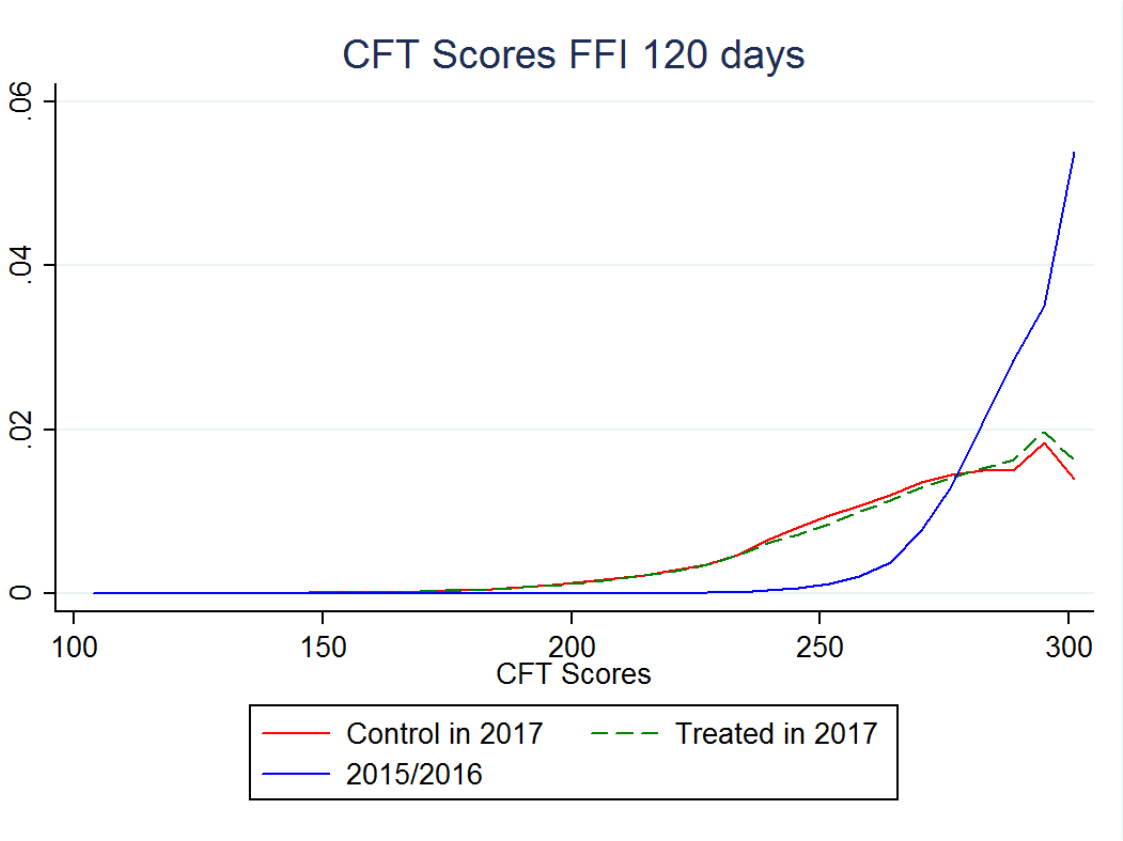

Figure 26. Kernel Density of Combat Fitness Test Scores with FFI 120 Days or Greater

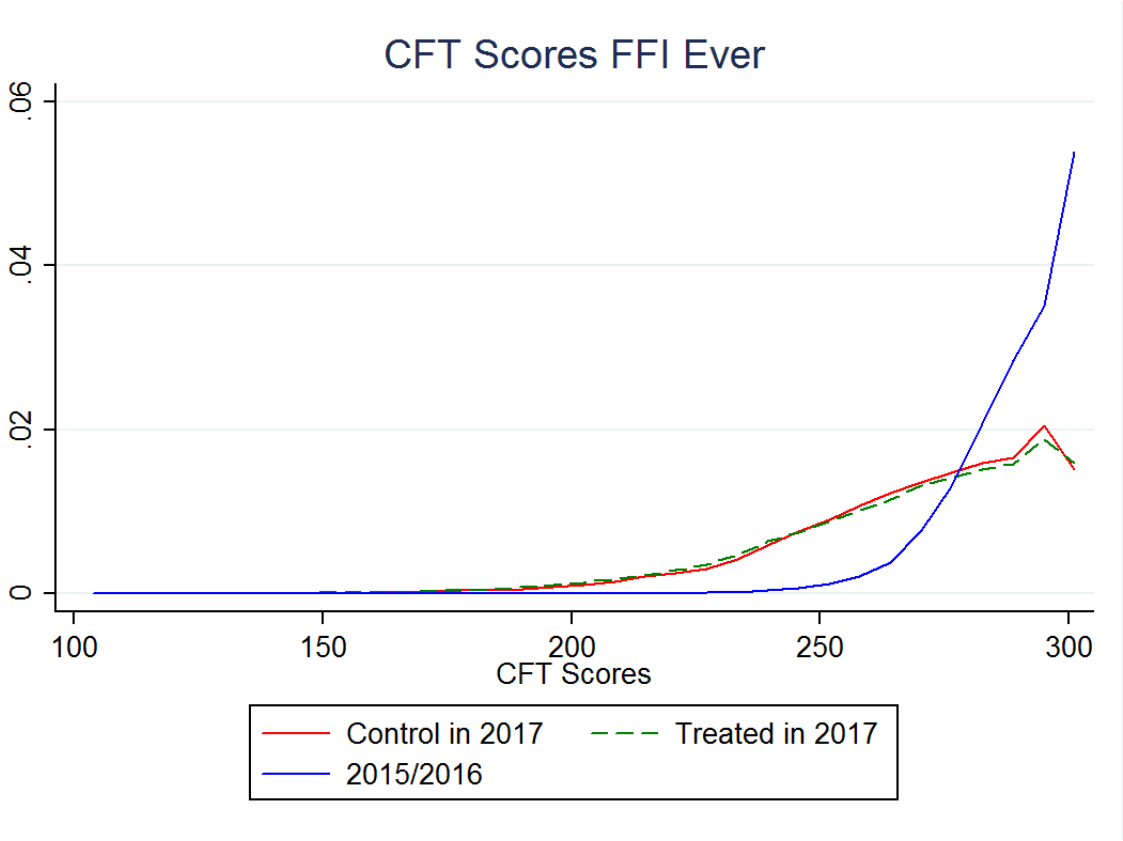

Figure 27. Kernel Density of Combat Fitness Test Scores Ever Having an FFI

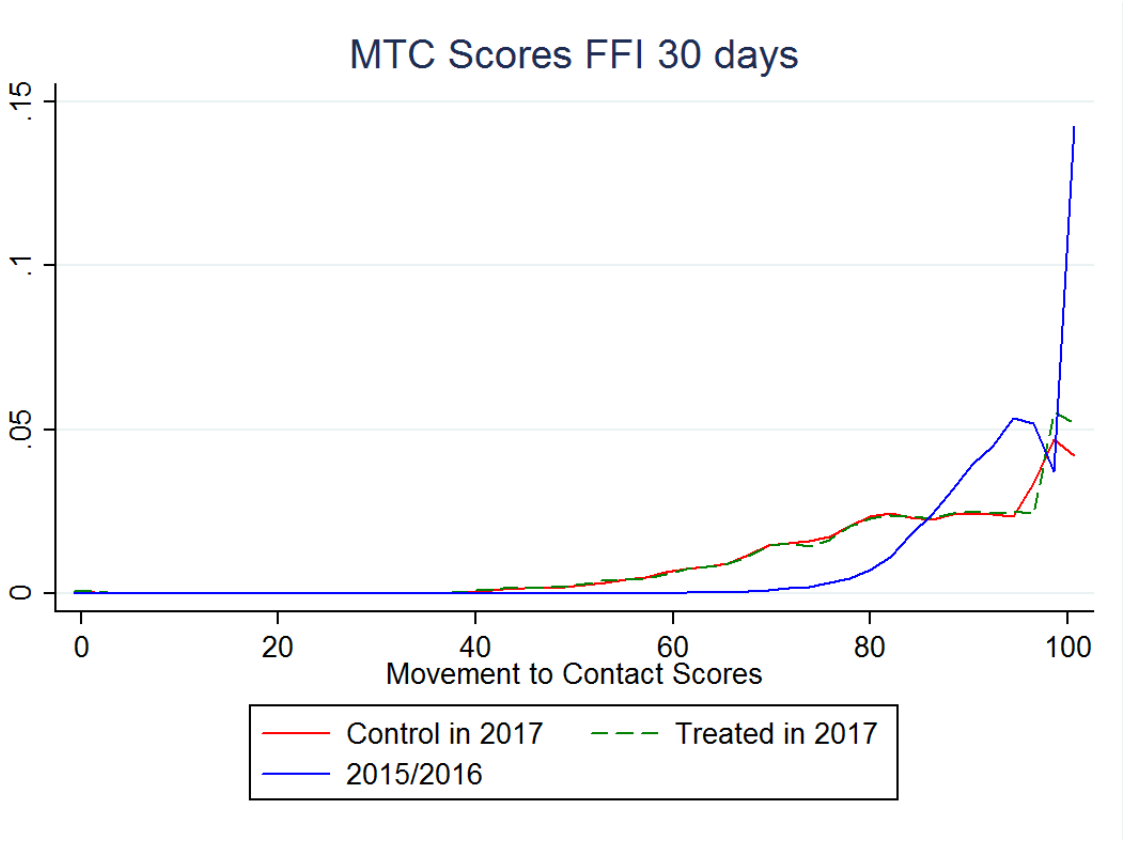

Figure 28. Kernel Density of Movement to Contact Scores with FFI 30 Days or Greater

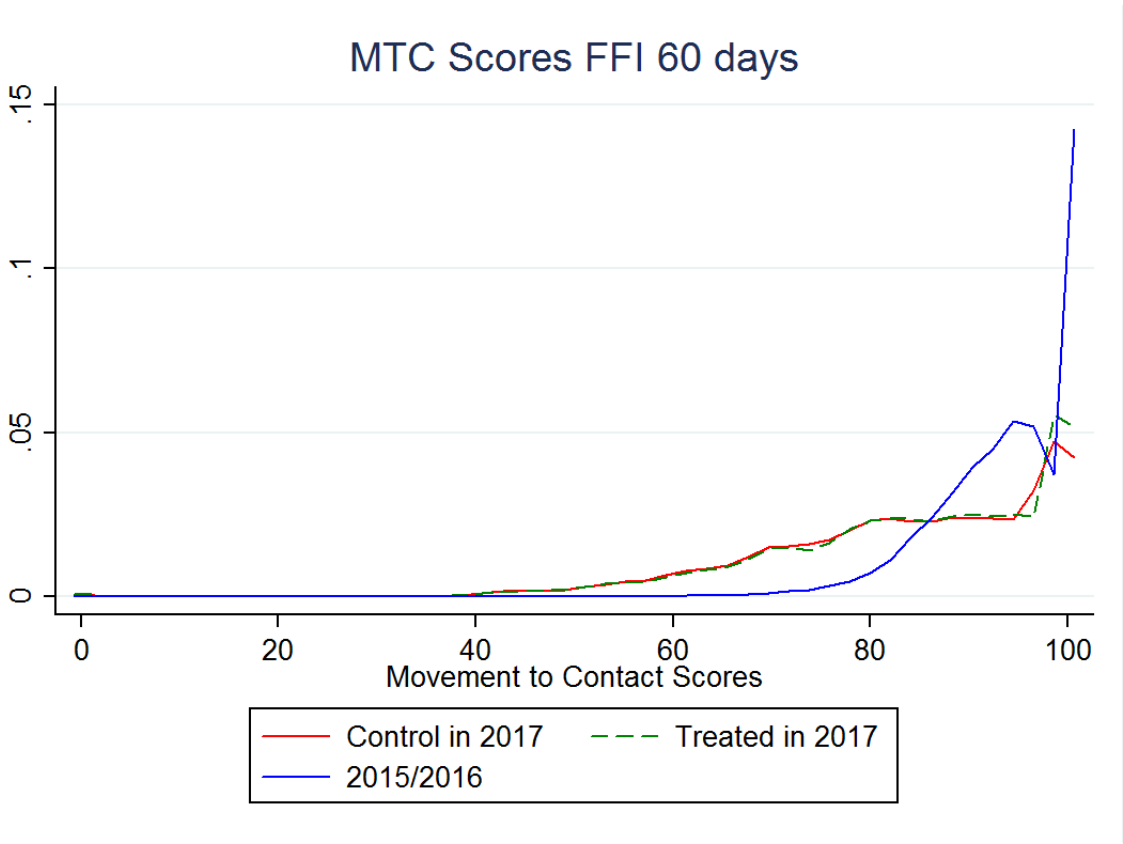

Figure 29. Kernel Density of Movement to Contact Scores with FFI 60 Days or Greater

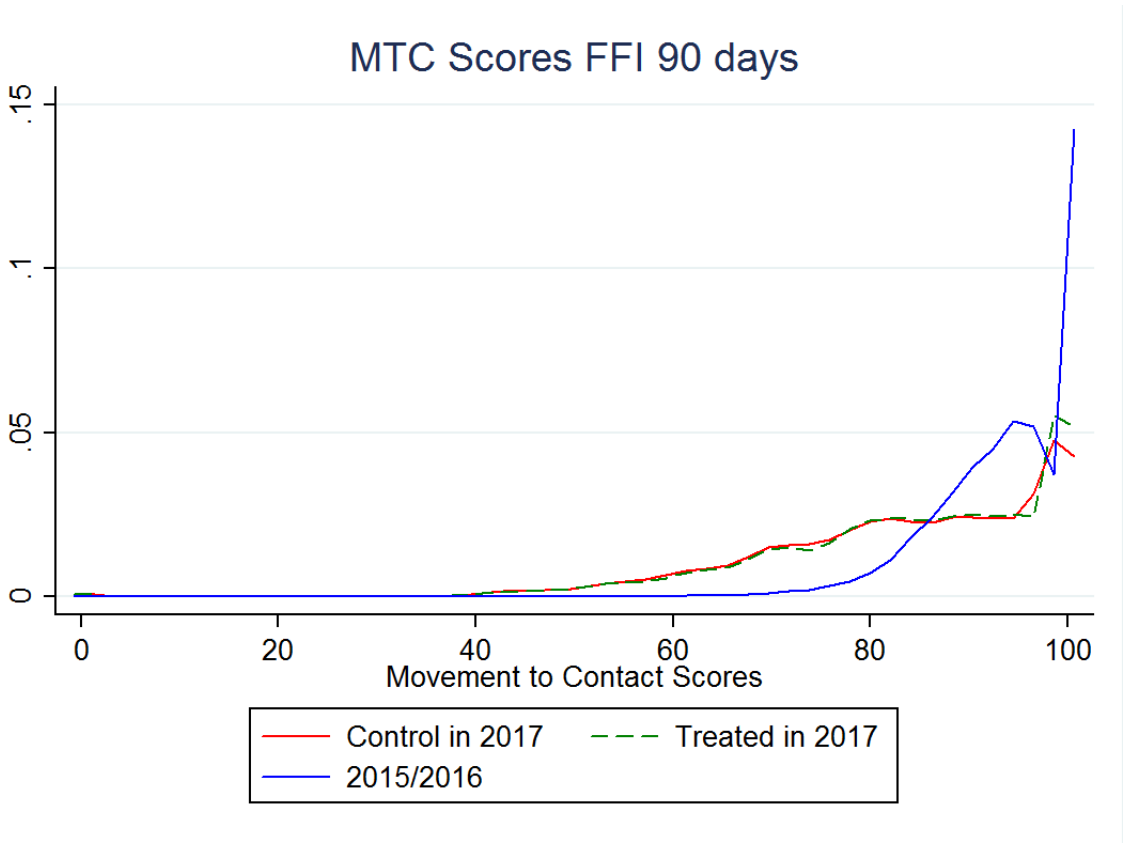

Figure 30. Kernel Density of Movement to Contact Scores with FFI 90 Days or Greater

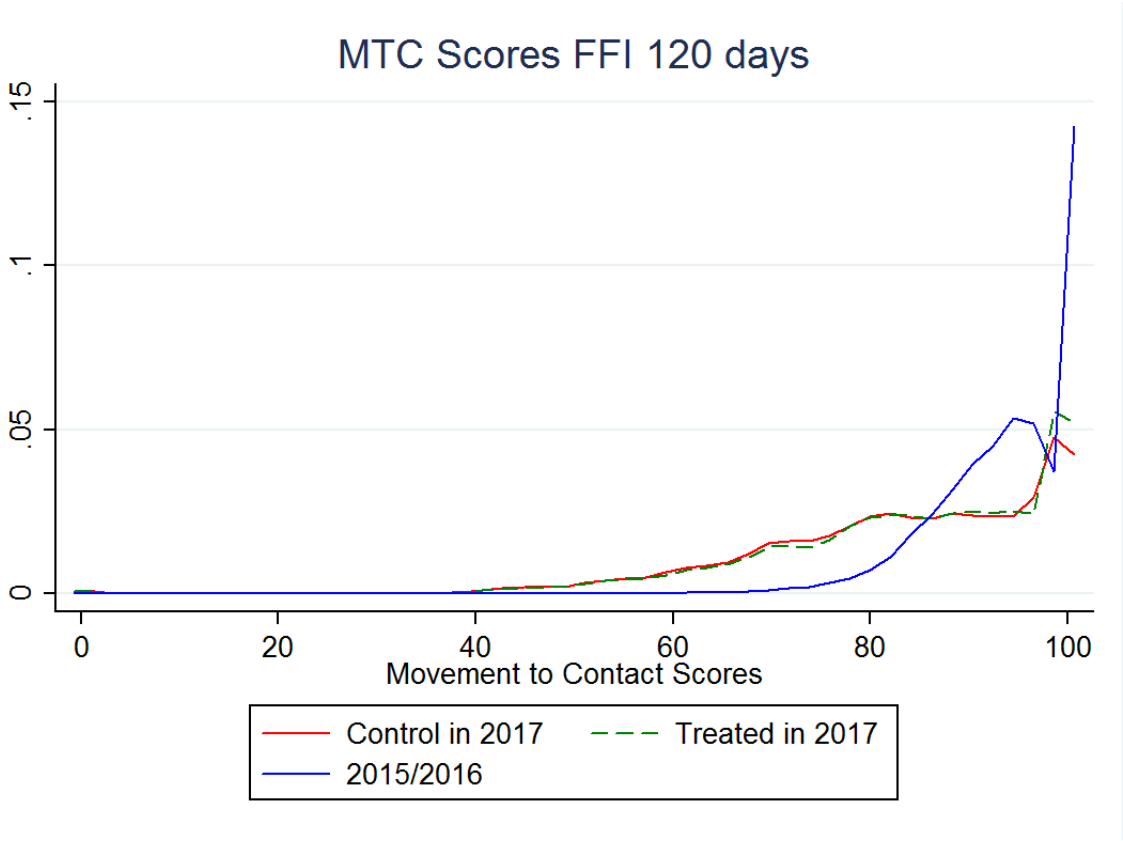

Figure 31. Kernel Density of Movement to Contact Scores with FFI 120 Days or Greater

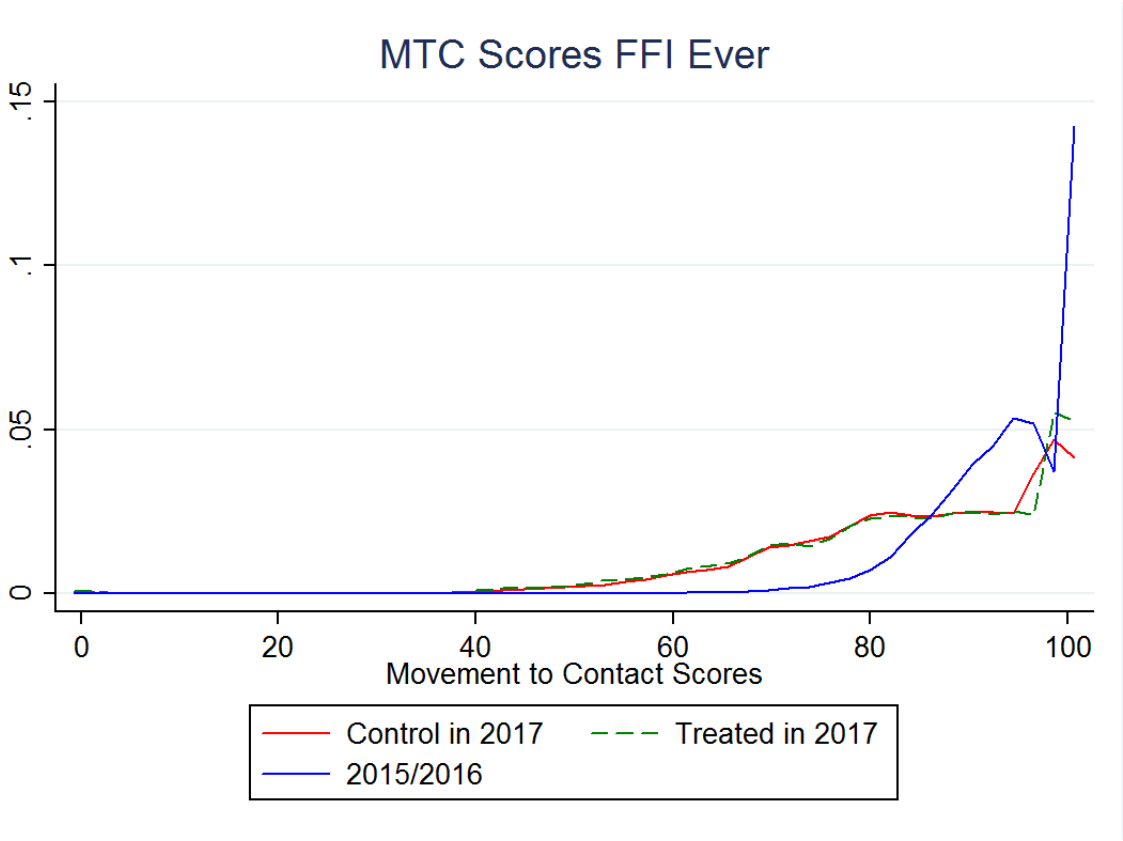

Figure 32. Kernel Density of Movement to Contact Scores Ever Having an FFI

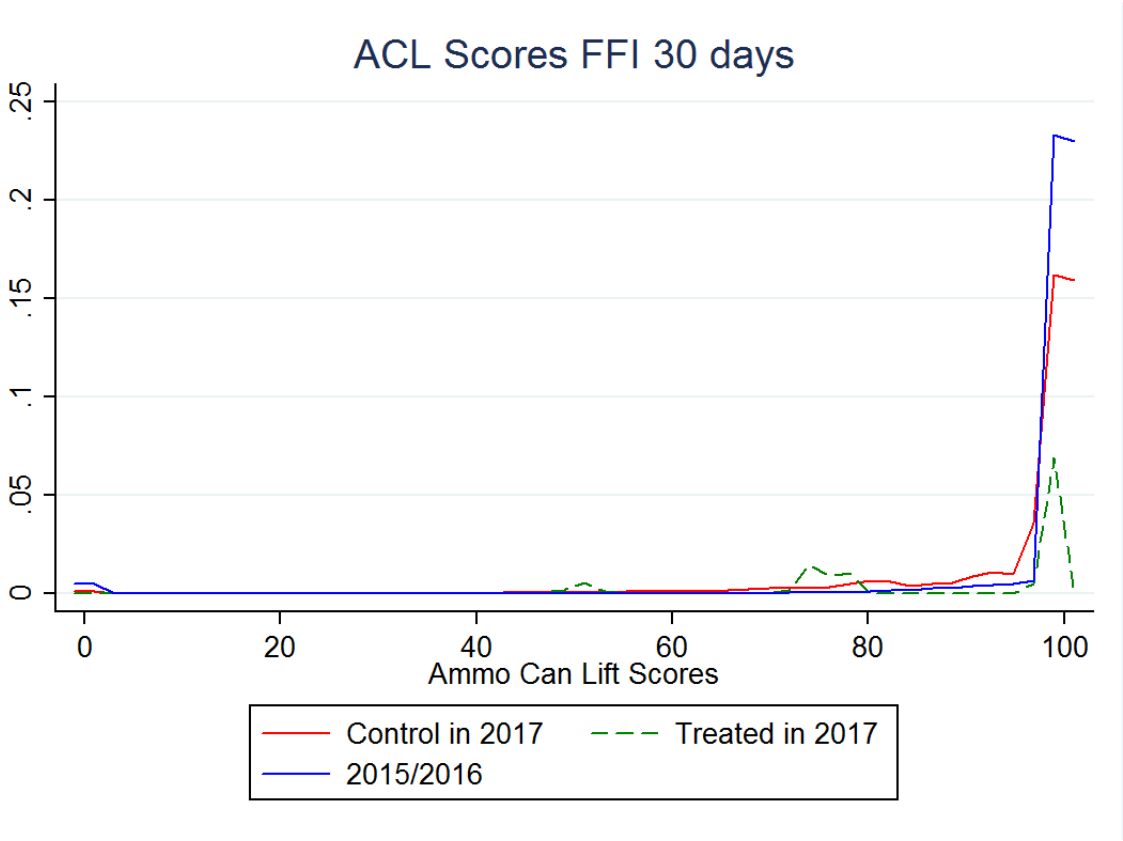

Figure 33. Kernel Density of Ammo Can Lift Scores with FFI 30 Days or Greater

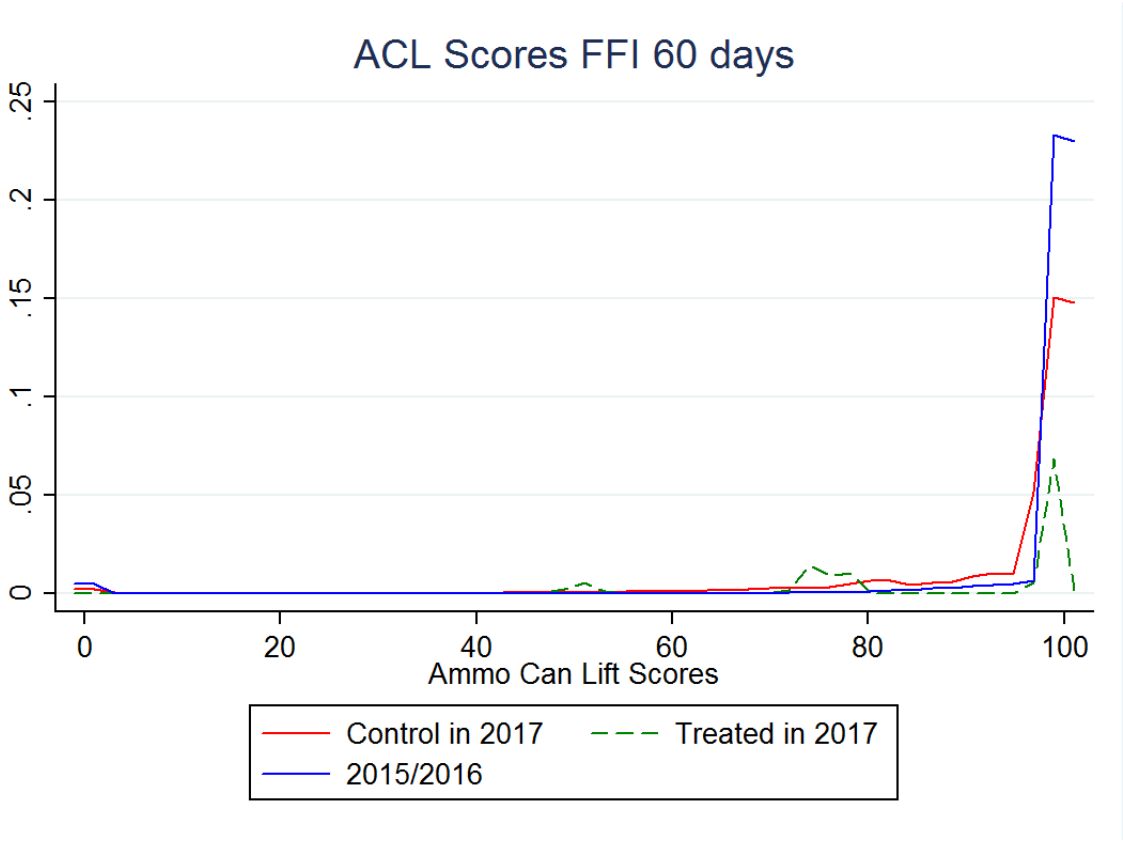

Figure 34. Kernel Density of Ammo Can Lift Scores with FFI 60 Days or Greater

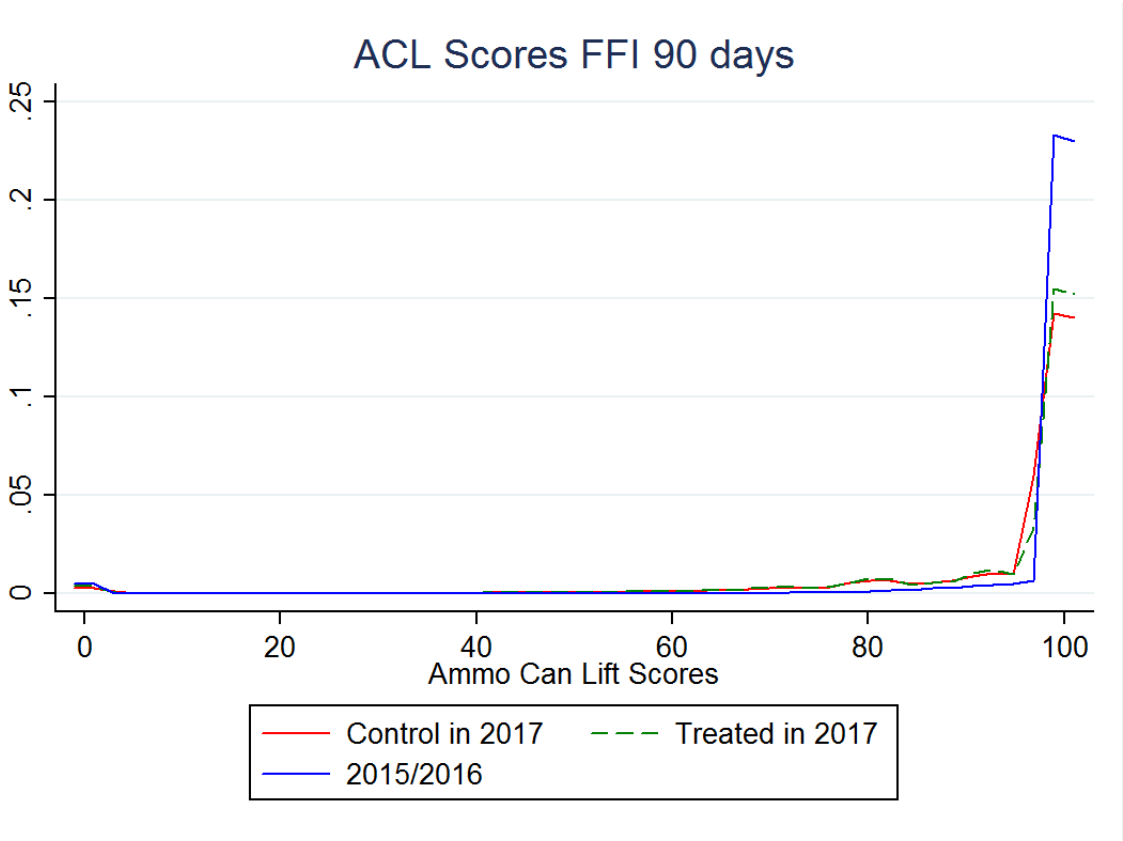

Figure 35. Kernel Density of Ammo Can Lift Scores with FFI 90 Days or Greater

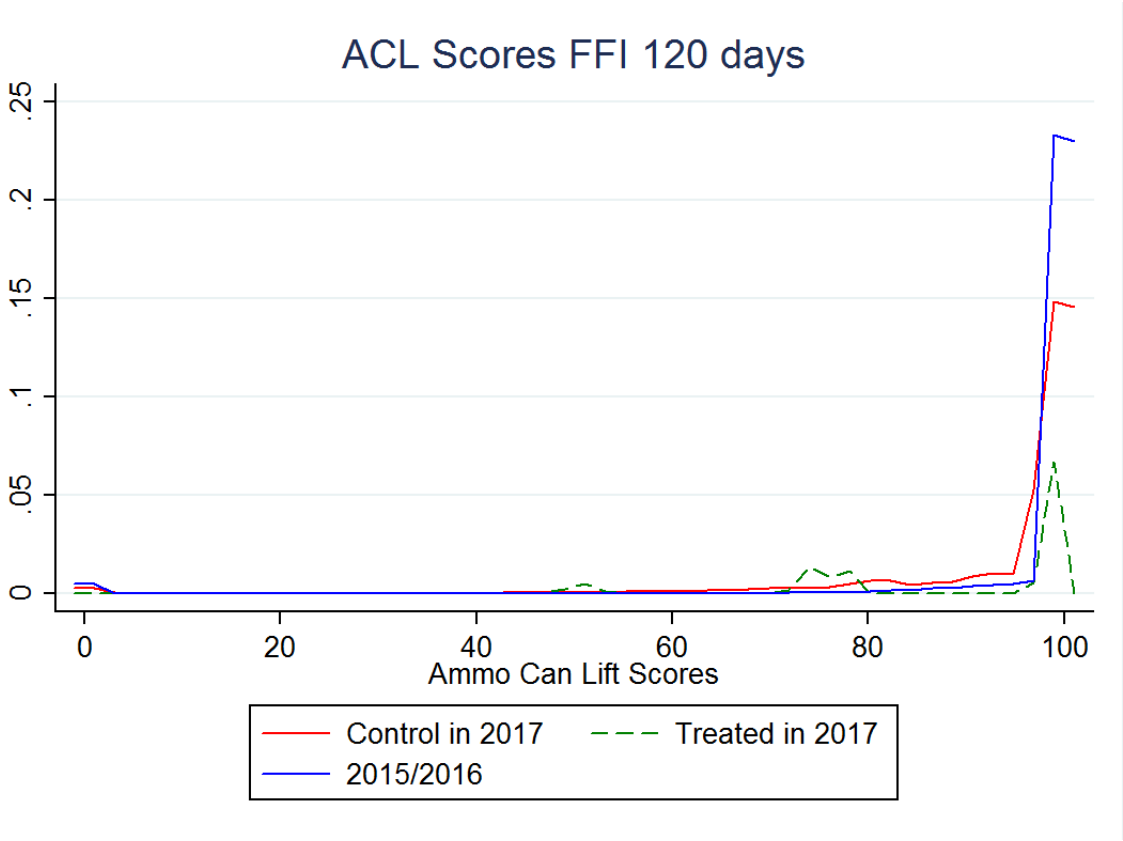

Figure 36. Kernel Density of Ammo Can Lift Scores with FFI 120 Days or Greater

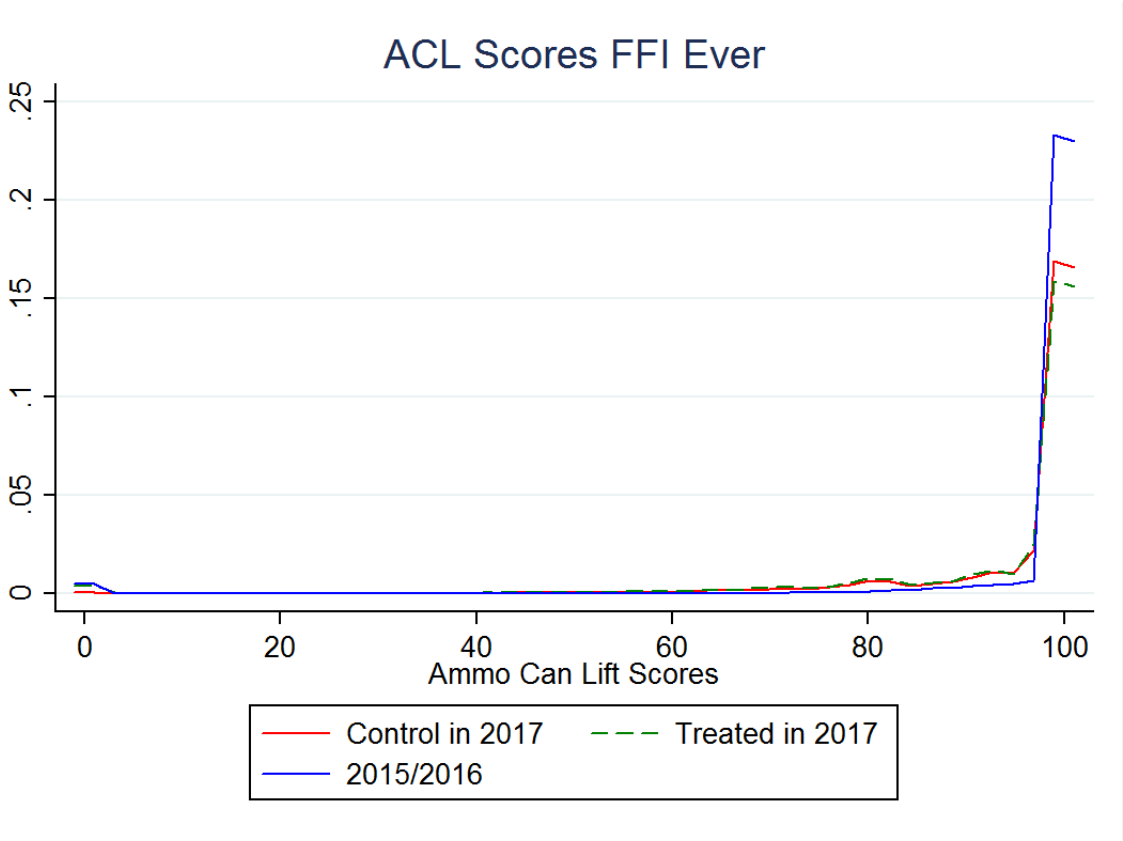

Figure 37. Kernel Density of Ammo Can Lift Scores Ever Having an FFI

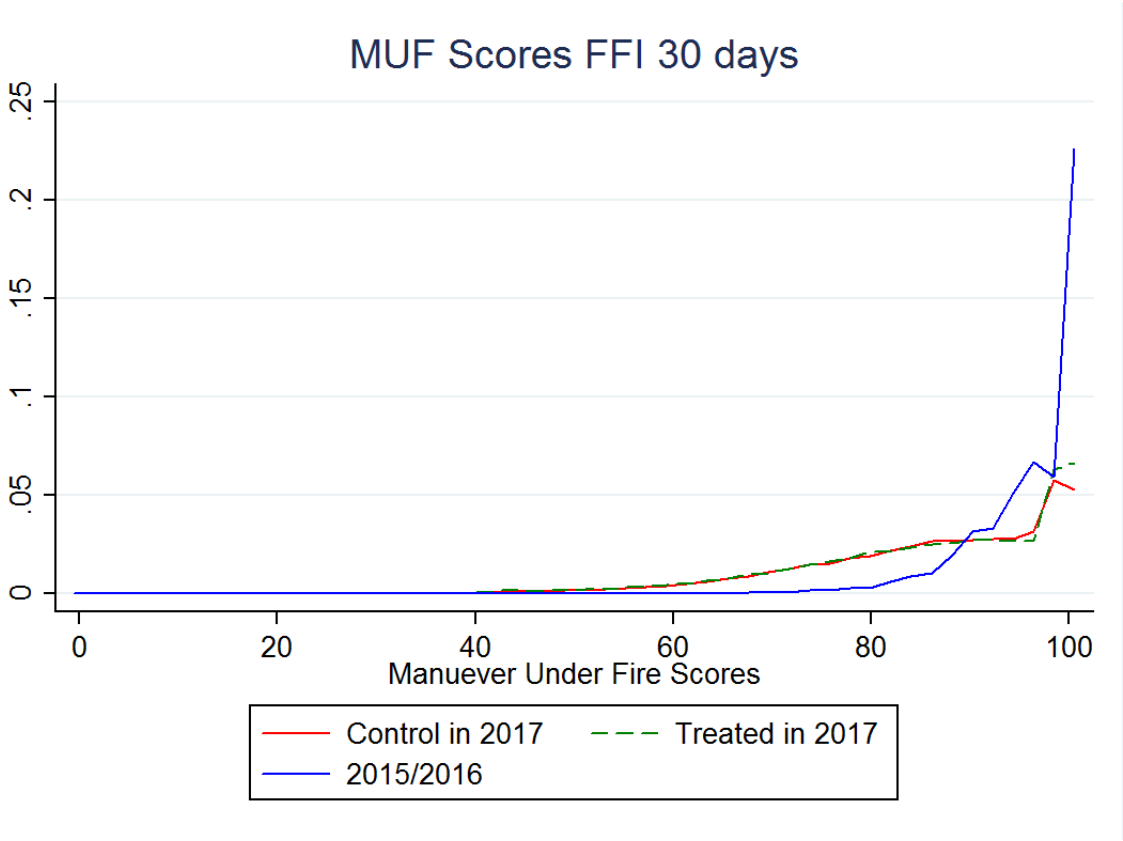

Figure 38. Kernel Density of Maneuver under Fire Scores with FFI 30 Days or Greater

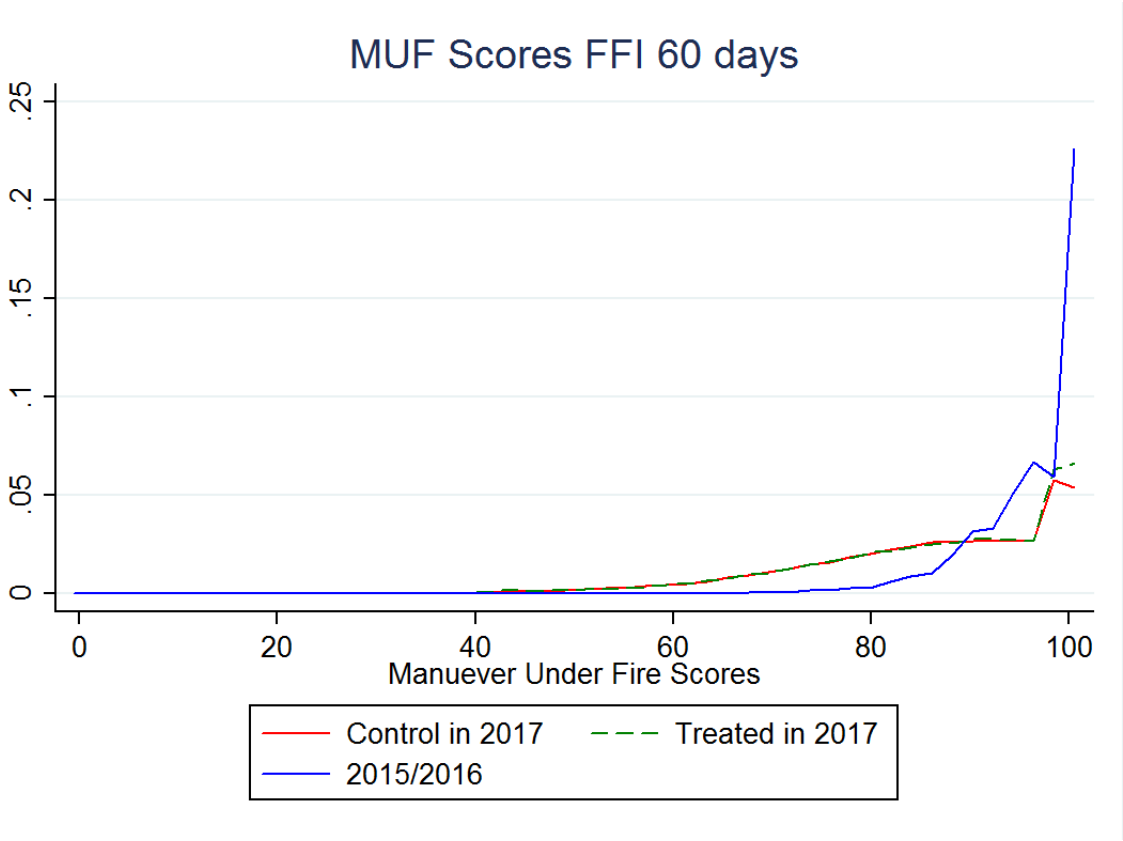

Figure 39. Kernel Density of Maneuver under Fire Scores with FFI 60 Days or Greater

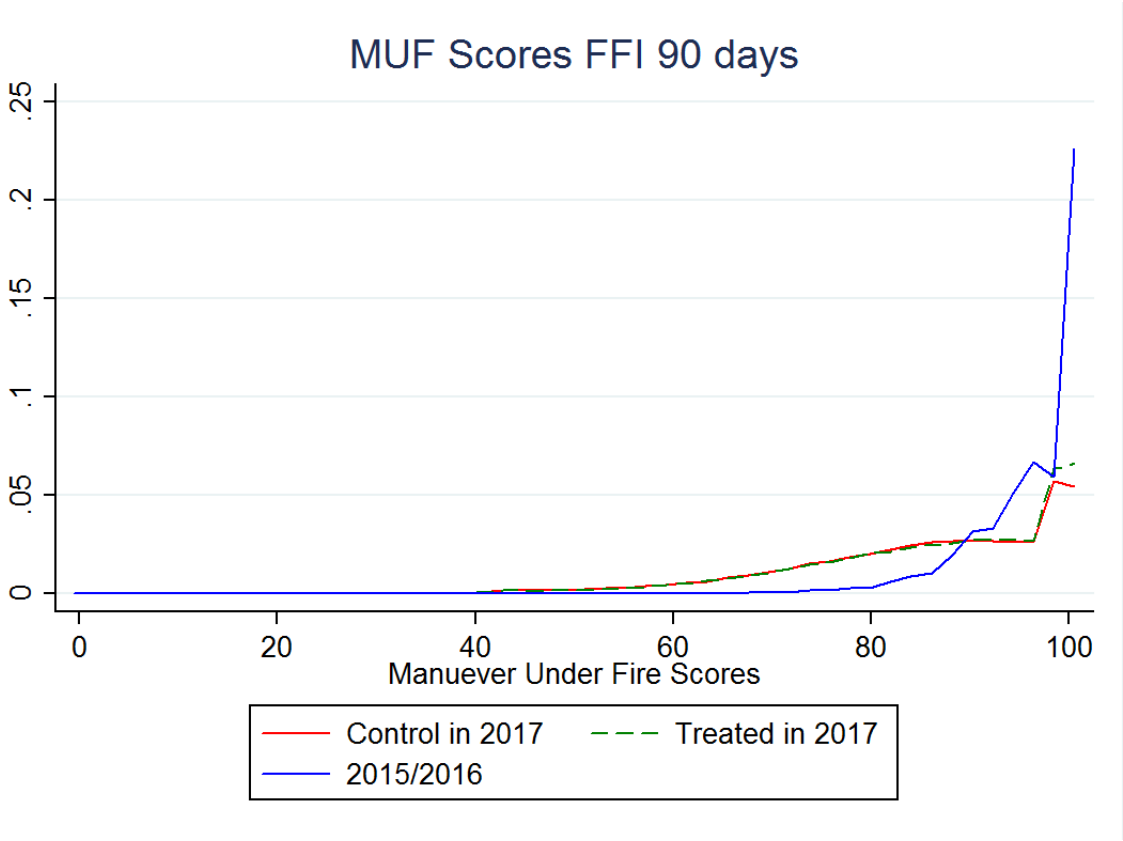

Figure 40. Kernel Density of Maneuver under Fire Scores with FFI 90 Days or Greater

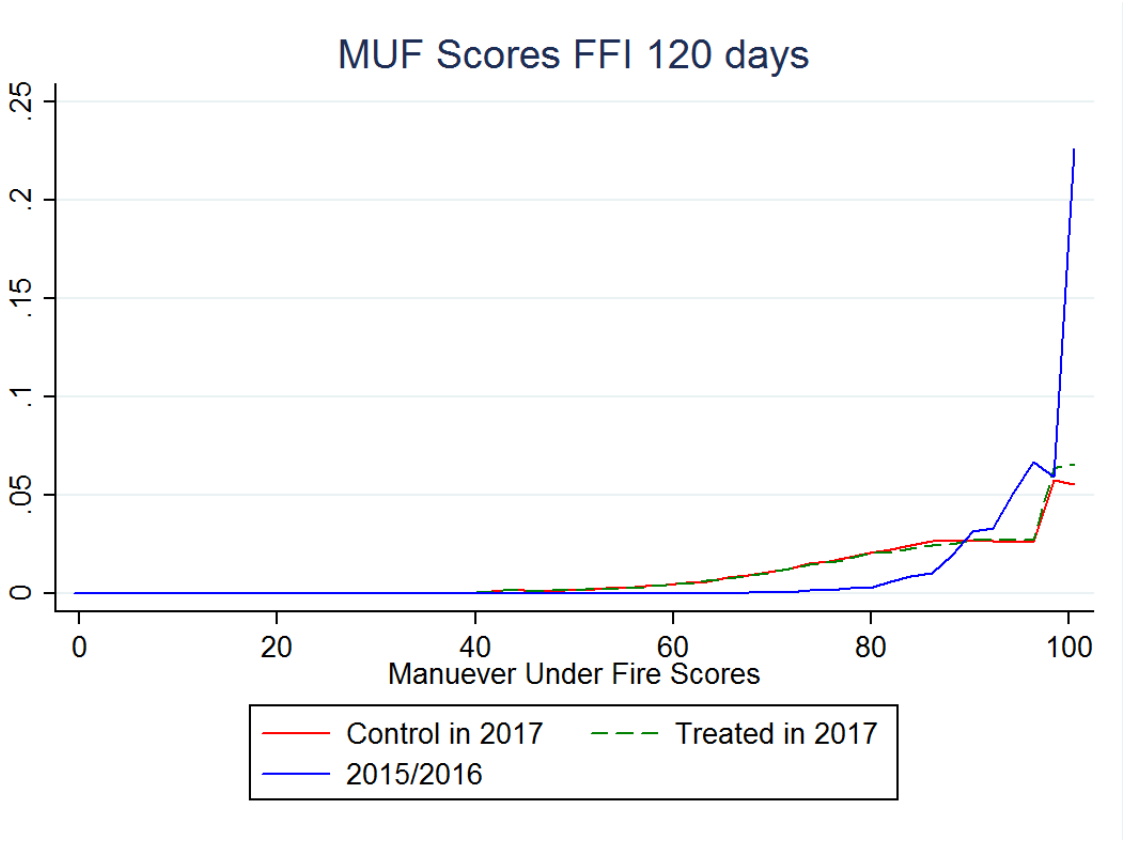

Figure 41. Kernel Density of Maneuver under Fire Scores with FFI 120 Days or Greater

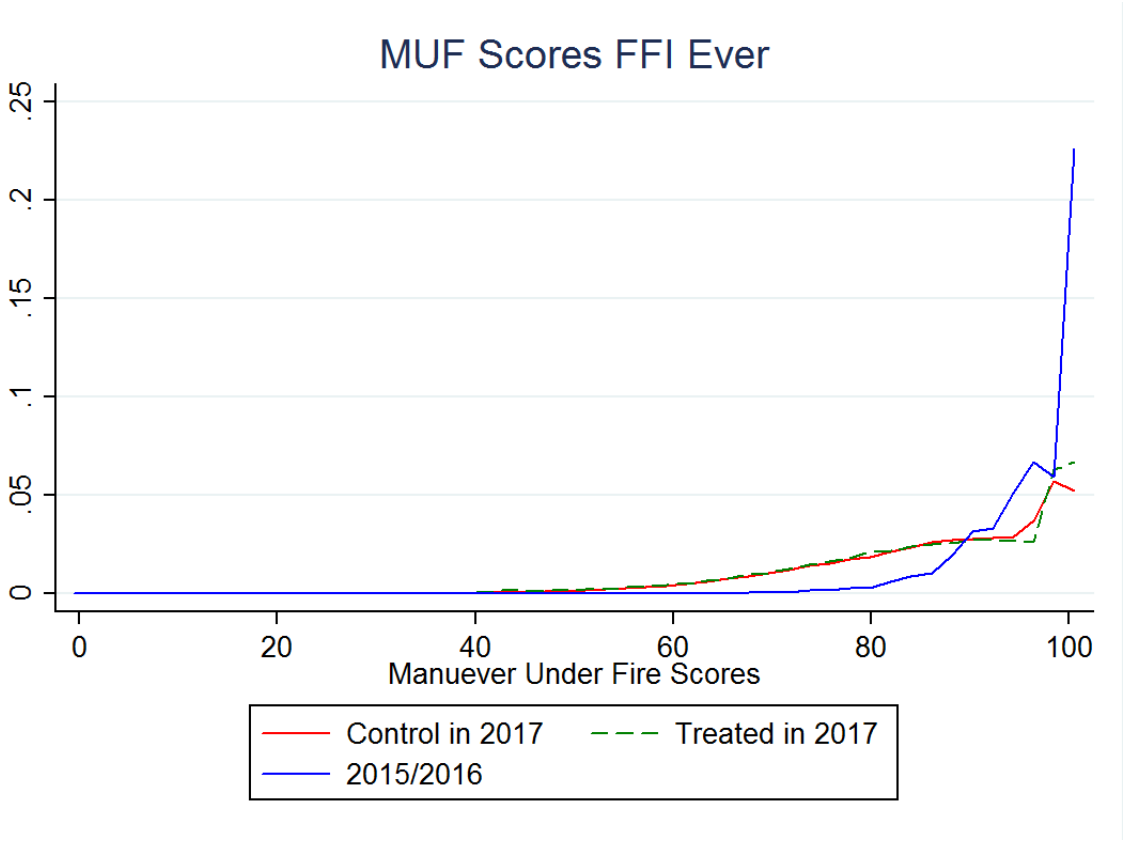

Figure 42. Kernel Density of Maneuver under Fire Scores Ever Having an FFI

APPENDIX B. UNIT TYPE TABLES

Table 10. Ground Combat Element with FFI 30 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-4.630***	-5.937***	4.334***	4.644***	0.638***	0.242	-4.860***	-5.366***								
	(0.447)	(0.444)	(0.217)	(0.216)	(0.168)	(0.169)	(0.152)	(0.151)								
PFT FFI 30 day	3.851***	2.839***	-0.204	-0.148	-1.397***	-1.642***	1.159***	0.992***								
	(0.324)	(0.322)	(0.156)	(0.155)	(0.121)	(0.121)	(0.110)	(0.110)								
Diff-in-diff	-1.957***	-0.495	1.343***	1.354***	2.002***	2.326***	-4.171***	-3.973***	-4.076***	-2.771***	-0.501***	-0.457***	-1.342***	-0.962***	-0.239*	-0.245**
	(0.594)	(0.589)	(0.289)	(0.287)	(0.224)	(0.225)	(0.202)	(0.201)	(0.582)	(0.578)	(0.145)	(0.144)	(0.172)	(0.171)	(0.124)	(0.123)
Officer		28.85***		12.22***		2.939***		10.27***		12.80***		4.742***		1.978***		2.817***
		(0.545)		(0.265)		(0.207)		(0.186)		(0.439)		(0.109)		(0.130)		(0.0938)
Female		-8.729***		5.438***		-5.199***		-0.701		-11.26***		0.309		-4.439***		0.405
		(1.446)		(0.716)		(0.552)		(0.492)		(1.155)		(0.287)		(0.342)		(0.247)
Female Officer		4.779		-2.941*		3.916***		5.318***		5.206**		0.811		2.677***		0.254
		(3.074)		(1.523)		(1.168)		(1.047)		(2.462)		(0.612)		(0.728)		(0.526)
Female FFI		-15.78***		-5.458***		-1.535***		-3.364***		-8.969***		-2.877***		-1.540***		-2.473***
		(0.785)		(0.380)		(0.297)		(0.268)		(0.634)		(0.158)		(0.188)		(0.136)
Female FFI & Female Marine		6.434**		4.258***		0.409		2.648***		1.811		1.282**		-0.214		1.855***
		(2.621)		(1.295)		(0.998)		(0.894)		(2.119)		(0.527)		(0.627)		(0.453)
Age		0.719***		1.846***		-0.375***		-1.229***		0.155		-0.0454		-0.0563		0.473***
		(0.198)		(0.0965)		(0.0755)		(0.0676)		(0.159)		(0.0396)		(0.0471)		(0.0340)
Age Squared		-0.0313***		-0.0313***		0.00209		0.0145***		-0.0193***		0.000276		-0.00360***		-0.00711***
		(0.00335)		(0.00163)		(0.00127)		(0.00114)		(0.00269)		(0.000670)		(0.000797)		(0.000575)
CFT Treated Year									-15.03***	-16.59***	-8.257***	-8.280***	-1.631***	-2.099***	-7.961***	-7.803***
									(0.503)	(0.501)	(0.125)	(0.124)	(0.149)	(0.148)	(0.107)	(0.107)
CFT FFI 30 day									0.886***	0.158	0.405***	0.360***	0.0769	-0.126*	0.466***	0.451***
									(0.254)	(0.253)	(0.0632)	(0.0629)	(0.0751)	(0.0749)	(0.0542)	(0.0541)
Constant	248.3***	249.0***	78.84***	52.37***	94.72***	102.6***	74.76***	95.20***	285.8***	293.8***	94.36***	95.05***	98.41***	102.1***	95.97***	88.70***
	(0.190)	(2.805)	(0.0912)	(1.364)	(0.0707)	(1.067)	(0.0646)	(0.956)	(0.154)	(2.244)	(0.0382)	(0.558)	(0.0454)	(0.664)	(0.0328)	(0.479)
Observations	152,034	152,034	149,764	149,764	149,825	149,825	151,804	151,804	134,282	134,282	134,282	134,282	134,282	134,282	134,282	134,282
R-squared	0.003	0.029	0.009	0.031	0.002	0.008	0.039	0.063	0.045	0.063	0.143	0.158	0.012	0.027	0.165	0.178
Mean control t(0)	248.3	249	78.84	52.37	94.72	102.6	74.76	95.20	285.8	293.8	94.36	95.05	98.41	102.1	95.97	88.70
Mean treated t(0)	252.1	251.9	78.63	52.22	93.32	100.9	75.92	96.20	286.7	294	94.77	95.41	98.49	101.9	96.44	89.16
Diff t(0)	3.851	2.839	-0.204	-0.148	-1.397	-1.642	1.159	0.992	0.886	0.158	0.405	0.360	0.0769	-0.126	0.466	0.451
Mean control t(1)	243.6	243.1	83.17	57.02	95.35	102.8	69.90	89.84	270.8	277.2	86.10	86.77	96.78	99.96	88.01	80.90
Mean treated t(1)	245.5	245.5	84.31	58.22	95.96	103.5	66.89	86.86	267.6	274.6	86.01	86.67	95.52	98.87	88.24	81.11
Diff t(1)	1.895	2.344	1.139	1.206	0.605	0.684	-3.012	-2.981	-3.190	-2.613	-0.0958	-0.0978	-1.265	-1.089	0.227	0.207

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Ground Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 11. Ground Combat Element with FFI 60 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-4.138***	-5.426***	4.324***	4.641***	0.771***	0.380**	-4.619***	-5.120***								
	(0.430)	(0.427)	(0.208)	(0.207)	(0.161)	(0.162)	(0.146)	(0.145)								
PFT FFI 60 day	3.815***	2.811***	-0.212	-0.168	-1.440***	-1.681***	1.119***	0.969***								
	(0.325)	(0.323)	(0.156)	(0.156)	(0.121)	(0.122)	(0.111)	(0.110)								
Diff-in-diff	-2.634***	-1.181**	1.429***	1.438***	1.844***	2.167***	-4.704***	-4.519***	-3.239***	-1.852***	-0.277**	-0.229*	-1.463***	-1.061***	0.147	0.154
	(0.585)	(0.581)	(0.285)	(0.283)	(0.221)	(0.222)	(0.199)	(0.198)	(0.542)	(0.539)	(0.135)	(0.134)	(0.160)	(0.159)	(0.116)	(0.115)
Officer		28.86***		12.21***		2.936***		10.28***		12.81***		4.745***		1.981***		2.819***
		(0.545)		(0.265)		(0.207)		(0.186)		(0.439)		(0.109)		(0.130)		(0.0938)
Female		-8.661***		5.444***		-5.207***		-0.709		-11.14***		0.318		-4.393***		0.402
		(1.446)		(0.716)		(0.552)		(0.492)		(1.155)		(0.287)		(0.342)		(0.247)
Female Officer		4.737		-2.940*		3.918***		5.301***		5.181**		0.805		2.663***		0.253
		(3.074)		(1.523)		(1.168)		(1.047)		(2.462)		(0.612)		(0.728)		(0.526)
Female FFI		-15.75***		-5.479***		-1.546***		-3.304***		-8.798***		-2.852***		-1.493***		-2.454***
		(0.786)		(0.380)		(0.297)		(0.268)		(0.636)		(0.158)		(0.188)		(0.136)
Female FFI & Female Marine		6.432**		4.247***		0.405		2.694***		1.694		1.274**		-0.247		1.852***
		(2.622)		(1.295)		(0.998)		(0.894)		(2.119)		(0.527)		(0.627)		(0.453)
Age		0.708***		1.845***		-0.373***		-1.230***		0.150		-0.0478		-0.0569		0.470***
		(0.198)		(0.0965)		(0.0755)		(0.0676)		(0.159)		(0.0396)		(0.0471)		(0.0340)
Age Squared		-0.0311***		-0.0313***		0.00205		0.0145***		-0.0192***		0.000320		-0.00358***		-0.00707***
		(0.00335)		(0.00163)		(0.00127)		(0.00114)		(0.00269)		(0.000670)		(0.000797)		(0.000575)
CFT Treated Year									-16.36***	-17.84***	-8.473***	-8.496***	-1.736***	-2.179***	-8.275***	-8.124***
									(0.450)	(0.448)	(0.112)	(0.111)	(0.133)	(0.133)	(0.0959)	(0.0957)
CFT FFI 60 day									1.993***	1.038***	0.460***	0.406***	0.390***	0.124	0.481***	0.457***
									(0.259)	(0.258)	(0.0642)	(0.0642)	(0.0763)	(0.0764)	(0.0551)	(0.0551)
Constant	248.3***	249.2***	78.84***	52.39***	94.73***	102.6***	74.77***	95.23***	285.5***	293.6***	94.35***	95.08***	98.31***	102.0***	95.98***	88.75***
	(0.189)	(2.805)	(0.0911)	(1.364)	(0.0706)	(1.066)	(0.0645)	(0.955)	(0.151)	(2.243)	(0.0374)	(0.558)	(0.0445)	(0.663)	(0.0321)	(0.479)
Observations	152,034	152,034	149,764	149,764	149,825	149,825	151,804	151,804	134,282	134,282	134,282	134,282	134,282	134,282	134,282	134,282
R-squared	0.003	0.029	0.009	0.031	0.002	0.008	0.040	0.064	0.045	0.063	0.143	0.158	0.013	0.027	0.166	0.178
Mean control t(0)	248.3	249.2	78.84	52.39	94.73	102.6	74.77	95.23	285.5	293.6	94.35	95.08	98.31	102	95.98	88.75
Mean treated t(0)	252.1	252	78.63	52.22	93.29	100.9	75.89	96.20	287.4	294.6	94.81	95.48	98.70	102.1	96.46	89.21
Diff t(0)	3.815	2.811	-0.212	-0.168	-1.440	-1.681	1.119	0.969	1.993	1.038	0.460	0.406	0.390	0.124	0.481	0.457
Mean control t(1)	244.2	243.8	83.16	57.03	95.50	102.9	70.16	90.11	269.1	275.7	85.88	86.58	96.57	99.79	87.70	80.62
Mean treated t(1)	245.3	245.4	84.38	58.30	95.90	103.4	66.57	86.56	267.8	274.9	86.06	86.76	95.50	98.85	88.33	81.24
Diff t(1)	1.180	1.629	1.217	1.269	0.404	0.485	-3.585	-3.550	-1.246	-0.813	0.183	0.176	-1.073	-0.937	0.628	0.611

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Ground Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 12. Ground Combat Element with FFI 90 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-3.984***	-5.276***	4.384***	4.682***	0.807***	0.424***	-5.330***	-5.840***								
	(0.414)	(0.411)	(0.201)	(0.200)	(0.156)	(0.156)	(0.141)	(0.140)								
PFT FFI 90 day	3.815***	2.811***	-0.212	-0.168	-1.440***	-1.681***	1.119***	0.965***								
	(0.325)	(0.323)	(0.156)	(0.156)	(0.121)	(0.122)	(0.111)	(0.110)								
Diff-in-diff	-2.818***	-1.333**	1.400***	1.445***	1.808***	2.119***	-3.729***	-3.525***	-0.900*	0.337	0.207	0.256**	-0.924***	-0.567***	0.430***	0.448***
	(0.578)	(0.574)	(0.282)	(0.280)	(0.219)	(0.219)	(0.197)	(0.196)	(0.525)	(0.522)	(0.130)	(0.130)	(0.155)	(0.154)	(0.112)	(0.111)
Officer		28.86***		12.22***		2.937***		10.27***		12.80***		4.742***		1.978***		2.817***
		(0.545)		(0.265)		(0.207)		(0.186)		(0.439)		(0.109)		(0.130)		(0.0938)
Female		-8.627***		5.472***		-5.196***		-0.794		-11.23***		0.298		-4.414***		0.389
		(1.446)		(0.716)		(0.552)		(0.493)		(1.155)		(0.287)		(0.342)		(0.247)
Female Officer		4.705		-2.964*		3.908***		5.383***		5.246**		0.823		2.671***		0.269
		(3.074)		(1.523)		(1.168)		(1.047)		(2.462)		(0.612)		(0.728)		(0.526)
Female FFI		-15.75***		-5.483***		-1.545***		-3.355***		-8.846***		-2.860***		-1.510***		-2.455***
		(0.786)		(0.380)		(0.297)		(0.268)		(0.636)		(0.158)		(0.188)		(0.136)
Female FFI & Female Marine		6.399**		4.214***		0.395		2.744***		1.714		1.275**		-0.236		1.849***
		(2.622)		(1.295)		(0.998)		(0.894)		(2.119)		(0.527)		(0.627)		(0.453)
Age		0.708***		1.846***		-0.373***		-1.227***		0.151		-0.0470		-0.0573		0.471***
		(0.198)		(0.0965)		(0.0755)		(0.0676)		(0.159)		(0.0396)		(0.0471)		(0.0340)
Age Squared		-0.0311***		-0.0313***		0.00206		0.0145***		-0.0193***		0.000305		-0.00358***		-0.00708***
		(0.00335)		(0.00163)		(0.00127)		(0.00114)		(0.00269)		(0.000670)		(0.000797)		(0.000575)
CFT Treated Year									-18.19***	-19.54***	-8.840***	-8.863***	-2.176***	-2.582***	-8.477***	-8.335***
									(0.428)	(0.426)	(0.106)	(0.106)	(0.126)	(0.126)	(0.0912)	(0.0910)
CFT FFI 90 day									1.993***	1.034***	0.460***	0.405***	0.390***	0.123	0.481***	0.457***
									(0.259)	(0.258)	(0.0642)	(0.0642)	(0.0764)	(0.0764)	(0.0551)	(0.0551)
Constant	248.3***	249.2***	78.84***	52.38***	94.73***	102.6***	74.77***	95.19***	285.5***	293.5***	94.35***	95.07***	98.31***	102.0***	95.98***	88.73***
	(0.189)	(2.805)	(0.0911)	(1.364)	(0.0706)	(1.066)	(0.0646)	(0.956)	(0.151)	(2.243)	(0.0374)	(0.557)	(0.0445)	(0.664)	(0.0321)	(0.479)
Observations	152,034	152,034	149,764	149,764	149,825	149,825	151,804	151,804	134,282	134,282	134,282	134,282	134,282	134,282	134,282	134,282
R-squared	0.003	0.029	0.009	0.031	0.002	0.008	0.039	0.063	0.045	0.063	0.143	0.158	0.012	0.027	0.166	0.179
Mean control t(0)	248.3	249.2	78.84	52.38	94.73	102.6	74.77	95.19	285.5	293.5	94.35	95.07	98.31	102	95.98	88.73
Mean treated t(0)	252.1	252	78.63	52.21	93.29	100.9	75.89	96.16	287.4	294.6	94.81	95.47	98.70	102.1	96.46	89.19
Diff t(0)	3.815	2.811	-0.212	-0.168	-1.440	-1.681	1.119	0.965	1.993	1.034	0.460	0.405	0.390	0.123	0.481	0.457
Mean control t(1)	244.3	243.9	83.22	57.06	95.53	103	69.44	89.35	267.3	274	85.51	86.20	96.13	99.40	87.50	80.40
Mean treated t(1)	245.3	245.4	84.41	58.34	95.90	103.4	66.83	86.79	268.4	275.4	86.18	86.86	95.60	98.95	88.41	81.30
Diff t(1)	0.997	1.479	1.187	1.277	0.368	0.438	-2.610	-2.560	1.093	1.372	0.667	0.660	-0.535	-0.444	0.911	0.905

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Ground Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 13. Ground Combat Element with FFI 120 Days or Greater

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-3.313***	-4.633***	4.566***	4.813***	0.949***	0.576***	-5.387***	-5.909***								
	(0.390)	(0.388)	(0.189)	(0.189)	(0.147)	(0.148)	(0.133)	(0.132)								
PFT FFI 120 day	3.815***	2.815***	-0.212	-0.168	-1.440***	-1.680***	1.119***	0.967***								
	(0.325)	(0.323)	(0.156)	(0.156)	(0.121)	(0.122)	(0.111)	(0.110)								
Diff-in-diff	-3.972***	-2.371***	1.202***	1.358***	1.579***	1.881***	-3.955***	-3.722***	-1.123**	0.129	0.247*	0.303**	-0.946***	-0.586***	0.155	0.180*
	(0.572)	(0.568)	(0.279)	(0.278)	(0.217)	(0.217)	(0.195)	(0.194)	(0.510)	(0.507)	(0.127)	(0.126)	(0.150)	(0.150)	(0.109)	(0.108)
Officer		28.87***		12.22***		2.939***		10.26***		12.80***		4.741***		1.979***		2.818***
		(0.545)		(0.265)		(0.207)		(0.186)		(0.439)		(0.109)		(0.130)		(0.0938)
Female		-8.605***		5.485***		-5.191***		-0.816*		-11.23***		0.294		-4.411***		0.398
		(1.446)		(0.716)		(0.552)		(0.492)		(1.155)		(0.287)		(0.342)		(0.247)
Female Officer		4.681		-2.976*		3.903***		5.405***		5.252**		0.832		2.665***		0.267
		(3.074)		(1.523)		(1.168)		(1.047)		(2.462)		(0.612)		(0.728)		(0.526)
Female FFI		-15.69***		-5.493***		-1.532***		-3.306***		-8.852***		-2.867***		-1.506***		-2.455***
		(0.786)		(0.380)		(0.297)		(0.268)		(0.636)		(0.158)		(0.188)		(0.136)
Female FFI & Female Marine		6.428**		4.207***		0.401		2.771***		1.716		1.278**		-0.238		1.849***
		(2.622)		(1.295)		(0.998)		(0.894)		(2.119)		(0.527)		(0.627)		(0.453)
Age		0.705***		1.846***		-0.374***		-1.230***		0.151		-0.0469		-0.0573		0.471***
		(0.198)		(0.0965)		(0.0755)		(0.0676)		(0.159)		(0.0396)		(0.0471)		(0.0340)
Age Squared		-0.0310***		-0.0313***		0.00207		0.0145***		-0.0193***		0.000304		-0.00358***		-0.00708***
		(0.00335)		(0.00163)		(0.00127)		(0.00114)		(0.00269)		(0.000670)		(0.000797)		(0.000575)
CFT Treated Year									-17.99***	-19.35***	-8.850***	-8.878***	-2.176***	-2.581***	-8.247***	-8.110***
									(0.406)	(0.405)	(0.101)	(0.101)	(0.120)	(0.120)	(0.0866)	(0.0864)
CFT FFI 120 day									1.993***	1.034***	0.460***	0.405***	0.390***	0.123	0.481***	0.457***
									(0.259)	(0.258)	(0.0642)	(0.0642)	(0.0764)	(0.0764)	(0.0551)	(0.0551)
Constant	248.3***	249.3***	78.84***	52.37***	94.73***	102.6***	74.77***	95.24***	285.5***	293.5***	94.35***	95.06***	98.31***	102.0***	95.98***	88.74***
	(0.189)	(2.805)	(0.0911)	(1.364)	(0.0706)	(1.066)	(0.0645)	(0.956)	(0.151)	(2.243)	(0.0374)	(0.557)	(0.0445)	(0.664)	(0.0321)	(0.479)
Observations	152,034	152,034	149,764	149,764	149,825	149,825	151,804	151,804	134,282	134,282	134,282	134,282	134,282	134,282	134,282	134,282
R-squared	0.003	0.028	0.009	0.031	0.002	0.007	0.039	0.063	0.045	0.063	0.143	0.158	0.012	0.027	0.166	0.178
Mean control t(0)	248.3	249.3	78.84	52.37	94.73	102.6	74.77	95.24	285.5	293.5	94.35	95.06	98.31	102	95.98	88.74
Mean treated t(0)	252.1	252.1	78.63	52.20	93.29	100.9	75.89	96.20	287.4	294.6	94.81	95.47	98.70	102.1	96.46	89.19
Diff t(0)	3.815	2.815	-0.212	-0.168	-1.440	-1.680	1.119	0.967	1.993	1.034	0.460	0.405	0.390	0.123	0.481	0.457
Mean control t(1)	245	244.6	83.41	57.19	95.68	103.1	69.39	89.33	267.5	274.2	85.50	86.19	96.13	99.40	87.73	80.63
Mean treated t(1)	244.8	245.1	84.40	58.38	95.82	103.3	66.55	86.57	268.3	275.4	86.21	86.89	95.58	98.94	88.37	81.26
Diff t(1)	-0.157	0.444	0.989	1.190	0.139	0.201	-2.836	-2.755	0.870	1.163	0.707	0.708	-0.556	-0.463	0.636	0.637

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Ground Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 14. Ground Combat Element Ever Having an FFI

VARIABLES	(1) PFT Score	(2) PFT Score	(3) UBE Score	(4) UBE Score	(5) Crunch Score	(6) Crunch Score	(7) AC Score	(8) AC Score	(9) CFT Score	(10) CFT Score	(11) MTC Score	(12) MTC Score	(13) ACL Score	(14) ACL Score	(15) MUF Score	(16) MUF Score
PFT Treated Year	-5.684***	-7.025***	4.106***	4.409***	0.442**	0.0378	-5.241***	-5.766***								
	(0.465)	(0.461)	(0.225)	(0.224)	(0.175)	(0.175)	(0.158)	(0.157)								
PFT FFI Ever	3.895***	2.885***	-0.203	-0.133	-1.373***	-1.620***	1.196***	1.019***								
	(0.324)	(0.322)	(0.156)	(0.155)	(0.121)	(0.121)	(0.110)	(0.110)								
Diff-in-diff	-0.531	0.959	1.624***	1.634***	2.245***	2.577***	-3.508***	-3.277***	-4.132***	-2.957***	-0.287*	-0.286*	-1.432***	-1.078***	-0.502***	-0.558***
	(0.604)	(0.599)	(0.294)	(0.292)	(0.228)	(0.228)	(0.206)	(0.204)	(0.657)	(0.652)	(0.163)	(0.162)	(0.194)	(0.193)	(0.140)	(0.139)
Officer		28.86***		12.22***		2.943***		10.26***		12.80***		4.740***		1.978***		2.817***
		(0.545)		(0.265)		(0.207)		(0.186)		(0.439)		(0.109)		(0.130)		(0.0938)
Female		-8.807***		5.427***		-5.198***		-0.734		-11.29***		0.281		-4.439***		0.396
		(1.446)		(0.716)		(0.552)		(0.493)		(1.154)		(0.287)		(0.341)		(0.247)
Female Officer		4.861		-2.929*		3.915***		5.347***		5.231**		0.815		2.686***		0.251
		(3.074)		(1.523)		(1.168)		(1.048)		(2.462)		(0.612)		(0.728)		(0.526)
Female FFI		-15.82***		-5.455***		-1.531***		-3.415***		-9.000***		-2.914***		-1.537***		-2.496***
		(0.785)		(0.380)		(0.297)		(0.268)		(0.633)		(0.157)		(0.187)		(0.135)
Female FFI & Female Marine		6.422**		4.257***		0.410		2.639***		1.830		1.306**		-0.215		1.863***
		(2.621)		(1.295)		(0.998)		(0.894)		(2.119)		(0.527)		(0.627)		(0.453)
Age		0.729***		1.846***		-0.378***		-1.222***		0.157		-0.0452		-0.0553		0.474***
		(0.198)		(0.0965)		(0.0755)		(0.0676)		(0.159)		(0.0396)		(0.0471)		(0.0340)
Age Squared		-0.0314***		-0.0313***		0.00212*		0.0144***		-0.0194***		0.000268		-0.00361***		-0.00713***
		(0.00335)		(0.00163)		(0.00127)		(0.00114)		(0.00269)		(0.000670)		(0.000797)		(0.000575)
CFT Treated Year									-14.76***	-16.34***	-8.384***	-8.381***	-1.491***	-1.974***	-7.719***	-7.524***
									(0.592)	(0.589)	(0.147)	(0.146)	(0.175)	(0.174)	(0.126)	(0.126)
CFT FFI Ever									0.787***	0.250	0.309***	0.283***	0.0813	-0.0713	0.445***	0.447***
									(0.252)	(0.250)	(0.0625)	(0.0621)	(0.0743)	(0.0739)	(0.0536)	(0.0533)
Constant	248.3***	248.9***	78.84***	52.37***	94.71***	102.6***	74.74***	95.10***	285.8***	293.7***	94.39***	95.08***	98.41***	102.0***	95.97***	88.68***
	(0.190)	(2.805)	(0.0913)	(1.364)	(0.0708)	(1.067)	(0.0648)	(0.956)	(0.156)	(2.244)	(0.0389)	(0.558)	(0.0462)	(0.664)	(0.0333)	(0.479)
Observations	152,034	152,034	149,764	149,764	149,825	149,825	151,804	151,804	134,282	134,282	134,282	134,282	134,282	134,282	134,282	134,282
R-squared	0.003	0.029	0.010	0.031	0.002	0.008	0.038	0.062	0.044	0.063	0.143	0.158	0.012	0.027	0.165	0.178
Mean control t(0)	248.3	248.9	78.84	52.37	94.71	102.6	74.74	95.10	285.8	293.7	94.39	95.08	98.41	102	95.97	88.68
Mean treated t(0)	252.2	251.8	78.63	52.23	93.34	101	75.94	96.12	286.6	294	94.70	95.36	98.49	102	96.41	89.13
Diff t(0)	3.895	2.885	-0.203	-0.133	-1.373	-1.620	1.196	1.019	0.787	0.250	0.309	0.283	0.0813	-0.0713	0.445	0.447
Mean control t(1)	242.6	241.9	82.94	56.77	95.15	102.7	69.50	89.33	271.1	277.4	86.01	86.69	96.92	100	88.25	81.16
Mean treated t(1)	245.9	245.7	84.36	58.28	96.02	103.6	67.19	87.08	267.7	274.7	86.03	86.69	95.57	98.90	88.19	81.05
Diff t(1)	3.364	3.844	1.421	1.502	0.872	0.957	-2.312	-2.258	-3.345	-2.707	0.0214	-0.00332	-1.350	-1.149	-0.0562	-0.111

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Ground Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 15. Aviation Combat Element with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-7.015***	-8.618***	2.896***	2.997***	-0.242	-0.680***	-5.958***	-6.313***								
	(0.690)	(0.675)	(0.271)	(0.268)	(0.212)	(0.210)	(0.193)	(0.191)								
PFT FFI 30 day	1.578***	0.975**	-1.245***	-1.263***	-1.498***	-1.611***	1.068***	0.978***								
	(0.489)	(0.483)	(0.190)	(0.189)	(0.148)	(0.148)	(0.137)	(0.137)								
Diff-in-diff	-1.771*	-1.387	1.670***	1.458***	1.586***	1.776***	-2.355***	-2.356***	-6.277***	-4.734***	0.413**	0.295	-2.294***	-1.869***	0.658***	0.395**
	(0.925)	(0.904)	(0.364)	(0.359)	(0.284)	(0.282)	(0.259)	(0.256)	(1.093)	(1.071)	(0.191)	(0.190)	(0.330)	(0.325)	(0.170)	(0.169)
Officer		36.35***		12.90***		3.782***		8.593***		20.65***		4.314***		3.969***		2.941***
		(0.772)		(0.304)		(0.239)		(0.218)		(0.719)		(0.128)		(0.218)		(0.113)
Female		-8.264***		6.398***		-5.723***		-0.300		-9.414***		0.503***		-4.613***		1.883***
		(0.710)		(0.285)		(0.220)		(0.201)		(0.660)		(0.117)		(0.201)		(0.104)
Female Officer		2.042		-2.952***		2.193***		5.840***		-4.953**		1.665***		-1.501**		0.107
		(2.434)		(0.983)		(0.757)		(0.689)		(2.292)		(0.407)		(0.696)		(0.361)
Female FFI		3.419***		1.981***		0.863**		-0.281		4.090***		0.296		0.865***		0.769***
		(1.147)		(0.449)		(0.353)		(0.324)		(1.062)		(0.188)		(0.323)		(0.167)
Female FFI & Female Marine		-5.330		-2.834*		0.0393		-1.062		0.952		-0.442		1.180		-0.739
		(3.787)		(1.505)		(1.169)		(1.072)		(3.527)		(0.626)		(1.071)		(0.555)
Age		-1.399***		1.797***		-0.255***		-1.600***		-0.837***		-0.215***		-0.180**		0.322***
		(0.267)		(0.106)		(0.0829)		(0.0754)		(0.249)		(0.0441)		(0.0755)		(0.0391)
Age Squared		-0.0148***		-0.0353***		-0.00221		0.0202***		-0.0190***		0.00268***		-0.00480***		-0.00390***
		(0.00433)		(0.00172)		(0.00135)		(0.00123)		(0.00406)		(0.000719)		(0.00123)		(0.000638)
CFT Treated Year									-18.89***	-21.67***	-10.62***	-10.55***	-1.733***	-2.438***	-10.70***	-10.36***
									(0.963)	(0.945)	(0.169)	(0.168)	(0.291)	(0.287)	(0.150)	(0.149)
CFT FFI 30 day									1.632***	1.343***	0.438***	0.422***	0.322**	0.242*	-0.0470	-0.00196
									(0.449)	(0.446)	(0.0787)	(0.0791)	(0.136)	(0.135)	(0.0701)	(0.0702)
Constant	237.4***	282.0***	78.80***	55.32***	94.28***	102.7***	70.89***	97.35***	276.8***	311.1***	93.35***	96.53***	96.41***	104.6***	95.04***	88.91***
	(0.336)	(3.898)	(0.130)	(1.543)	(0.101)	(1.211)	(0.0939)	(1.103)	(0.310)	(3.623)	(0.0544)	(0.643)	(0.0937)	(1.100)	(0.0484)	(0.570)
Observations	94,705	94,705	93,041	93,041	93,380	93,380	94,546	94,546	83,275	83,275	83,275	83,275	83,275	83,275	83,275	83,275
R-squared	0.003	0.051	0.005	0.037	0.001	0.020	0.034	0.059	0.035	0.075	0.178	0.192	0.009	0.039	0.216	0.235
Mean control t(0)	237.4	282	78.80	55.32	94.28	102.7	70.89	97.35	276.8	311.1	93.35	96.53	96.41	104.6	95.04	88.91
Mean treated t(0)	239	282.9	77.55	54.06	92.78	101.1	71.96	98.33	278.4	312.4	93.79	96.95	96.73	104.9	94.99	88.91
Diff t(0)	1.578	0.975	-1.245	-1.263	-1.498	-1.611	1.068	0.978	1.632	1.343	0.438	0.422	0.322	0.242	-0.0470	-0.00196
Mean control t(1)	230.4	273.4	81.69	58.32	94.04	102	64.93	91.04	257.9	289.4	82.73	85.98	94.67	102.2	84.34	78.55
Mean treated t(1)	230.2	272.9	82.12	58.52	94.13	102.2	63.65	89.66	253.2	286	83.58	86.70	92.70	100.6	84.95	78.94
Diff t(1)	-0.193	-0.412	0.426	0.195	0.0882	0.165	-1.287	-1.378	-4.645	-3.391	0.851	0.717	-1.972	-1.628	0.611	0.393

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Aviation Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 16. Aviation Combat Element with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-8.944***	-10.49***	2.775***	2.842***	-0.379*	-0.799***	-6.499***	-6.844***								
	(0.670)	(0.656)	(0.264)	(0.260)	(0.206)	(0.205)	(0.187)	(0.185)								
PFT FFI 60 day	1.573***	0.989**	-1.246***	-1.262***	-1.495***	-1.608***	1.066***	0.981***								
	(0.489)	(0.483)	(0.190)	(0.189)	(0.148)	(0.148)	(0.137)	(0.137)								
Diff-in-diff	1.679*	1.942**	1.913***	1.749***	1.838***	2.001***	-1.459***	-1.484***	-1.073	0.0711	0.764***	0.655***	-0.973***	-0.660**	1.124***	0.918***
	(0.918)	(0.897)	(0.362)	(0.357)	(0.282)	(0.280)	(0.257)	(0.254)	(0.988)	(0.968)	(0.173)	(0.172)	(0.298)	(0.294)	(0.154)	(0.152)
Officer		36.30***		12.90***		3.778***		8.577***		20.59***		4.311***		3.955***		2.932***
		(0.772)		(0.304)		(0.239)		(0.218)		(0.719)		(0.128)		(0.218)		(0.113)
Female		-8.282***		6.396***		-5.725***		-0.308		-9.416***		0.508***		-4.617***		1.886***
		(0.710)		(0.285)		(0.220)		(0.201)		(0.660)		(0.117)		(0.201)		(0.104)
Female Officer		2.107		-2.945***		2.198***		5.861***		-4.881**		1.667***		-1.481**		0.112
		(2.434)		(0.983)		(0.757)		(0.689)		(2.292)		(0.407)		(0.696)		(0.361)
Female FFI		3.613***		2.000***		0.878**		-0.237		4.385***		0.342*		0.911***		0.819***
		(1.147)		(0.449)		(0.353)		(0.324)		(1.063)		(0.189)		(0.323)		(0.167)
Female FFI & Female Marine		-5.294		-2.832*		0.0413		-1.048		0.979		-0.451		1.195		-0.744
		(3.787)		(1.505)		(1.169)		(1.072)		(3.527)		(0.626)		(1.071)		(0.555)
Age		-1.405***		1.797***		-0.255***		-1.603***		-0.859***		-0.218***		-0.185**		0.319***
		(0.267)		(0.106)		(0.0829)		(0.0754)		(0.249)		(0.0441)		(0.0755)		(0.0391)
Age Squared		-0.0147***		-0.0353***		-0.00221		0.0202***		-0.0187***		0.00273***		-0.00473***		-0.00387***
		(0.00433)		(0.00172)		(0.00135)		(0.00123)		(0.00406)		(0.000719)		(0.00123)		(0.000638)
CFT Treated Year									-23.32***	-25.68***	-10.84***	-10.79***	-2.906***	-3.491***	-11.02***	-10.75***
									(0.833)	(0.818)	(0.146)	(0.145)	(0.252)	(0.248)	(0.130)	(0.129)
CFT FFI 60 day									1.962***	1.553***	0.420***	0.431***	0.400***	0.280**	-0.0701	0.00862
									(0.450)	(0.446)	(0.0787)	(0.0791)	(0.136)	(0.136)	(0.0701)	(0.0702)
Constant	237.4***	282.0***	78.80***	55.32***	94.28***	102.7***	70.89***	97.39***	276.6***	311.4***	93.36***	96.56***	96.37***	104.7***	95.05***	88.94***
	(0.336)	(3.898)	(0.130)	(1.543)	(0.101)	(1.211)	(0.0939)	(1.103)	(0.309)	(3.622)	(0.0540)	(0.642)	(0.0932)	(1.100)	(0.0481)	(0.570)
Observations	94,705	94,705	93,041	93,041	93,380	93,380	94,546	94,546	83,275	83,275	83,275	83,275	83,275	83,275	83,275	83,275
R-squared	0.003	0.051	0.005	0.037	0.001	0.020	0.033	0.059	0.035	0.075	0.179	0.192	0.009	0.039	0.217	0.235
Mean control t(0)	237.4	282	78.80	55.32	94.28	102.7	70.89	97.39	276.6	311.4	93.36	96.56	96.37	104.7	95.05	88.94
Mean treated t(0)	239	283	77.55	54.06	92.78	101.1	71.96	98.37	278.6	312.9	93.78	96.99	96.77	105	94.98	88.95
Diff t(0)	1.573	0.989	-1.246	-1.262	-1.495	-1.608	1.066	0.981	1.962	1.553	0.420	0.431	0.400	0.280	-0.0701	0.00862
Mean control t(1)	228.5	271.6	81.57	58.16	93.90	101.9	64.40	90.55	253.3	285.7	82.52	85.77	93.47	101.2	84.03	78.19
Mean treated t(1)	231.7	274.5	82.24	58.65	94.24	102.3	64	90.05	254.2	287.3	83.71	86.86	92.89	100.8	85.09	79.12
Diff t(1)	3.252	2.931	0.667	0.486	0.343	0.393	-0.393	-0.503	0.889	1.624	1.184	1.086	-0.573	-0.380	1.054	0.927

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Aviation Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 17. Aviation Combat Element with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-8.226***	-9.805***	2.888***	2.966***	-0.328	-0.755***	-6.306***	-6.654***								
	(0.660)	(0.646)	(0.260)	(0.256)	(0.203)	(0.201)	(0.184)	(0.183)								
PFT FFI 90 day	1.573***	0.986**	-1.246***	-1.263***	-1.495***	-1.607***	1.066***	0.978***								
	(0.489)	(0.483)	(0.190)	(0.189)	(0.148)	(0.148)	(0.137)	(0.137)								
Diff-in-diff	0.461	0.775	1.726***	1.536***	1.756***	1.934***	-1.832***	-1.854***	-0.612	0.225	0.438***	0.389**	-0.729***	-0.494*	0.877***	0.738***
	(0.916)	(0.895)	(0.361)	(0.355)	(0.282)	(0.279)	(0.256)	(0.253)	(0.936)	(0.917)	(0.164)	(0.163)	(0.282)	(0.278)	(0.146)	(0.144)
Officer		36.31***		12.90***		3.779***		8.585***		20.60***		4.320***		3.951***		2.939***
		(0.772)		(0.304)		(0.239)		(0.218)		(0.719)		(0.128)		(0.218)		(0.113)
Female		-8.278***		6.397***		-5.725***		-0.305		-9.421***		0.506***		-4.617***		1.884***
		(0.710)		(0.285)		(0.220)		(0.201)		(0.660)		(0.117)		(0.201)		(0.104)
Female Officer		2.091		-2.949***		2.198***		5.852***		-4.874**		1.667***		-1.480**		0.112
		(2.434)		(0.983)		(0.757)		(0.689)		(2.292)		(0.407)		(0.696)		(0.361)
Female FFI		3.578***		1.992***		0.881**		-0.276		4.387***		0.320*		0.923***		0.803***
		(1.148)		(0.449)		(0.353)		(0.325)		(1.062)		(0.188)		(0.323)		(0.167)
Female FFI & Female Marine		-5.317		-2.835*		0.0387		-1.046		0.993		-0.445		1.194		-0.738
		(3.787)		(1.505)		(1.169)		(1.072)		(3.527)		(0.626)		(1.071)		(0.555)
Age		-1.405***		1.797***		-0.255***		-1.602***		-0.861***		-0.217***		-0.185**		0.319***
		(0.267)		(0.106)		(0.0829)		(0.0754)		(0.249)		(0.0441)		(0.0755)		(0.0391)
Age Squared		-0.0147***		-0.0353***		-0.00221		0.0202***		-0.0186***		0.00273***		-0.00473***		-0.00386***
		(0.00433)		(0.00172)		(0.00135)		(0.00123)		(0.00406)		(0.000719)		(0.00123)		(0.000638)
CFT Treated Year									-23.61***	-25.71***	-10.54***	-10.54***	-3.112***	-3.631***	-10.78***	-10.57***
									(0.763)	(0.749)	(0.134)	(0.133)	(0.230)	(0.227)	(0.119)	(0.118)
CFT FFI 90 day									1.962***	1.554***	0.420***	0.430***	0.400***	0.281**	-0.0701	0.00765
									(0.450)	(0.446)	(0.0788)	(0.0791)	(0.136)	(0.136)	(0.0701)	(0.0702)
Constant	237.4***	282.0***	78.80***	55.32***	94.28***	102.7***	70.89***	97.37***	276.6***	311.4***	93.36***	96.56***	96.37***	104.7***	95.05***	88.94***
	(0.336)	(3.898)	(0.130)	(1.543)	(0.101)	(1.211)	(0.0939)	(1.103)	(0.309)	(3.622)	(0.0540)	(0.643)	(0.0932)	(1.100)	(0.0481)	(0.570)
Observations	94,705	94,705	93,041	93,041	93,380	93,380	94,546	94,546	83,275	83,275	83,275	83,275	83,275	83,275	83,275	83,275
R-squared	0.003	0.051	0.005	0.037	0.001	0.020	0.033	0.059	0.035	0.075	0.178	0.192	0.009	0.039	0.216	0.235
Mean control t(0)	237.4	282	78.80	55.32	94.28	102.7	70.89	97.37	276.6	311.4	93.36	96.56	96.37	104.7	95.05	88.94
Mean treated t(0)	239	283	77.55	54.06	92.78	101.1	71.96	98.35	278.6	312.9	93.78	96.99	96.77	105	94.98	88.94
Diff t(0)	1.573	0.986	-1.246	-1.263	-1.495	-1.607	1.066	0.978	1.962	1.554	0.420	0.430	0.400	0.281	-0.0701	0.00765
Mean control t(1)	229.2	272.2	81.69	58.29	93.95	102	64.59	90.72	253	285.7	82.82	86.02	93.26	101.1	84.27	78.37
Mean treated t(1)	231.2	274	82.17	58.56	94.21	102.3	63.82	89.84	254.4	287.5	83.68	86.84	92.93	100.8	85.07	79.11
Diff t(1)	2.034	1.762	0.479	0.273	0.261	0.327	-0.766	-0.875	1.350	1.779	0.858	0.819	-0.329	-0.213	0.807	0.746

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Aviation Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 18. Aviation Combat Element with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-8.145***	-9.760***	2.810***	2.862***	-0.326*	-0.755***	-6.327***	-6.676***								
	(0.647)	(0.633)	(0.254)	(0.251)	(0.198)	(0.197)	(0.181)	(0.179)								
PFT FFI 120 day	1.573***	0.991**	-1.246***	-1.260***	-1.495***	-1.606***	1.066***	0.976***								
	(0.489)	(0.483)	(0.190)	(0.189)	(0.148)	(0.148)	(0.137)	(0.137)								
Diff-in-diff	0.405	0.778	1.905***	1.754***	1.766***	1.951***	-1.828***	-1.855***	-1.208	-0.402	1.072***	1.001***	-1.368***	-1.135***	1.062***	0.897***
	(0.914)	(0.892)	(0.360)	(0.355)	(0.281)	(0.279)	(0.256)	(0.252)	(0.901)	(0.883)	(0.158)	(0.157)	(0.272)	(0.268)	(0.140)	(0.139)
Officer		36.32***		12.90***		3.779***		8.585***		20.60***		4.309***		3.960***		2.934***
		(0.772)		(0.304)		(0.239)		(0.218)		(0.719)		(0.128)		(0.218)		(0.113)
Female		-8.277***		6.395***		-5.725***		-0.306		-9.421***		0.504***		-4.615***		1.883***
		(0.710)		(0.285)		(0.220)		(0.201)		(0.660)		(0.117)		(0.201)		(0.104)
Female Officer		2.088		-2.944***		2.198***		5.853***		-4.878**		1.681***		-1.493**		0.118
		(2.434)		(0.983)		(0.757)		(0.689)		(2.292)		(0.406)		(0.696)		(0.361)
Female FFI		3.648***		2.029***		0.896**		-0.311		4.334***		0.340*		0.894***		0.802***
		(1.150)		(0.450)		(0.354)		(0.325)		(1.062)		(0.188)		(0.323)		(0.167)
Female FFI & Female Marine		-5.338		-2.840*		0.0348		-1.036		0.985		-0.443		1.191		-0.739
		(3.787)		(1.505)		(1.169)		(1.072)		(3.527)		(0.625)		(1.071)		(0.555)
Age		-1.405***		1.797***		-0.255***		-1.602***		-0.858***		-0.220***		-0.182**		0.319***
		(0.267)		(0.106)		(0.0829)		(0.0754)		(0.249)		(0.0441)		(0.0755)		(0.0391)
Age Squared		-0.0147***		-0.0353***		-0.00221		0.0202***		-0.0187***		0.00277***		-0.00477***		-0.00385***
		(0.00433)		(0.00172)		(0.00135)		(0.00123)		(0.00406)		(0.000719)		(0.00123)		(0.000638)
CFT Treated Year									-23.14***	-25.19***	-10.92***	-10.91***	-2.702***	-3.213***	-10.86***	-10.63***
									(0.709)	(0.697)	(0.124)	(0.124)	(0.214)	(0.212)	(0.111)	(0.110)
CFT FFI 120 day									1.962***	1.550***	0.420***	0.431***	0.400***	0.279**	-0.0701	0.00754
									(0.450)	(0.446)	(0.0787)	(0.0791)	(0.136)	(0.135)	(0.0701)	(0.0702)
Constant	237.4***	282.0***	78.80***	55.32***	94.28***	102.7***	70.89***	97.38***	276.6***	311.3***	93.36***	96.60***	96.37***	104.6***	95.05***	88.95***
	(0.336)	(3.898)	(0.130)	(1.543)	(0.101)	(1.211)	(0.0939)	(1.103)	(0.309)	(3.622)	(0.0540)	(0.642)	(0.0932)	(1.100)	(0.0481)	(0.570)
Observations	94,705	94,705	93,041	93,041	93,380	93,380	94,546	94,546	83,275	83,275	83,275	83,275	83,275	83,275	83,275	83,275
R-squared	0.003	0.051	0.005	0.037	0.001	0.020	0.033	0.059	0.035	0.075	0.179	0.193	0.009	0.039	0.217	0.235
Mean control t(0)	237.4	282	78.80	55.32	94.28	102.7	70.89	97.38	276.6	311.3	93.36	96.60	96.37	104.6	95.05	88.95
Mean treated t(0)	239	283	77.55	54.06	92.78	101.1	71.96	98.35	278.6	312.9	93.78	97.03	96.77	104.9	94.98	88.96
Diff t(0)	1.573	0.991	-1.246	-1.260	-1.495	-1.606	1.066	0.976	1.962	1.550	0.420	0.431	0.400	0.279	-0.0701	0.00754
Mean control t(1)	229.3	272.3	81.61	58.19	93.95	102	64.57	90.70	253.5	286.1	82.44	85.69	93.67	101.4	84.19	78.31
Mean treated t(1)	231.3	274.1	82.27	58.68	94.22	102.3	63.80	89.82	254.2	287.3	83.93	87.12	92.70	100.6	85.18	79.22
Diff t(1)	1.979	1.769	0.659	0.494	0.271	0.344	-0.762	-0.879	0.754	1.148	1.492	1.432	-0.969	-0.856	0.992	0.904

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Aviation Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 19. Aviation Combat Element Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-7.364***	-8.945***	2.779***	2.888***	-0.315	-0.745***	-6.037***	-6.398***								
	(0.714)	(0.698)	(0.281)	(0.277)	(0.219)	(0.218)	(0.200)	(0.197)								
PFT FFI Ever	1.584***	0.979**	-1.245***	-1.263***	-1.499***	-1.612***	1.073***	0.983***								
	(0.489)	(0.483)	(0.190)	(0.189)	(0.148)	(0.148)	(0.137)	(0.137)								
Diff-in-diff	-1.203	-0.842	1.833***	1.621***	1.698***	1.873***	-2.158***	-2.144***	-13.80***	-11.24***	-1.533***	-1.618***	-3.054***	-2.367***	-0.241	-0.532**
	-0.935	(0.914)	(0.368)	(0.363)	(0.287)	(0.285)	(0.261)	(0.258)	(1.363)	(1.336)	(0.239)	(0.237)	(0.412)	(0.406)	(0.213)	(0.210)
Officer		36.34***		12.90***		3.781***		8.589***		20.64***		4.327***		3.954***		2.948***
		(0.772)		(0.304)		(0.239)		(0.218)		(0.719)		(0.128)		(0.218)		(0.113)
Female		-8.269***		6.398***		-5.723***		-0.306		-9.378***		0.511***		-4.608***		1.888***
		(0.710)		(0.285)		(0.220)		(0.201)		(0.660)		(0.117)		(0.201)		(0.104)
Female Officer		2.056		-2.947***		2.196***		5.841***		-4.941**		1.652***		-1.486**		0.0990
		(2.434)		(0.983)		(0.757)		(0.689)		(2.292)		(0.407)		(0.696)		(0.361)
Female FFI		3.449***		1.989***		0.867**		-0.267		3.885***		0.228		0.858***		0.736***
		(1.147)		(0.449)		(0.353)		(0.324)		(1.063)		(0.189)		(0.323)		(0.167)
Female FFI & Female Marine		-5.322		-2.832*		0.0405		-1.060		0.907		-0.459		1.179		-0.748
		(3.787)		(1.505)		(1.169)		(1.072)		(3.526)		(0.626)		(1.071)		(0.555)
Age		-1.400***		1.796***		-0.256***		-1.600***		-0.816***		-0.208***		-0.179**		0.325***
		(0.267)		(0.106)		(0.0829)		(0.0754)		(0.249)		(0.0441)		(0.0755)		(0.0391)
Age Squared		-0.0148***		-0.0353***		-0.00220		0.0202***		-0.0193***		0.00260***		-0.00481***		-0.00394***
		(0.00433)		(0.00172)		(0.00135)		(0.00123)		(0.00405)		(0.000719)		(0.00123)		(0.000638)
CFT Treated Year									-11.79***	-15.60***	-8.926***	-8.865***	-0.920**	-1.894***	-9.936***	-9.551***
									(1.267)	(1.244)	(0.222)	(0.221)	(0.383)	(0.378)	(0.198)	(0.196)
CFT FFI Ever									1.880***	1.609***	0.473***	0.445***	0.381***	0.312**	-0.0264	0.00845
									(0.449)	(0.446)	(0.0787)	(0.0791)	(0.136)	(0.135)	(0.0700)	(0.0702)
Constant	237.4***	282.0***	78.80***	55.34***	94.28***	102.7***	70.89***	97.34***	276.6***	310.6***	93.33***	96.41***	96.38***	104.6***	95.03***	88.86***
	(0.336)	(3.898)	(0.130)	(1.543)	(0.101)	(1.211)	(0.0939)	(1.103)	(0.312)	(3.623)	(0.0547)	(0.643)	(0.0942)	(1.100)	(0.0487)	(0.570)
Observations	94,705	94,705	93,041	93,041	93,380	93,380	94,546	94,546	83,275	83,275	83,275	83,275	83,275	83,275	83,275	83,275
R-squared	0.003	0.051	0.005	0.037	0.001	0.020	0.034	0.059	0.036	0.076	0.178	0.192	0.009	0.039	0.216	0.235
Mean control t(0)	237.4	282	78.80	55.34	94.28	102.7	70.89	97.34	276.6	310.6	93.33	96.41	96.38	104.6	95.03	88.86
Mean treated t(0)	239	283	77.55	54.07	92.78	101.1	71.96	98.32	278.5	312.2	93.80	96.85	96.76	104.9	95	88.86
Diff t(0)	1.584	0.979	-1.245	-1.263	-1.499	-1.612	1.073	0.983	1.880	1.609	0.473	0.445	0.381	0.312	-0.0264	0.00845
Mean control t(1)	230	273	81.58	58.23	93.97	102	64.85	90.94	264.8	295	84.41	87.54	95.46	102.7	85.09	79.30
Mean treated t(1)	230.4	273.2	82.17	58.58	94.16	102.2	63.77	89.78	252.9	285.4	83.35	86.37	92.78	100.6	84.83	78.78
Diff t(1)	0.382	0.138	0.588	0.359	0.199	0.261	-1.085	-1.161	-11.92	-9.632	-1.060	-1.173	-2.674	-2.055	-0.268	-0.523

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Aviation Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 20. Logistics Combat Element with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-2.895***	-4.008***	2.511***	2.818***	-0.354	-0.628***	-3.626***	-4.077***								
	(0.735)	(0.728)	(0.311)	(0.308)	(0.225)	(0.224)	(0.218)	(0.216)								
PFT FFI 30 day	-3.838***	-4.602***	-2.743***	-2.638***	-1.860***	-2.035***	-0.465***	-0.812***								
	(0.605)	(0.612)	(0.254)	(0.257)	(0.184)	(0.187)	(0.179)	(0.182)								
Diff-in-diff	-3.223***	-2.323**	1.438***	1.513***	0.911***	1.065***	-1.909***	-1.535***	-2.245*	-1.439	1.631***	1.518***	-1.162***	-0.815**	-2.814***	-3.003***
	(1.047)	(1.039)	(0.443)	(0.440)	(0.321)	(0.320)	(0.310)	(0.308)	(1.200)	(1.190)	(0.265)	(0.264)	(0.353)	(0.350)	(0.221)	(0.220)
Officer		26.09***		10.85***		2.592***		8.070***		13.27***		4.416***		2.112***		2.574***
		(1.052)		(0.443)		(0.322)		(0.312)		(0.926)		(0.205)		(0.272)		(0.171)
Female		-4.710***		6.300***		-6.120***		-0.690***		-5.685***		0.900***		-3.349***		1.509***
		(0.791)		(0.339)		(0.243)		(0.235)		(0.693)		(0.154)		(0.204)		(0.128)
Female Officer		-3.288		-4.565***		1.409*		6.482***		-4.551*		0.898*		-0.493		0.394
		(2.655)		(1.143)		(0.815)		(0.787)		(2.375)		(0.526)		(0.698)		(0.439)
Female FFI		-4.843***		-0.767**		-0.620***		-2.015***		-1.464**		-0.369**		-0.436**		-0.101
		(0.734)		(0.309)		(0.225)		(0.218)		(0.649)		(0.144)		(0.191)		(0.120)
Female FFI & Female Marine		-0.512		0.407		1.052*		-0.890*		-0.494		-0.209		0.0297		-0.00171
		(1.759)		(0.752)		(0.540)		(0.522)		(1.563)		(0.346)		(0.460)		(0.289)
Age		2.059***		2.850***		0.326***		-0.548***		0.293		0.0407		0.175**		0.534***
		(0.312)		(0.132)		(0.0958)		(0.0924)		(0.273)		(0.0604)		(0.0802)		(0.0504)
Age Squared		-0.0588***		-0.0488***		-0.0105***		0.00331**		-0.0249***		-0.00115		-0.00789***		-0.00767***
		(0.00514)		(0.00218)		(0.00158)		(0.00152)		(0.00452)		(0.00100)		(0.00133)		(0.000835)
CFT Treated Year									-15.63***	-17.39***	-11.42***	-11.27***	-0.822***	-1.359***	-6.730***	-6.375***
									(1.050)	(1.042)	(0.232)	(0.231)	(0.309)	(0.306)	(0.194)	(0.193)
CFT FFI 30 day									-5.170***	-5.282***	-0.247**	-0.288**	-1.317***	-1.396***	-0.268***	-0.260***
									(0.514)	(0.520)	(0.113)	(0.115)	(0.151)	(0.153)	(0.0948)	(0.0962)
Constant	244.5***	231.9***	79.28***	38.68***	95.20***	94.72***	73.59***	85.10***	282.6***	292.1***	93.45***	92.84***	97.81***	99.07***	95.55***	86.87***
	(0.329)	(4.485)	(0.138)	(1.897)	(0.1000)	(1.378)	(0.0975)	(1.330)	(0.291)	(3.909)	(0.0642)	(0.866)	(0.0855)	(1.149)	(0.0536)	(0.723)
Observations	59,552	59,552	58,751	58,751	58,983	58,983	59,481	59,481	52,887	52,887	52,887	52,887	52,887	52,887	52,887	52,887
R-squared	0.004	0.031	0.005	0.031	0.002	0.023	0.019	0.043	0.041	0.062	0.171	0.181	0.010	0.030	0.201	0.214
Mean control t(0)	244.5	231.9	79.28	38.68	95.20	94.72	73.59	85.10	282.6	292.1	93.45	92.84	97.81	99.07	95.55	86.87
Mean treated t(0)	240.7	227.3	76.54	36.04	93.34	92.68	73.13	84.29	277.4	286.8	93.20	92.55	96.50	97.68	95.29	86.61
Diff t(0)	-3.838	-4.602	-2.743	-2.638	-1.860	-2.035	-0.465	-0.812	-5.170	-5.282	-0.247	-0.288	-1.317	-1.396	-0.268	-0.260
Mean control t(1)	241.6	227.9	81.79	41.50	94.85	94.09	69.97	81.02	267	274.7	82.03	81.57	96.99	97.71	88.82	80.49
Mean treated t(1)	234.5	221	80.49	40.37	93.90	93.12	67.59	78.67	259.6	268	83.42	82.80	94.51	95.50	85.74	77.23
Diff t(1)	-7.062	-6.926	-1.305	-1.125	-0.949	-0.970	-2.374	-2.347	-7.415	-6.722	1.384	1.230	-2.479	-2.210	-3.082	-3.263

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Logistics Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 21. Logistics Combat Element with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.736***	-5.727***	2.325***	2.608***	-0.573***	-0.804***	-4.177***	-4.611***								
	(0.719)	(0.712)	(0.304)	(0.302)	(0.221)	(0.219)	(0.213)	(0.211)								
PFT FFI 60 day	-4.101***	-4.852***	-2.773***	-2.703***	-1.937***	-2.114***	-0.570***	-0.913***								
	(0.608)	(0.616)	(0.255)	(0.258)	(0.185)	(0.188)	(0.180)	(0.183)								
Diff-in-diff	-0.127	0.573	1.749***	1.894***	1.312***	1.393***	-0.986***	-0.636**	-1.568	-0.752	2.274***	2.185***	-1.401***	-1.069***	-1.688***	-1.853***
	(1.043)	(1.036)	(0.441)	(0.439)	(0.320)	(0.319)	(0.309)	(0.307)	(1.077)	(1.070)	(0.237)	(0.237)	(0.316)	(0.315)	(0.199)	(0.198)
Officer		26.13***		10.85***		2.593***		8.082***		13.20***		4.406***		2.097***		2.557***
		(1.052)		(0.443)		(0.322)		(0.312)		(0.927)		(0.205)		(0.272)		(0.171)
Female		-4.754***		6.295***		-6.126***		-0.708***		-5.668***		0.896***		-3.340***		1.494***
		(0.791)		(0.339)		(0.243)		(0.235)		(0.694)		(0.154)		(0.204)		(0.128)
Female Officer		-3.255		-4.560***		1.413*		6.492***		-4.432*		0.910*		-0.464		0.413
		(2.656)		(1.143)		(0.815)		(0.787)		(2.377)		(0.526)		(0.699)		(0.440)
Female FFI		-4.859***		-0.785**		-0.641***		-2.024***		-0.835		-0.346**		-0.254		-0.0676
		(0.735)		(0.309)		(0.225)		(0.218)		(0.652)		(0.144)		(0.192)		(0.120)
Female FFI & Female Marine		-0.629		0.370		1.025*		-0.915*		-0.699		-0.232		-0.0186		-0.0275
		(1.759)		(0.752)		(0.540)		(0.522)		(1.564)		(0.346)		(0.460)		(0.289)
Age		2.089***		2.861***		0.335***		-0.540***		0.313		0.0443		0.179**		0.533***
		(0.312)		(0.132)		(0.0958)		(0.0924)		(0.273)		(0.0604)		(0.0802)		(0.0505)
Age Squared		-0.0593***		-0.0489***		-0.0106***		0.00319**		-0.0253***		-0.00123		-0.00798***		-0.00766***
		(0.00514)		(0.00218)		(0.00158)		(0.00152)		(0.00452)		(0.00100)		(0.00133)		(0.000836)
CFT Treated Year									-17.66***	-19.41***	-11.86***	-11.74***	-1.105***	-1.615***	-7.810***	-7.494***
									(0.892)	(0.886)	(0.196)	(0.196)	(0.262)	(0.260)	(0.164)	(0.164)
CFT FFI 60 day									-2.857***	-2.911***	-0.233**	-0.257**	-0.605***	-0.675***	-0.269***	-0.244**
									(0.526)	(0.534)	(0.116)	(0.118)	(0.154)	(0.157)	(0.0969)	(0.0987)
Constant	244.6***	231.5***	79.28***	38.53***	95.22***	94.61***	73.62***	85.02***	281.8***	291.0***	93.44***	92.78***	97.57***	98.75***	95.55***	86.87***
	(0.328)	(4.484)	(0.138)	(1.896)	(0.0997)	(1.377)	(0.0973)	(1.330)	(0.286)	(3.911)	(0.0630)	(0.865)	(0.0841)	(1.150)	(0.0528)	(0.723)
Observations	59,552	59,552	58,751	58,751	58,983	58,983	59,481	59,481	52,887	52,887	52,887	52,887	52,887	52,887	52,887	52,887
R-squared	0.004	0.031	0.005	0.031	0.002	0.023	0.019	0.043	0.040	0.060	0.172	0.182	0.008	0.028	0.200	0.212
Mean control t(0)	244.6	231.5	79.28	38.53	95.22	94.61	73.62	85.02	281.8	291	93.44	92.78	97.57	98.75	95.55	86.87
Mean treated t(0)	240.5	226.7	76.51	35.82	93.28	92.49	73.05	84.11	278.9	288	93.20	92.53	96.96	98.08	95.28	86.63
Diff t(0)	-4.101	-4.852	-2.773	-2.703	-1.937	-2.114	-0.570	-0.913	-2.857	-2.911	-0.233	-0.257	-0.605	-0.675	-0.269	-0.244
Mean control t(1)	239.8	225.8	81.61	41.13	94.64	93.80	69.44	80.41	264.1	271.5	81.58	81.04	96.46	97.14	87.74	79.38
Mean treated t(1)	235.6	221.5	80.58	40.33	94.02	93.08	67.89	78.86	259.7	267.9	83.62	82.97	94.46	95.39	85.78	77.28
Diff t(1)	-4.228	-4.279	-1.024	-0.809	-0.625	-0.721	-1.555	-1.549	-4.425	-3.663	2.041	1.928	-2.006	-1.744	-1.957	-2.097

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Logistics Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 22. Logistics Combat Element with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.647***	-5.669***	2.359***	2.650***	-0.593***	-0.838***	-4.225***	-4.658***								
	(0.708)	(0.702)	(0.300)	(0.297)	(0.217)	(0.216)	(0.210)	(0.208)								
PFT FFI 90 day	-4.101***	-4.852***	-2.773***	-2.703***	-1.937***	-2.113***	-0.570***	-0.913***								
	(0.608)	(0.616)	(0.255)	(0.258)	(0.185)	(0.188)	(0.180)	(0.183)								
Diff-in-diff	-0.414	0.340	1.656***	1.794***	1.329***	1.434***	-0.946***	-0.597*	0.424	1.122	2.416***	2.351***	-0.629**	-0.337	-1.315***	-1.460***
	(1.040)	(1.034)	(0.440)	(0.438)	(0.319)	(0.318)	(0.308)	(0.307)	(1.012)	(1.006)	(0.223)	(0.222)	(0.297)	(0.296)	(0.187)	(0.186)
Officer		26.13***		10.85***		2.595***		8.085***		13.17***		4.406***		2.088***		2.551***
		(1.052)		(0.443)		(0.322)		(0.312)		(0.927)		(0.205)		(0.273)		(0.171)
Female		-4.758***		6.293***		-6.124***		-0.707***		-5.685***		0.892***		-3.347***		1.492***
		(0.791)		(0.339)		(0.243)		(0.235)		(0.694)		(0.153)		(0.204)		(0.128)
Female Officer		-3.242		-4.557***		1.414*		6.496***		-4.414*		0.929*		-0.459		0.406
		(2.656)		(1.143)		(0.815)		(0.787)		(2.378)		(0.526)		(0.699)		(0.440)
Female FFI		-4.862***		-0.788**		-0.640***		-2.022***		-0.784		-0.341**		-0.235		-0.0575
		(0.735)		(0.309)		(0.225)		(0.218)		(0.652)		(0.144)		(0.192)		(0.120)
Female FFI & Female Marine		-0.596		0.380		1.025*		-0.912*		-0.736		-0.243		-0.0319		-0.0308
		(1.759)		(0.752)		(0.540)		(0.522)		(1.565)		(0.346)		(0.460)		(0.289)
Age		2.084***		2.860***		0.334***		-0.542***		0.318		0.0423		0.181**		0.535***
		(0.312)		(0.132)		(0.0958)		(0.0924)		(0.273)		(0.0604)		(0.0803)		(0.0505)
Age Squared		-0.0592***		-0.0489***		-0.0106***		0.00322**		-0.0255***		-0.00120		-0.00803***		-0.00770***
		(0.00514)		(0.00218)		(0.00158)		(0.00152)		(0.00452)		(0.001000)		(0.00133)		(0.000836)
CFT Treated Year									-19.39***	-21.02***	-11.86***	-11.77***	-1.790***	-2.258***	-8.192***	-7.898***
									(0.805)	(0.800)	(0.177)	(0.177)	(0.237)	(0.235)	(0.148)	(0.148)
CFT FFI 90 day									-2.857***	-2.902***	-0.233**	-0.257**	-0.605***	-0.672***	-0.269***	-0.242**
									(0.526)	(0.534)	(0.116)	(0.118)	(0.154)	(0.157)	(0.0969)	(0.0987)
Constant	244.6***	231.6***	79.28***	38.54***	95.22***	94.61***	73.62***	85.04***	281.8***	290.9***	93.44***	92.81***	97.57***	98.73***	95.55***	86.84***
	(0.328)	(4.484)	(0.138)	(1.896)	(0.0997)	(1.377)	(0.0973)	(1.330)	(0.286)	(3.911)	(0.0630)	(0.865)	(0.0841)	(1.150)	(0.0528)	(0.723)
Observations	59,552	59,552	58,751	58,751	58,983	58,983	59,481	59,481	52,887	52,887	52,887	52,887	52,887	52,887	52,887	52,887
R-squared	0.004	0.031	0.005	0.031	0.002	0.023	0.019	0.043	0.039	0.060	0.172	0.182	0.008	0.028	0.199	0.212
Mean control t(0)	244.6	231.6	79.28	38.54	95.22	94.61	73.62	85.04	281.8	290.9	93.44	92.81	97.57	98.73	95.55	86.84
Mean treated t(0)	240.5	226.7	76.51	35.84	93.28	92.50	73.05	84.12	278.9	288	93.20	92.56	96.96	98.05	95.28	86.60
Diff t(0)	-4.101	-4.852	-2.773	-2.703	-1.937	-2.113	-0.570	-0.913	-2.857	-2.902	-0.233	-0.257	-0.605	-0.672	-0.269	-0.242
Mean control t(1)	239.9	225.9	81.64	41.19	94.62	93.78	69.40	80.38	262.4	269.9	81.58	81.04	95.78	96.47	87.36	78.94
Mean treated t(1)	235.4	221.4	80.52	40.28	94.01	93.10	67.88	78.87	260	268.1	83.76	83.13	94.55	95.46	85.77	77.24
Diff t(1)	-4.515	-4.512	-1.116	-0.909	-0.608	-0.680	-1.515	-1.509	-2.433	-1.779	2.182	2.095	-1.234	-1.009	-1.583	-1.702

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Logistics Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 23. Logistics Combat Element with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.806***	-5.873***	2.337***	2.621***	-0.578***	-0.835***	-4.210***	-4.657***								
	(0.691)	(0.685)	(0.293)	(0.290)	(0.212)	(0.211)	(0.205)	(0.203)								
PFT FFI 120 day	-4.101***	-4.850***	-2.773***	-2.703***	-1.937***	-2.113***	-0.570***	-0.912***								
	(0.608)	(0.616)	(0.255)	(0.258)	(0.185)	(0.188)	(0.180)	(0.183)								
Diff-in-diff	-0.357	0.481	1.636***	1.798***	1.267***	1.390***	-1.057***	-0.681**	-0.0875	0.535	1.999***	1.971***	-0.772***	-0.522*	-1.208***	-1.318***
	(1.037)	(1.031)	(0.439)	(0.436)	(0.318)	(0.317)	(0.307)	(0.306)	(0.951)	(0.947)	(0.209)	(0.209)	(0.280)	(0.278)	(0.175)	(0.175)
Officer		26.13***		10.85***		2.594***		8.082***		13.17***		4.418***		2.083***		2.541***
		(1.052)		(0.443)		(0.322)		(0.312)		(0.927)		(0.205)		(0.273)		(0.171)
Female		-4.752***		6.294***		-6.124***		-0.707***		-5.695***		0.908***		-3.353***		1.479***
		(0.791)		(0.339)		(0.243)		(0.235)		(0.694)		(0.154)		(0.204)		(0.128)
Female Officer		-3.287		-4.565***		1.408*		6.480***		-4.402*		0.901*		-0.451		0.427
		(2.656)		(1.143)		(0.815)		(0.787)		(2.377)		(0.526)		(0.699)		(0.440)
Female FFI		-4.854***		-0.787**		-0.640***		-2.022***		-0.803		-0.350**		-0.241		-0.0550
		(0.735)		(0.309)		(0.225)		(0.218)		(0.651)		(0.144)		(0.192)		(0.120)
Female FFI & Female Marine		-0.586		0.383		1.031*		-0.899*		-0.675		-0.266		-0.00393		-0.00431
		(1.760)		(0.752)		(0.540)		(0.522)		(1.565)		(0.346)		(0.460)		(0.289)
Age		2.080***		2.859***		0.333***		-0.543***		0.316		0.0430		0.181**		0.535***
		(0.312)		(0.132)		(0.0958)		(0.0924)		(0.273)		(0.0604)		(0.0802)		(0.0505)
Age Squared		-0.0592***		-0.0489***		-0.0106***		0.00325**		-0.0254***		-0.00121		-0.00801***		-0.00769***
		(0.00514)		(0.00218)		(0.00158)		(0.00152)		(0.00452)		(0.00100)		(0.00133)		(0.000836)
CFT Treated Year									-19.24***	-20.76***	-11.40***	-11.35***	-1.792***	-2.213***	-8.391***	-8.131***
									(0.713)	(0.709)	(0.157)	(0.157)	(0.209)	(0.208)	(0.131)	(0.131)
CFT FFI 120 day									-2.857***	-2.904***	-0.233**	-0.259**	-0.605***	-0.672***	-0.269***	-0.241**
									(0.526)	(0.534)	(0.116)	(0.118)	(0.154)	(0.157)	(0.0969)	(0.0987)
Constant	244.6***	231.6***	79.28***	38.55***	95.22***	94.62***	73.62***	85.06***	281.8***	290.9***	93.44***	92.80***	97.57***	98.73***	95.55***	86.85***
	(0.328)	(4.484)	(0.138)	(1.896)	(0.0997)	(1.377)	(0.0973)	(1.330)	(0.286)	(3.911)	(0.0630)	(0.865)	(0.0841)	(1.150)	(0.0528)	(0.723)
Observations	59,552	59,552	58,751	58,751	58,983	58,983	59,481	59,481	52,887	52,887	52,887	52,887	52,887	52,887	52,887	52,887
R-squared	0.004	0.031	0.005	0.031	0.002	0.023	0.019	0.043	0.039	0.060	0.172	0.182	0.008	0.028	0.199	0.212
Mean control t(0)	244.6	231.6	79.28	38.55	95.22	94.62	73.62	85.06	281.8	290.9	93.44	92.80	97.57	98.73	95.55	86.85
Mean treated t(0)	240.5	226.8	76.51	35.85	93.28	92.51	73.05	84.15	278.9	288	93.20	92.54	96.96	98.06	95.28	86.61
Diff t(0)	-4.101	-4.850	-2.773	-2.703	-1.937	-2.113	-0.570	-0.912	-2.857	-2.904	-0.233	-0.259	-0.605	-0.672	-0.269	-0.241
Mean control t(1)	239.8	225.8	81.62	41.17	94.64	93.79	69.41	80.41	262.6	270.2	82.03	81.45	95.78	96.52	87.16	78.72
Mean treated t(1)	235.3	221.4	80.48	40.27	93.97	93.07	67.78	78.81	259.6	267.8	83.80	83.17	94.40	95.33	85.68	77.16
Diff t(1)	-4.458	-4.369	-1.137	-0.904	-0.670	-0.723	-1.626	-1.594	-2.945	-2.369	1.766	1.712	-1.377	-1.194	-1.477	-1.559

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Logistics Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 24. Logistics Combat Element Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-2.303***	-3.480***	2.651***	3.020***	-0.114	-0.437*	-3.420***	-3.861***								
	(0.758)	(0.750)	(0.321)	(0.318)	(0.232)	(0.231)	(0.224)	(0.222)								
PFT FFI Ever	-3.682***	-4.476***	-2.760***	-2.614***	-1.838***	-2.023***	-0.362**	-0.719***								
	(0.603)	(0.609)	(0.253)	(0.256)	(0.183)	(0.186)	(0.179)	(0.181)								
Diff-in-diff	-3.951***	-2.948***	1.266***	1.209***	0.546*	0.782**	-2.188***	-1.825***	-2.904*	-2.443	0.753**	0.609*	-0.770*	-0.525	-2.594***	-2.765***
	(1.055)	(1.046)	(0.446)	(0.443)	(0.323)	(0.322)	(0.312)	(0.310)	(1.544)	(1.527)	(0.340)	(0.338)	(0.454)	(0.449)	(0.285)	(0.283)
Officer		26.16***		10.86***		2.602***		8.094***		13.24***		4.428***		2.096***		2.554***
		(1.051)		(0.443)		(0.322)		(0.312)		(0.926)		(0.205)		(0.272)		(0.171)
Female		-4.671***		6.304***		-6.117***		-0.676***		-5.710***		0.913***		-3.361***		1.490***
		(0.791)		(0.339)		(0.243)		(0.235)		(0.694)		(0.154)		(0.204)		(0.128)
Female Officer		-3.359		-4.578***		1.397*		6.459***		-4.455*		0.881*		-0.457		0.435
		(2.655)		(1.143)		(0.815)		(0.787)		(2.376)		(0.526)		(0.699)		(0.440)
Female FFI		-4.831***		-0.762**		-0.619***		-2.002***		-1.239*		-0.375***		-0.340*		-0.0954
		(0.734)		(0.308)		(0.224)		(0.218)		(0.648)		(0.144)		(0.191)		(0.120)
Female FFI & Female Marine		-0.516		0.423		1.066**		-0.894*		-0.509		-0.187		0.00928		-0.0246
		(1.759)		(0.752)		(0.540)		(0.522)		(1.564)		(0.346)		(0.460)		(0.289)
Age		2.033***		2.838***		0.316***		-0.553***		0.283		0.0400		0.173**		0.533***
		(0.312)		(0.132)		(0.0958)		(0.0924)		(0.273)		(0.0604)		(0.0802)		(0.0505)
Age Squared		-0.0584***		-0.0486***		-0.0103***		0.00341**		-0.0248***		-0.00113		-0.00789***		-0.00767***
		(0.00514)		(0.00218)		(0.00158)		(0.00152)		(0.00452)		(0.00100)		(0.00133)		(0.000836)
CFT Treated Year									-15.07***	-16.58***	-10.72***	-10.54***	-1.205***	-1.682***	-6.749***	-6.404***
									(1.439)	(1.426)	(0.317)	(0.316)	(0.423)	(0.419)	(0.265)	(0.264)
CFT FFI Ever									-4.495***	-4.559***	-0.205*	-0.240**	-1.070***	-1.124***	-0.253***	-0.239**
									(0.504)	(0.507)	(0.111)	(0.112)	(0.148)	(0.149)	(0.0929)	(0.0939)
Constant	244.5***	232.2***	79.30***	38.86***	95.20***	94.87***	73.56***	85.14***	282.5***	292.1***	93.44***	92.83***	97.76***	99.05***	95.56***	86.90***
	(0.330)	(4.487)	(0.138)	(1.898)	(0.100)	(1.379)	(0.0978)	(1.330)	(0.297)	(3.912)	(0.0655)	(0.867)	(0.0874)	(1.151)	(0.0548)	(0.724)
Observations	59,552	59,552	58,751	58,751	58,983	58,983	59,481	59,481	52,887	52,887	52,887	52,887	52,887	52,887	52,887	52,887
R-squared	0.004	0.031	0.005	0.031	0.002	0.023	0.020	0.043	0.041	0.061	0.170	0.180	0.009	0.029	0.200	0.212
Mean control t(0)	244.5	232.2	79.30	38.86	95.20	94.87	73.56	85.14	282.5	292.1	93.44	92.83	97.76	99.05	95.56	86.90
Mean treated t(0)	240.8	227.7	76.54	36.25	93.36	92.84	73.20	84.42	278	287.6	93.23	92.59	96.69	97.92	95.30	86.67
Diff t(0)	-3.682	-4.476	-2.760	-2.614	-1.838	-2.023	-0.362	-0.719	-4.495	-4.559	-0.205	-0.240	-1.070	-1.124	-0.253	-0.239
Mean control t(1)	242.2	228.7	81.95	41.88	95.09	94.43	70.14	81.28	267.4	275.6	82.72	82.29	96.56	97.37	88.81	80.50
Mean treated t(1)	234.5	221.3	80.46	40.48	93.79	93.19	67.59	78.74	260	268.6	83.27	82.66	94.72	95.72	85.96	77.50
Diff t(1)	-7.633	-7.423	-1.494	-1.405	-1.292	-1.241	-2.550	-2.544	-7.399	-7.003	0.548	0.368	-1.840	-1.650	-2.847	-3.004

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Logistics Combat Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 25. MEF Information Group and Command Element with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	4.460***	1.355	5.136***	4.815***	1.989***	1.229***	-2.072***	-3.246***								
	(1.261)	(1.245)	(0.553)	(0.550)	(0.432)	(0.431)	(0.390)	(0.385)								
PFT FFI 30 day	-0.128	-2.913***	-1.227***	-1.462***	0.131	-0.599*	-1.660***	-2.829***								
	(0.887)	(0.898)	(0.388)	(0.395)	(0.302)	(0.309)	(0.274)	(0.278)								
Diff-in-diff	-11.24***	-6.739***	-1.253*	-0.567	-1.564***	-0.536	-4.418***	-2.648***	-11.31***	-9.035**	-2.658***	-2.090***	-2.827***	-2.804***	-1.280**	-0.571
	(1.626)	(1.624)	(0.716)	(0.719)	(0.559)	(0.564)	(0.503)	(0.503)	(3.632)	(3.604)	(0.755)	(0.751)	(1.079)	(1.074)	(0.640)	(0.638)
Officer		30.86***		12.92***		3.724***		8.922***		14.17***		4.912***		2.247***		2.593***
		(1.273)		(0.563)		(0.441)		(0.394)		(1.180)		(0.246)		(0.352)		(0.209)
Female		-6.686***		4.440***		-5.510***		0.800**		-8.112***		1.063***		-3.783***		1.333***
		(1.152)		(0.519)		(0.401)		(0.357)		(1.052)		(0.219)		(0.313)		(0.186)
Female Officer		-1.791		-3.084*		1.608		6.611***		-0.428		1.685**		-0.585		0.208
		(3.754)		(1.707)		(1.307)		(1.162)		(3.500)		(0.729)		(1.043)		(0.619)
Female FFI		-7.427***		-2.111***		-1.682***		-3.590***		-4.844***		-0.764***		0.0171		-1.250***
		(0.816)		(0.362)		(0.284)		(0.253)		(0.749)		(0.156)		(0.223)		(0.133)
Female FFI & Female Marine		-0.315		1.320		1.529*		-1.450**		1.552		-0.186		0.182		0.541
		(2.352)		(1.058)		(0.819)		(0.728)		(2.166)		(0.451)		(0.645)		(0.383)
Age		0.148		1.740***		-0.520***		-1.687***		-1.147***		-0.144		-0.339***		0.274***
		(0.463)		(0.205)		(0.161)		(0.143)		(0.422)		(0.0881)		(0.126)		(0.0747)
Age Squared		-0.0321***		-0.0321***		0.00248		0.0221***		-0.00392		0.00235		5.75e-05		-0.00359***
		(0.00773)		(0.00343)		(0.00268)		(0.00239)		(0.00708)		(0.00148)		(0.00211)		(0.00125)
CFT Treated Year									-12.84***	-15.14***	-8.661***	-9.123***	-0.622	-0.856	-8.609***	-9.037***
									(3.527)	(3.489)	(0.733)	(0.727)	(1.048)	(1.039)	(0.621)	(0.617)
CFT FFI 30 day									0.931	-0.714	-0.265	-0.390**	0.386*	0.250	-0.169	-0.398***
									(0.778)	(0.791)	(0.162)	(0.165)	(0.231)	(0.236)	(0.137)	(0.140)
Constant	244.7***	263.5***	79.39***	55.84***	93.78***	106.2***	73.97***	102.2***	280.9***	314.1***	93.53***	95.28***	97.26***	106.2***	95.83***	91.24***
	(0.427)	(6.648)	(0.187)	(2.947)	(0.145)	(2.307)	(0.132)	(2.058)	(0.393)	(6.049)	(0.0817)	(1.261)	(0.117)	(1.802)	(0.0692)	(1.070)
Observations	31,188	31,188	30,663	30,663	30,774	30,774	31,146	31,146	27,658	27,658	27,658	27,658	27,658	27,658	27,658	27,658
R-squared	0.003	0.042	0.005	0.031	0.001	0.018	0.034	0.069	0.046	0.070	0.212	0.228	0.010	0.030	0.221	0.235
Mean control t(0)	244.7	263.5	79.39	55.84	93.78	106.2	73.97	102.2	280.9	314.1	93.53	95.28	97.26	106.2	95.83	91.24
Mean treated t(0)	244.6	260.6	78.16	54.37	93.91	105.6	72.31	99.41	281.8	313.4	93.26	94.89	97.65	106.4	95.66	90.84
Diff t(0)	-0.128	-2.913	-1.227	-1.462	0.131	-0.599	-1.660	-2.829	0.931	-0.714	-0.265	-0.390	0.386	0.250	-0.169	-0.398
Mean control t(1)	249.2	264.9	84.52	60.65	95.77	107.4	71.89	98.99	268	299	84.87	86.15	96.64	105.3	87.22	82.20
Mean treated t(1)	237.8	255.2	82.05	58.62	94.34	106.3	65.82	93.51	257.7	289.2	81.94	83.67	94.20	102.7	85.77	81.24
Diff t(1)	-11.37	-9.652	-2.480	-2.029	-1.433	-1.135	-6.078	-5.477	-10.38	-9.749	-2.922	-2.481	-2.442	-2.554	-1.449	-0.969

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the MEF Information Group and Command Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 26. MEF Information Group and Command Element with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	2.839**	-0.0605	4.428***	4.238***	1.664***	0.932**	-2.043***	-3.138***								
	(1.134)	(1.121)	(0.498)	(0.496)	(0.389)	(0.389)	(0.350)	(0.347)								
PFT FFI 60 day	-0.213	-2.996***	-1.221***	-1.471***	0.100	-0.636**	-1.715***	-2.868***								
	(0.890)	(0.902)	(0.389)	(0.397)	(0.303)	(0.311)	(0.275)	(0.279)								
Diff-in-diff	-9.932***	-5.542***	-0.461	0.0907	-1.209**	-0.186	-4.997***	-3.286***	-16.71***	-13.55***	-1.932***	-1.381**	-3.862***	-3.647***	-3.532***	-2.923***
	(1.546)	(1.548)	(0.682)	(0.686)	(0.532)	(0.538)	(0.477)	(0.478)	(2.943)	(2.931)	(0.613)	(0.611)	(0.875)	(0.873)	(0.518)	(0.518)
Officer		30.93***		12.94***		3.732***		8.943***		14.20***		4.909***		2.264***		2.574***
		(1.273)		(0.563)		(0.441)		(0.393)		(1.180)		(0.246)		(0.351)		(0.209)
Female		-6.774***		4.420***		-5.522***		0.753**		-7.938***		1.062***		-3.731***		1.351***
		(1.152)		(0.519)		(0.401)		(0.356)		(1.052)		(0.219)		(0.313)		(0.186)
Female Officer		-1.725		-3.053*		1.623		6.633***		-0.718		1.675**		-0.666		0.166
		(3.754)		(1.707)		(1.307)		(1.160)		(3.499)		(0.730)		(1.042)		(0.619)
Female FFI		-7.472***		-2.133***		-1.699***		-3.572***		-4.054***		-0.749***		0.236		-1.191***
		(0.817)		(0.362)		(0.284)		(0.253)		(0.751)		(0.157)		(0.224)		(0.133)
Female FFI & Female Marine		-0.223		1.309		1.529*		-1.352*		1.388		-0.188		0.138		0.524
		(2.352)		(1.058)		(0.819)		(0.727)		(2.165)		(0.451)		(0.645)		(0.383)
Age		0.170		1.748***		-0.516***		-1.674***		-1.103***		-0.142		-0.325***		0.272***
		(0.462)		(0.205)		(0.161)		(0.143)		(0.422)		(0.0881)		(0.126)		(0.0747)
Age Squared		-0.0324***		-0.0322***		0.00242		0.0220***		-0.00452		0.00231		-0.000119		-0.00357***
		(0.00773)		(0.00343)		(0.00268)		(0.00239)		(0.00708)		(0.00148)		(0.00211)		(0.00125)
CFT Treated Year									-10.47***	-13.36***	-9.410***	-9.872***	-0.419	-0.791	-6.496***	-6.850***
									(2.803)	(2.778)	(0.583)	(0.579)	(0.833)	(0.827)	(0.494)	(0.491)
CFT FFI 60 day									4.546***	2.639***	-0.242	-0.333*	1.407***	1.215***	-0.119	-0.302**
									(0.805)	(0.822)	(0.168)	(0.171)	(0.239)	(0.245)	(0.142)	(0.145)
Constant	244.8***	263.2***	79.38***	55.71***	93.79***	106.2***	73.98***	102.0***	280.1***	312.4***	93.51***	95.22***	97.04***	105.7***	95.81***	91.22***
	(0.426)	(6.646)	(0.186)	(2.945)	(0.145)	(2.306)	(0.132)	(2.055)	(0.386)	(6.048)	(0.0803)	(1.261)	(0.115)	(1.801)	(0.0680)	(1.070)
Observations	31,188	31,188	30,663	30,663	30,774	30,774	31,146	31,146	27,658	27,658	27,658	27,658	27,658	27,658	27,658	27,658
R-squared	0.003	0.041	0.005	0.031	0.001	0.018	0.037	0.071	0.047	0.071	0.212	0.228	0.011	0.031	0.223	0.236
Mean control t(0)	244.8	263.2	79.38	55.71	93.79	106.2	73.98	102	280.1	312.4	93.51	95.22	97.04	105.7	95.81	91.22
Mean treated t(0)	244.5	260.2	78.16	54.24	93.89	105.5	72.26	99.14	284.6	315.1	93.27	94.88	98.44	106.9	95.69	90.92
Diff t(0)	-0.213	-2.996	-1.221	-1.471	0.100	-0.636	-1.715	-2.868	4.546	2.639	-0.242	-0.333	1.407	1.215	-0.119	-0.302
Mean control t(1)	247.6	263.2	83.81	59.94	95.45	107.1	71.93	98.87	269.6	299.1	84.10	85.34	96.62	104.9	89.32	84.37
Mean treated t(1)	237.5	254.6	82.13	58.56	94.34	106.3	65.22	92.72	257.4	288.1	81.93	83.63	94.16	102.4	85.67	81.15
Diff t(1)	-10.15	-8.538	-1.682	-1.380	-1.109	-0.822	-6.713	-6.154	-12.17	-10.91	-2.174	-1.714	-2.455	-2.431	-3.650	-3.224

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the MEF Information Group and Command Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 27. MEF Information Group and Command Element with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	2.789***	0.257	4.422***	4.296***	1.634***	1.002***	-2.376***	-3.292***								
	(1.053)	(1.039)	(0.462)	(0.459)	(0.361)	(0.360)	(0.325)	(0.321)								
PFT FFI 90 day	-0.213	-3.049***	-1.221***	-1.480***	0.100	-0.641**	-1.715***	-2.909***								
	(0.890)	(0.901)	(0.389)	(0.397)	(0.303)	(0.311)	(0.275)	(0.279)								
Diff-in-diff	-10.80***	-6.805***	-0.616	-0.133	-1.270**	-0.377	-5.097***	-3.590***	-11.02***	-8.104***	-1.888***	-1.317**	-2.411***	-2.284***	-3.111***	-2.472***
	(1.502)	(1.496)	(0.663)	(0.664)	(0.517)	(0.520)	(0.464)	(0.462)	(2.506)	(2.502)	(0.521)	(0.522)	(0.745)	(0.745)	(0.441)	(0.442)
Officer		30.90***		12.93***		3.729***		8.924***		14.22***		4.903***		2.269***		2.567***
		(1.272)		(0.563)		(0.441)		(0.393)		(1.180)		(0.246)		(0.351)		(0.209)
Female		-6.826***		4.410***		-5.527***		0.717**		-7.984***		1.059***		-3.742***		1.344***
		(1.151)		(0.519)		(0.401)		(0.356)		(1.052)		(0.219)		(0.313)		(0.186)
Female Officer		-1.601		-3.033*		1.635		6.723***		-0.634		1.678**		-0.645		0.176
		(3.753)		(1.707)		(1.307)		(1.159)		(3.500)		(0.730)		(1.042)		(0.619)
Female FFI		-7.664***		-2.165***		-1.717***		-3.718***		-4.107***		-0.741***		0.221		-1.183***
		(0.815)		(0.362)		(0.284)		(0.252)		(0.752)		(0.157)		(0.224)		(0.133)
Female FFI & Female Marine		-0.148		1.322		1.540*		-1.325*		1.430		-0.184		0.148		0.533
		(2.351)		(1.058)		(0.819)		(0.726)		(2.165)		(0.451)		(0.645)		(0.383)
Age		0.151		1.744***		-0.519***		-1.685***		-1.102***		-0.143		-0.325***		0.270***
		(0.462)		(0.205)		(0.161)		(0.143)		(0.422)		(0.0881)		(0.126)		(0.0747)
Age Squared		-0.0320***		-0.0322***		0.00247		0.0222***		-0.00454		0.00233		-0.000128		-0.00353***
		(0.00773)		(0.00343)		(0.00268)		(0.00239)		(0.00708)		(0.00148)		(0.00211)		(0.00125)
CFT Treated Year									-16.05***	-18.68***	-9.489***	-9.964***	-1.832***	-2.117***	-6.956***	-7.332***
									(2.339)	(2.320)	(0.487)	(0.484)	(0.695)	(0.691)	(0.412)	(0.410)
CFT FFI 90 day									4.546***	2.625***	-0.242	-0.331*	1.407***	1.211***	-0.119	-0.300**
									(0.805)	(0.822)	(0.168)	(0.171)	(0.239)	(0.245)	(0.142)	(0.145)
Constant	244.8***	263.5***	79.38***	55.77***	93.79***	106.2***	73.98***	102.2***	280.1***	312.4***	93.51***	95.24***	97.04***	105.7***	95.81***	91.25***
	(0.426)	(6.644)	(0.186)	(2.945)	(0.145)	(2.306)	(0.131)	(2.053)	(0.386)	(6.049)	(0.0803)	(1.261)	(0.115)	(1.802)	(0.0680)	(1.070)
Observations	31,188	31,188	30,663	30,663	30,774	30,774	31,146	31,146	27,658	27,658	27,658	27,658	27,658	27,658	27,658	27,658
R-squared	0.004	0.042	0.005	0.031	0.001	0.018	0.038	0.073	0.047	0.071	0.212	0.228	0.011	0.031	0.223	0.236
Mean control t(0)	244.8	263.5	79.38	55.77	93.79	106.2	73.98	102.2	280.1	312.4	93.51	95.24	97.04	105.7	95.81	91.25
Mean treated t(0)	244.5	260.5	78.16	54.29	93.89	105.6	72.26	99.29	284.6	315	93.27	94.91	98.44	106.9	95.69	90.96
Diff t(0)	-0.213	-3.049	-1.221	-1.480	0.100	-0.641	-1.715	-2.909	4.546	2.625	-0.242	-0.331	1.407	1.211	-0.119	-0.300
Mean control t(1)	247.5	263.8	83.81	60.06	95.42	107.2	71.60	98.91	264	293.7	84.03	85.28	95.21	103.5	88.86	83.92
Mean treated t(1)	236.5	253.9	81.97	58.45	94.25	106.2	64.79	92.41	257.5	288.3	81.90	83.63	94.20	102.5	85.63	81.15
Diff t(1)	-11.01	-9.854	-1.837	-1.613	-1.170	-1.018	-6.813	-6.500	-6.476	-5.479	-2.130	-1.648	-1.004	-1.073	-3.230	-2.772

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the MEF Information Group and Command Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 28. MEF Information Group and Command Element with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	2.179**	0.0961	4.343***	4.278***	1.612***	1.065***	-3.156***	-3.904***								
	(0.950)	(0.937)	(0.418)	(0.415)	(0.327)	(0.326)	(0.293)	(0.289)								
PFT FFI 120 day	-0.213	-3.100***	-1.221***	-1.488***	0.100	-0.646**	-1.715***	-2.942***								
	(0.889)	(0.901)	(0.389)	(0.397)	(0.303)	(0.311)	(0.275)	(0.279)								
Diff-in-diff	-11.81***	-8.429***	-0.836	-0.425	-1.464***	-0.706	-4.960***	-3.703***	-12.02***	-9.608***	-1.658***	-1.135**	-2.280***	-2.275***	-2.077***	-1.433***
	(1.468)	(1.458)	(0.650)	(0.650)	(0.507)	(0.509)	(0.453)	(0.450)	(2.145)	(2.150)	(0.446)	(0.448)	(0.637)	(0.640)	(0.378)	(0.380)
Officer		30.99***		12.95***		3.738***		8.991***		14.20***		4.904***		2.268***		2.577***
		(1.271)		(0.563)		(0.441)		(0.393)		(1.180)		(0.246)		(0.351)		(0.209)
Female		-6.834***		4.407***		-5.530***		0.714**		-7.983***		1.057***		-3.743***		1.336***
		(1.151)		(0.519)		(0.401)		(0.356)		(1.052)		(0.219)		(0.313)		(0.186)
Female Officer		-1.827		-3.067*		1.613		6.594***		-0.643		1.683**		-0.643		0.193
		(3.751)		(1.707)		(1.307)		(1.158)		(3.499)		(0.729)		(1.042)		(0.619)
Female FFI		-7.837***		-2.190***		-1.734***		-3.827***		-4.016***		-0.733***		0.230		-1.189***
		(0.815)		(0.362)		(0.284)		(0.252)		(0.752)		(0.157)		(0.224)		(0.133)
Female FFI & Female Marine		-0.0858		1.329		1.552*		-1.327*		1.429		-0.183		0.148		0.537
		(2.350)		(1.058)		(0.819)		(0.726)		(2.165)		(0.451)		(0.645)		(0.383)
Age		0.0763		1.732***		-0.528***		-1.726***		-1.117***		-0.145*		-0.327***		0.269***
		(0.462)		(0.205)		(0.161)		(0.143)		(0.422)		(0.0881)		(0.126)		(0.0747)
Age Squared		-0.0308***		-0.0320***		0.00262		0.0228***		-0.00432		0.00236		-0.000103		-0.00353***
		(0.00773)		(0.00343)		(0.00269)		(0.00239)		(0.00708)		(0.00148)		(0.00211)		(0.00125)
CFT Treated Year									-15.30***	-17.46***	-9.755***	-10.17***	-1.978***	-2.155***	-7.988***	-8.358***
									(1.945)	(1.932)	(0.405)	(0.403)	(0.578)	(0.575)	(0.343)	(0.342)
CFT FFI 120 day									4.546***	2.648***	-0.242	-0.329*	1.407***	1.213***	-0.119	-0.302**
									(0.805)	(0.822)	(0.168)	(0.171)	(0.239)	(0.245)	(0.142)	(0.145)
Constant	244.8***	264.6***	79.38***	55.95***	93.79***	106.3***	73.98***	102.8***	280.1***	312.6***	93.51***	95.27***	97.04***	105.7***	95.81***	91.27***
	(0.426)	(6.642)	(0.186)	(2.946)	(0.145)	(2.306)	(0.131)	(2.052)	(0.386)	(6.049)	(0.0803)	(1.261)	(0.115)	(1.802)	(0.0680)	(1.070)
Observations	31,188	31,188	30,663	30,663	30,774	30,774	31,146	31,146	27,658	27,658	27,658	27,658	27,658	27,658	27,658	27,658
R-squared	0.005	0.043	0.005	0.031	0.001	0.018	0.039	0.074	0.047	0.071	0.212	0.228	0.011	0.031	0.222	0.235
Mean control t(0)	244.8	264.6	79.38	55.95	93.79	106.3	73.98	102.8	280.1	312.6	93.51	95.27	97.04	105.7	95.81	91.27
Mean treated t(0)	244.5	261.5	78.16	54.47	93.89	105.7	72.26	99.88	284.6	315.3	93.27	94.94	98.44	106.9	95.69	90.97
Diff t(0)	-0.213	-3.100	-1.221	-1.488	0.100	-0.646	-1.715	-2.942	4.546	2.648	-0.242	-0.329	1.407	1.213	-0.119	-0.302
Mean control t(1)	246.9	264.7	83.73	60.23	95.40	107.4	70.82	98.92	264.8	295.2	83.76	85.09	95.06	103.5	87.82	82.91
Mean treated t(1)	234.9	253.2	81.67	58.32	94.04	106.1	64.14	92.27	257.3	288.2	81.86	83.63	94.19	102.5	85.63	81.18
Diff t(1)	-12.02	-11.53	-2.058	-1.913	-1.364	-1.352	-6.676	-6.646	-7.478	-6.959	-1.900	-1.464	-0.873	-1.062	-2.196	-1.734

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the MEF Information Group and Command Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 29. MEF Information Group and Command Element Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	4.109***	0.776	4.988***	4.530***	1.874***	1.086**	-1.956***	-3.278***								
	(1.433)	(1.415)	(0.629)	(0.625)	(0.491)	(0.491)	(0.443)	(0.438)								
PFT FFI Ever	0.134	-2.633***	-1.173***	-1.375***	0.203	-0.523*	-1.531***	-2.689***								
	(0.883)	(0.893)	(0.386)	(0.393)	(0.301)	(0.308)	(0.273)	(0.277)								
Diff-in-diff	-10.17***	-5.537***	-0.924	-0.129	-1.364**	-0.330	-4.214***	-2.321***	-13.86***	-12.00***	-3.542***	-2.830***	-3.349**	-3.386***	-3.154***	-2.364***
	(1.751)	(1.748)	(0.771)	(0.773)	(0.601)	(0.606)	(0.542)	(0.541)	(4.391)	(4.349)	(0.913)	(0.906)	(1.305)	(1.296)	(0.773)	(0.769)
Officer		30.90***		12.93***		3.730***		8.938***		14.15***		4.909***		2.242***		2.586***
		(1.273)		(0.563)		(0.441)		(0.394)		(1.180)		(0.246)		(0.352)		(0.209)
Female		-6.720***		4.434***		-5.512***		0.784**		-8.087***		1.071***		-3.780***		1.346***
		(1.152)		(0.519)		(0.401)		(0.357)		(1.052)		(0.219)		(0.313)		(0.186)
Female Officer		-1.751		-3.072*		1.613		6.626***		-0.413		1.688**		-0.580		0.204
		(3.755)		(1.707)		(1.308)		(1.163)		(3.500)		(0.729)		(1.043)		(0.619)
Female FFI		-7.386***		-2.096***		-1.669***		-3.552***		-4.870***		-0.769***		0.0133		-1.241***
		(0.816)		(0.361)		(0.283)		(0.253)		(0.746)		(0.155)		(0.222)		(0.132)
Female FFI & Female Marine		-0.421		1.301		1.514*		-1.488**		1.530		-0.192		0.177		0.531
		(2.353)		(1.058)		(0.819)		(0.729)		(2.165)		(0.451)		(0.645)		(0.383)
Age		0.155		1.740***		-0.519***		-1.689***		-1.151***		-0.145*		-0.339***		0.271***
		(0.463)		(0.205)		(0.161)		(0.143)		(0.422)		(0.0880)		(0.126)		(0.0747)
Age Squared		-0.0322***		-0.0321***		0.00245		0.0221***		-0.00385		0.00237		5.66e-05		-0.00354***
		(0.00774)		(0.00343)		(0.00269)		(0.00240)		(0.00708)		(0.00148)		(0.00211)		(0.00125)
CFT Treated Year									-9.900**	-12.09***	-7.763***	-8.369***	-0.0359	-0.259	-6.740***	-7.269***
									(4.312)	(4.264)	(0.897)	(0.889)	(1.281)	(1.270)	(0.759)	(0.754)
CFT FFI Ever									0.466	-0.833	-0.288*	-0.423***	0.331	0.260	-0.198	-0.418***
									(0.741)	(0.750)	(0.154)	(0.156)	(0.220)	(0.223)	(0.131)	(0.133)
Constant	244.7***	263.4***	79.38***	55.82***	93.76***	106.2***	73.94***	102.3***	281.0***	314.2***	93.54***	95.32***	97.26***	106.1***	95.84***	91.30***
	(0.428)	(6.655)	(0.187)	(2.949)	(0.146)	(2.308)	(0.132)	(2.062)	(0.405)	(6.050)	(0.0841)	(1.261)	(0.120)	(1.802)	(0.0713)	(1.070)
Observations	31,188	31,188	30,663	30,663	30,774	30,774	31,146	31,146	27,658	27,658	27,658	27,658	27,658	27,658	27,658	27,658
R-squared	0.003	0.041	0.005	0.031	0.001	0.018	0.032	0.067	0.046	0.070	0.212	0.229	0.010	0.030	0.222	0.235
Mean control t(0)	244.7	263.4	79.38	55.82	93.76	106.2	73.94	102.3	281	314.2	93.54	95.32	97.26	106.1	95.84	91.30
Mean treated t(0)	244.8	260.8	78.21	54.44	93.97	105.7	72.41	99.56	281.4	313.4	93.26	94.90	97.59	106.4	95.65	90.89
Diff t(0)	0.134	-2.633	-1.173	-1.375	0.203	-0.523	-1.531	-2.689	0.466	-0.833	-0.288	-0.423	0.331	0.260	-0.198	-0.418
Mean control t(1)	248.8	264.2	84.37	60.35	95.64	107.3	71.99	98.97	271.1	302.2	85.78	86.95	97.23	105.9	89.10	84.03
Mean treated t(1)	238.7	256	82.27	58.85	94.48	106.4	66.24	93.96	257.7	289.3	81.95	83.70	94.21	102.8	85.75	81.25
Diff t(1)	-10.04	-8.170	-2.097	-1.504	-1.160	-0.853	-5.745	-5.010	-13.39	-12.84	-3.830	-3.253	-3.017	-3.127	-3.352	-2.782

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the MEF Information Group and Command Element taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 30. Total Operating Force Elements with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-5.115***	-6.606***	3.550***	3.735***	0.274**	-0.101	-5.033***	-5.554***								
	(0.329)	(0.324)	(0.143)	(0.142)	(0.110)	(0.110)	(0.101)	(0.100)								
PFT FFI 30 day	0.555**	-0.464*	-1.070***	-1.156***	-1.445***	-1.643***	0.296***	0.0342								
	(0.239)	(0.239)	(0.103)	(0.104)	(0.0794)	(0.0802)	(0.0739)	(0.0741)								
Diff-in-diff	-1.012**	0.0117	1.409***	1.484***	1.541***	1.760***	-2.720***	-2.472***	-4.487***	-3.012***	-0.147	-0.0808	-1.551***	-1.161***	-0.432***	-0.484***
	(0.440)	(0.435)	(0.193)	(0.191)	(0.148)	(0.148)	(0.136)	(0.135)	(0.494)	(0.488)	(0.105)	(0.104)	(0.147)	(0.146)	(0.0902)	(0.0899)
Officer		31.03***		12.26***		3.184***		9.231***		15.57***		4.633***		2.644***		2.844***
		(0.395)		(0.173)		(0.134)		(0.123)		(0.346)		(0.0738)		(0.103)		(0.0638)
Female		-9.597***		5.459***		-5.570***		-1.086***		-10.48***		-0.0386		-4.403***		0.795***
		(0.425)		(0.190)		(0.144)		(0.132)		(0.371)		(0.0792)		(0.111)		(0.0684)
Female Officer		0.858		-3.425***		2.221***		5.917***		-1.757		1.423***		-0.175		0.416*
		(1.371)		(0.614)		(0.465)		(0.425)		(1.213)		(0.259)		(0.362)		(0.223)
Female FFI		-5.905***		-1.699***		-0.647***		-2.098***		-3.303***		-1.415***		-0.258**		-0.960***
		(0.406)		(0.177)		(0.137)		(0.126)		(0.355)		(0.0758)		(0.106)		(0.0655)
Female FFI & Female Marine		3.260***		1.063**		0.843**		0.477		3.362***		0.825***		0.750**		0.908***
		(1.133)		(0.503)		(0.384)		(0.351)		(0.999)		(0.213)		(0.298)		(0.184)
Age		0.404***		2.092***		-0.172***		-1.301***		-0.168		-0.134***		-0.0515		0.335***
		(0.135)		(0.0594)		(0.0459)		(0.0420)		(0.118)		(0.0252)		(0.0352)		(0.0218)
Age Squared		-0.0362***		-0.0378***		-0.00246***		0.0150***		-0.0221***		0.00132***		-0.00520***		-0.00485***
		(0.00224)		(0.000986)		(0.000762)		(0.000695)		(0.00196)		(0.000419)		(0.000586)		(0.000362)
CFT Treated Year									-16.28***	-18.56***	-9.484***	-9.511***	-1.509***	-2.112***	-8.619***	-8.426***
									(0.435)	(0.429)	(0.0919)	(0.0915)	(0.129)	(0.128)	(0.0793)	(0.0791)
CFT FFI 30 day									-0.431**	-1.030***	0.239***	0.108**	-0.177***	-0.293***	0.0488	-0.0172
									(0.205)	(0.205)	(0.0434)	(0.0436)	(0.0609)	(0.0610)	(0.0374)	(0.0377)
Constant	244.6***	257.4***	78.98***	50.28***	94.60***	100.8***	73.54***	95.87***	282.5***	301.3***	93.85***	96.10***	97.69***	102.6***	95.65***	90.24***
	(0.144)	(1.942)	(0.0621)	(0.852)	(0.0477)	(0.659)	(0.0444)	(0.602)	(0.126)	(1.690)	(0.0267)	(0.360)	(0.0375)	(0.504)	(0.0231)	(0.311)
Observations	337,479	337,479	332,219	332,219	332,962	332,962	336,977	336,977	298,102	298,102	298,102	298,102	298,102	298,102	298,102	298,102
R-squared	0.002	0.037	0.006	0.030	0.001	0.014	0.032	0.057	0.039	0.068	0.162	0.176	0.010	0.034	0.188	0.199
Mean control t(0)	244.6	257.4	78.98	50.28	94.60	100.8	73.54	95.87	282.5	301.3	93.85	96.10	97.69	102.6	95.65	90.24
Mean treated t(0)	245.2	257	77.91	49.13	93.16	99.15	73.83	95.90	282.1	300.2	94.09	96.21	97.51	102.3	95.70	90.23
Diff t(0)	0.555	-0.464	-1.070	-1.156	-1.445	-1.643	0.296	0.0342	-0.431	-1.030	0.239	0.108	-0.177	-0.293	0.0488	-0.0172
Mean control t(1)	239.5	250.8	82.53	54.02	94.88	100.7	68.50	90.31	266.2	282.7	84.37	86.59	96.18	100.5	87.03	81.82
Mean treated t(1)	239	250.4	82.86	54.34	94.97	100.8	66.08	87.88	261.3	278.7	84.46	86.61	94.45	99.01	86.65	81.32
Diff t(1)	-0.457	-0.452	0.339	0.328	0.0959	0.117	-2.425	-2.438	-4.918	-4.041	0.0922	0.0270	-1.729	-1.454	-0.383	-0.501

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Operating Forces taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 31. Total Operating Force Elements with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-5.837***	-7.267***	3.454***	3.636***	0.238**	-0.123	-5.158***	-5.668***								
	(0.317)	(0.312)	(0.138)	(0.137)	(0.106)	(0.106)	(0.0977)	(0.0969)								
PFT FFI 60 day	0.475**	-0.520**	-1.077***	-1.172***	-1.478***	-1.674***	0.253***	0.00221								
	(0.240)	(0.239)	(0.104)	(0.104)	(0.0795)	(0.0803)	(0.0740)	(0.0742)								
Diff-in-diff	0.187	1.105**	1.595***	1.680***	1.624***	1.822***	-2.635***	-2.410***	-2.268***	-0.960**	0.283***	0.353***	-1.244***	-0.909***	0.102	0.0714
	(0.435)	(0.430)	(0.190)	(0.189)	(0.146)	(0.146)	(0.134)	(0.133)	(0.451)	(0.445)	(0.0953)	(0.0949)	(0.134)	(0.133)	(0.0823)	(0.0820)
Officer		31.03***		12.26***		3.182***		9.234***		15.54***		4.631***		2.638***		2.840***
		(0.395)		(0.173)		(0.134)		(0.123)		(0.346)		(0.0738)		(0.103)		(0.0638)
Female		-9.596***		5.460***		-5.571***		-1.103***		-10.50***		-0.0426		-4.407***		0.788***
		(0.425)		(0.190)		(0.144)		(0.132)		(0.372)		(0.0792)		(0.111)		(0.0684)
Female Officer		0.872		-3.421***		2.224***		5.926***		-1.696		1.429***		-0.162		0.422*
		(1.371)		(0.614)		(0.465)		(0.425)		(1.213)		(0.259)		(0.362)		(0.224)
Female FFI		-5.930***		-1.708***		-0.661***		-2.107***		-3.059***		-1.408***		-0.185*		-0.964***
		(0.406)		(0.177)		(0.137)		(0.126)		(0.356)		(0.0759)		(0.106)		(0.0656)
Female FFI & Female Marine		3.219***		1.040**		0.825**		0.503		3.330***		0.822***		0.745**		0.907***
		(1.133)		(0.503)		(0.384)		(0.351)		(0.999)		(0.213)		(0.298)		(0.184)
Age		0.407***		2.094***		-0.169***		-1.300***		-0.172		-0.135***		-0.0524		0.334***
		(0.135)		(0.0594)		(0.0459)		(0.0420)		(0.118)		(0.0252)		(0.0352)		(0.0218)
Age Squared		-0.0363***		-0.0379***		-0.00251***		0.0150***		-0.0221***		0.00133***		-0.00519***		-0.00484***
		(0.00224)		(0.000986)		(0.000762)		(0.000695)		(0.00197)		(0.000419)		(0.000586)		(0.000362)
CFT Treated Year									-18.80***	-20.84***	-9.837***	-9.872***	-1.983***	-2.512***	-9.062***	-8.895***
									(0.380)	(0.376)	(0.0804)	(0.0801)	(0.113)	(0.112)	(0.0694)	(0.0692)
CFT FFI 60 day									0.672***	-0.0401	0.254***	0.131***	0.146**	0.000216	0.0333	-0.0232
									(0.207)	(0.207)	(0.0439)	(0.0442)	(0.0616)	(0.0618)	(0.0379)	(0.0382)
Constant	244.6***	257.4***	78.98***	50.25***	94.61***	100.7***	73.55***	95.87***	282.1***	301.0***	93.85***	96.11***	97.57***	102.5***	95.66***	90.26***
	(0.144)	(1.941)	(0.0620)	(0.852)	(0.0476)	(0.659)	(0.0443)	(0.602)	(0.124)	(1.690)	(0.0263)	(0.360)	(0.0369)	(0.504)	(0.0227)	(0.311)
Observations	337,479	337,479	332,219	332,219	332,962	332,962	336,977	336,977	298,102	298,102	298,102	298,102	298,102	298,102	298,102	298,102
R-squared	0.002	0.037	0.006	0.030	0.001	0.014	0.032	0.057	0.038	0.068	0.162	0.176	0.009	0.033	0.188	0.199
Mean control t(0)	244.6	257.4	78.98	50.25	94.61	100.8	73.55	95.87	282.1	301	93.85	96.11	97.57	102.5	95.66	90.26
Mean treated t(0)	245.1	256.9	77.90	49.08	93.13	99.08	73.80	95.87	282.8	300.9	94.11	96.24	97.72	102.5	95.69	90.24
Diff t(0)	0.475	-0.520	-1.077	-1.172	-1.478	-1.674	0.253	0.00221	0.672	-0.0401	0.254	0.131	0.146	0.000216	0.0333	-0.0232
Mean control t(1)	238.8	250.2	82.43	53.88	94.85	100.6	68.39	90.20	263.3	280.1	84.01	86.24	95.59	99.96	86.60	81.36
Mean treated t(1)	239.5	250.7	82.95	54.39	95	100.8	66.01	87.80	261.7	279.1	84.55	86.72	94.49	99.05	86.73	81.41
Diff t(1)	0.662	0.585	0.518	0.508	0.146	0.148	-2.383	-2.408	-1.596	-1	0.537	0.484	-1.098	-0.909	0.135	0.0482

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Operating Forces taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 32. Total Operating Force Elements with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-5.337***	-6.784***	3.548***	3.735***	0.281***	-0.0804	-5.374***	-5.882***								
	(0.307)	(0.303)	(0.134)	(0.133)	(0.103)	(0.103)	(0.0949)	(0.0941)								
PFT FFI 90 day	0.475**	-0.519**	-1.077***	-1.171***	-1.478***	-1.674***	0.253***	-9.22e-06								
	(0.240)	(0.239)	(0.104)	(0.104)	(0.0795)	(0.0803)	(0.0740)	(0.0742)								
Diff-in-diff	-0.648	0.293	1.457***	1.531***	1.556***	1.755***	-2.387***	-2.164***	-0.217	0.831*	0.531***	0.632***	-0.682***	-0.427***	0.288***	0.299***
	(0.432)	(0.426)	(0.189)	(0.188)	(0.145)	(0.145)	(0.133)	(0.132)	(0.429)	(0.424)	(0.0908)	(0.0904)	(0.128)	(0.127)	(0.0784)	(0.0782)
Officer		31.03***		12.26***		3.182***		9.232***		15.53***		4.630***		2.633***		2.839***
		(0.395)		(0.173)		(0.134)		(0.123)		(0.346)		(0.0738)		(0.103)		(0.0638)
Female		-9.600***		5.460***		-5.572***		-1.100***		-10.52***		-0.0444		-4.413***		0.786***
		(0.425)		(0.190)		(0.144)		(0.132)		(0.372)		(0.0792)		(0.111)		(0.0684)
Female Officer		0.863		-3.425***		2.222***		5.936***		-1.672		1.435***		-0.158		0.426*
		(1.371)		(0.614)		(0.465)		(0.425)		(1.213)		(0.259)		(0.362)		(0.224)
Female FFI		-5.926***		-1.704***		-0.660***		-2.128***		-3.064***		-1.409***		-0.186*		-0.965***
		(0.406)		(0.177)		(0.137)		(0.126)		(0.356)		(0.0759)		(0.106)		(0.0656)
Female FFI & Female Marine		3.254***		1.045**		0.828**		0.502		3.312***		0.817***		0.742**		0.904***
		(1.133)		(0.503)		(0.384)		(0.352)		(0.999)		(0.213)		(0.298)		(0.184)
Age		0.405***		2.094***		-0.169***		-1.300***		-0.174		-0.135***		-0.0530		0.334***
		(0.135)		(0.0594)		(0.0459)		(0.0420)		(0.118)		(0.0252)		(0.0352)		(0.0218)
Age Squared		-0.0362***		-0.0379***		-0.00251***		0.0150***		-0.0220***		0.00134***		-0.00519***		-0.00484***
		(0.00224)		(0.000986)		(0.000762)		(0.000696)		(0.00197)		(0.000419)		(0.000586)		(0.000362)
CFT Treated Year									-20.44***	-22.25***	-10.01***	-10.07***	-2.455***	-2.917***	-9.201***	-9.069***
									(0.352)	(0.348)	(0.0745)	(0.0742)	(0.105)	(0.104)	(0.0643)	(0.0641)
CFT FFI 90 day									0.672***	-0.0414	0.254***	0.130***	0.146**	-0.000132	0.0333	-0.0234
									(0.207)	(0.207)	(0.0439)	(0.0442)	(0.0616)	(0.0618)	(0.0379)	(0.0382)
Constant	244.6***	257.4***	78.98***	50.25***	94.61***	100.8***	73.55***	95.87***	282.1***	301.0***	93.85***	96.11***	97.57***	102.5***	95.66***	90.26***
	(0.144)	(1.941)	(0.0620)	(0.852)	(0.0476)	(0.659)	(0.0443)	(0.602)	(0.124)	(1.690)	(0.0263)	(0.360)	(0.0369)	(0.504)	(0.0227)	(0.311)
Observations	337,479	337,479	332,219	332,219	332,962	332,962	336,977	336,977	298,102	298,102	298,102	298,102	298,102	298,102	298,102	298,102
R-squared	0.002	0.037	0.006	0.030	0.001	0.014	0.031	0.057	0.038	0.068	0.163	0.176	0.009	0.033	0.188	0.199
Mean control t(0)	244.6	257.4	78.98	50.25	94.61	100.8	73.55	95.87	282.1	301	93.85	96.11	97.57	102.5	95.66	90.26
Mean treated t(0)	245.1	256.9	77.90	49.08	93.13	99.08	73.80	95.87	282.8	301	94.11	96.24	97.72	102.5	95.69	90.24
Diff t(0)	0.475	-0.519	-1.077	-1.171	-1.478	-1.674	0.253	-9.22e-06	0.672	-0.0414	0.254	0.130	0.146	-0.000132	0.0333	-0.0234
Mean control t(1)	239.3	250.7	82.52	53.99	94.89	100.7	68.18	89.99	261.6	278.7	83.84	86.04	95.12	99.57	86.46	81.19
Mean treated t(1)	239.1	250.4	82.90	54.35	94.97	100.8	66.04	87.82	262.1	279.5	84.63	86.80	94.58	99.14	86.78	81.47
Diff t(1)	-0.173	-0.226	0.380	0.360	0.0783	0.0812	-2.134	-2.164	0.455	0.790	0.785	0.762	-0.537	-0.427	0.322	0.276

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Operating Forces taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 33. Total Operating Force Elements with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.751***	-6.220***	3.646***	3.822***	0.381***	0.0166	-5.364***	-5.872***								
	(0.294)	(0.290)	(0.128)	(0.127)	(0.0987)	(0.0986)	(0.0907)	(0.0900)								
PFT FFI 120 day	0.475**	-0.520**	-1.077***	-1.171***	-1.478***	-1.674***	0.253***	-0.00205								
	(0.240)	(0.239)	(0.104)	(0.104)	(0.0795)	(0.0803)	(0.0740)	(0.0742)								
Diff-in-diff	-1.790***	-0.812*	1.306***	1.399***	1.369***	1.575***	-2.620***	-2.400***	-0.436	0.494	0.753***	0.856***	-0.878***	-0.664***	0.296***	0.317***
	(0.429)	(0.423)	(0.188)	(0.186)	(0.144)	(0.144)	(0.132)	(0.131)	(0.410)	(0.406)	(0.0868)	(0.0865)	(0.122)	(0.121)	(0.0749)	(0.0748)
Officer		31.03***		12.26***		3.183***		9.229***		15.53***		4.628***		2.636***		2.838***
		(0.395)		(0.173)		(0.134)		(0.123)		(0.346)		(0.0738)		(0.103)		(0.0638)
Female		-9.600***		5.458***		-5.572***		-1.093***		-10.51***		-0.0410		-4.414***		0.788***
		(0.425)		(0.190)		(0.144)		(0.132)		(0.372)		(0.0792)		(0.111)		(0.0684)
Female Officer		0.847		-3.426***		2.220***		5.925***		-1.677		1.438***		-0.161		0.426*
		(1.371)		(0.614)		(0.465)		(0.425)		(1.213)		(0.259)		(0.362)		(0.224)
Female FFI		-5.939***		-1.702***		-0.661***		-2.150***		-3.065***		-1.414***		-0.182*		-0.966***
		(0.406)		(0.177)		(0.137)		(0.126)		(0.356)		(0.0759)		(0.106)		(0.0656)
Female FFI & Female Marine		3.309***		1.051**		0.836**		0.520		3.312***		0.805***		0.751**		0.901***
		(1.133)		(0.503)		(0.384)		(0.351)		(0.999)		(0.213)		(0.298)		(0.184)
Age		0.402***		2.094***		-0.170***		-1.303***		-0.174		-0.135***		-0.0531		0.334***
		(0.135)		(0.0594)		(0.0459)		(0.0420)		(0.118)		(0.0252)		(0.0352)		(0.0218)
Age Squared		-0.0362***		-0.0379***		-0.00250***		0.0150***		-0.0221***		0.00133***		-0.00519***		-0.00484***
		(0.00224)		(0.000986)		(0.000762)		(0.000695)		(0.00197)		(0.000419)		(0.000586)		(0.000362)
CFT Treated Year									-20.26***	-21.97***	-10.13***	-10.20***	-2.337***	-2.764***	-9.192***	-9.070***
									(0.326)	(0.323)	(0.0690)	(0.0687)	(0.0969)	(0.0962)	(0.0595)	(0.0594)
CFT FFI 120 day									0.672***	-0.0414	0.254***	0.130***	0.146**	0.000386	0.0333	-0.0235
									(0.207)	(0.207)	(0.0439)	(0.0442)	(0.0616)	(0.0618)	(0.0379)	(0.0382)
Constant	244.6***	257.5***	78.98***	50.25***	94.61***	100.8***	73.55***	95.91***	282.1***	301.0***	93.85***	96.11***	97.57***	102.5***	95.66***	90.26***
	(0.144)	(1.941)	(0.0620)	(0.852)	(0.0476)	(0.659)	(0.0443)	(0.602)	(0.124)	(1.690)	(0.0263)	(0.360)	(0.0369)	(0.504)	(0.0227)	(0.311)
Observations	337,479	337,479	332,219	332,219	332,962	332,962	336,977	336,977	298,102	298,102	298,102	298,102	298,102	298,102	298,102	298,102
R-squared	0.002	0.037	0.006	0.030	0.001	0.014	0.032	0.057	0.038	0.068	0.163	0.176	0.009	0.033	0.188	0.199
Mean control t(0)	244.6	257.5	78.98	50.25	94.61	100.8	73.55	95.91	282.1	301	93.85	96.11	97.57	102.5	95.66	90.26
Mean treated t(0)	245.1	257	77.90	49.08	93.13	99.09	73.80	95.91	282.8	300.9	94.11	96.24	97.72	102.5	95.69	90.24
Diff t(0)	0.475	-0.520	-1.077	-1.171	-1.478	-1.674	0.253	-0.00205	0.672	-0.0414	0.254	0.130	0.146	0.000386	0.0333	-0.0235
Mean control t(1)	239.9	251.3	82.62	54.07	94.99	100.8	68.19	90.04	261.8	279	83.72	85.91	95.23	99.72	86.47	81.19
Mean treated t(1)	238.6	249.9	82.85	54.30	94.88	100.7	65.82	87.64	262.1	279.5	84.72	86.90	94.50	99.06	86.80	81.49
Diff t(1)	-1.314	-1.332	0.228	0.227	-0.109	-0.0993	-2.367	-2.402	0.236	0.453	1.007	0.986	-0.732	-0.664	0.329	0.294

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Operating Forces taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 34. Total Operating Force Elements Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-5.670***	-7.195***	3.412***	3.609***	0.202*	-0.184	-5.204***	-5.737***								
	(0.342)	(0.337)	(0.149)	(0.148)	(0.115)	(0.115)	(0.106)	(0.105)								
PFT FFI Ever	0.627***	-0.409*	-1.069***	-1.143***	-1.424***	-1.626***	0.342***	0.0713								
	(0.239)	(0.238)	(0.103)	(0.104)	(0.0794)	(0.0800)	(0.0739)	(0.0740)								
Diff-in-diff	-0.196	0.883**	1.594***	1.645***	1.631***	1.866***	-2.365***	-2.094***	-7.330***	-5.596***	-0.938***	-0.895***	-1.852***	-1.372***	-0.938***	-1.033***
	(0.448)	(0.442)	(0.196)	(0.194)	(0.150)	(0.150)	(0.138)	(0.137)	(0.588)	(0.580)	(0.124)	(0.124)	(0.175)	(0.173)	(0.107)	(0.107)
Officer		31.03***		12.26***		3.185***		9.230***		15.56***		4.636***		2.638***		2.844***
		(0.395)		(0.173)		(0.134)		(0.123)		(0.346)		(0.0738)		(0.103)		(0.0638)
Female		-9.597***		5.459***		-5.569***		-1.085***		-10.44***		-0.0286		-4.399***		0.803***
		(0.425)		(0.190)		(0.144)		(0.132)		(0.371)		(0.0792)		(0.111)		(0.0684)
Female Officer		0.875		-3.422***		2.222***		5.921***		-1.742		1.417***		-0.165		0.415*
		(1.371)		(0.614)		(0.465)		(0.425)		(1.213)		(0.259)		(0.362)		(0.223)
Female FFI		-5.896***		-1.692***		-0.637***		-2.092***		-3.258***		-1.426***		-0.240**		-0.963***
		(0.405)		(0.177)		(0.137)		(0.126)		(0.355)		(0.0756)		(0.106)		(0.0653)
Female FFI & Female Marine		3.234***		1.066**		0.849**		0.453		3.337***		0.824***		0.742**		0.905***
		(1.133)		(0.503)		(0.384)		(0.352)		(0.999)		(0.213)		(0.298)		(0.184)
Age		0.404***		2.090***		-0.175***		-1.299***		-0.164		-0.132***		-0.0509		0.336***
		(0.135)		(0.0594)		(0.0459)		(0.0420)		(0.118)		(0.0252)		(0.0352)		(0.0218)
Age Squared		-0.0362***		-0.0378***		-0.00241***		0.0150***		-0.0222***		0.00130***		-0.00521***		-0.00486***
		(0.00224)		(0.000986)		(0.000762)		(0.000696)		(0.00196)		(0.000419)		(0.000586)		(0.000362)
CFT Treated Year									-13.52***	-16.14***	-8.748***	-8.758***	-1.181***	-1.895***	-8.142***	-7.905***
									(0.542)	(0.535)	(0.115)	(0.114)	(0.161)	(0.159)	(0.0989)	(0.0985)
CFT FFI Ever									-0.265	-0.772***	0.208***	0.0852**	-0.107*	-0.199***	0.0589	-0.00429
									(0.203)	(0.202)	(0.0430)	(0.0431)	(0.0604)	(0.0602)	(0.0371)	(0.0372)
Constant	244.6***	257.4***	78.98***	50.31***	94.60***	100.8***	73.52***	95.82***	282.4***	301.1***	93.86***	96.08***	97.67***	102.5***	95.65***	90.22***
	(0.144)	(1.942)	(0.0622)	(0.853)	(0.0478)	(0.659)	(0.0445)	(0.603)	(0.128)	(1.690)	(0.0272)	(0.360)	(0.0381)	(0.504)	(0.0234)	(0.311)
Observations	337,479	337,479	332,219	332,219	332,962	332,962	336,977	336,977	298,102	298,102	298,102	298,102	298,102	298,102	298,102	298,102
R-squared	0.002	0.037	0.006	0.030	0.001	0.014	0.031	0.057	0.039	0.069	0.162	0.176	0.010	0.033	0.188	0.199
Mean control t(0)	244.6	257.4	78.98	50.31	94.60	100.8	73.52	95.82	282.4	301.1	93.86	96.08	97.67	102.5	95.65	90.22
Mean treated t(0)	245.2	257	77.91	49.17	93.17	99.21	73.86	95.89	282.2	300.3	94.07	96.16	97.56	102.3	95.71	90.21
Diff t(0)	0.627	-0.409	-1.069	-1.143	-1.424	-1.626	0.342	0.0713	-0.265	-0.772	0.208	0.0852	-0.107	-0.199	0.0589	-0.00429
Mean control t(1)	238.9	250.2	82.39	53.92	94.80	100.6	68.31	90.08	268.9	285	85.11	87.32	96.48	100.6	87.51	82.31
Mean treated t(1)	239.3	250.7	82.91	54.42	95.01	100.9	66.29	88.06	261.3	278.6	84.38	86.51	94.53	99.07	86.63	81.28
Diff t(1)	0.431	0.474	0.525	0.502	0.206	0.240	-2.023	-2.022	-7.595	-6.369	-0.730	-0.810	-1.959	-1.571	-0.879	-1.037

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Operating Forces taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 35. Support Establishment Elements with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-2.481***	-4.407***	3.724***	3.693***	2.217***	1.588***	-5.884***	-6.026***								
	(0.927)	(0.908)	(0.343)	(0.339)	(0.284)	(0.281)	(0.246)	(0.245)								
PFT FFI 30 day	3.184***	3.122***	0.782**	0.275	-0.257	-0.0719	1.519***	1.180***								
	(0.839)	(0.831)	(0.306)	(0.306)	(0.253)	(0.253)	(0.223)	(0.225)								
Diff-in-diff	-11.55***	-9.001***	-0.686	-0.563	-0.823*	-0.304	-2.489***	-2.142***	-11.85***	-9.421***	-1.594***	-1.758***	-2.822***	-2.111***	-0.810***	-1.093***
	(1.454)	(1.425)	(0.540)	(0.533)	(0.447)	(0.442)	(0.386)	(0.385)	(1.827)	(1.797)	(0.269)	(0.269)	(0.571)	(0.562)	(0.232)	(0.230)
Officer		24.90***		8.990***		3.877***		5.836***		14.69***		2.438***		3.418***		1.579***
		(1.079)		(0.400)		(0.332)		(0.292)		(1.092)		(0.163)		(0.342)		(0.140)
Female		-11.75***		4.204***		-6.203***		-0.912***		-14.37***		0.363**		-5.656***		1.329***
		(1.022)		(0.388)		(0.316)		(0.277)		(1.038)		(0.155)		(0.325)		(0.133)
Female Officer		-13.16***		-2.097		-1.665		4.329***		-13.17***		1.055**		-4.121***		-0.402
		(3.459)		(1.342)		(1.070)		(0.935)		(3.529)		(0.527)		(1.103)		(0.452)
Female FFI		-4.230***		-0.886**		-0.940***		-1.386***		-4.821***		-0.354**		-0.965***		-0.345**
		(1.170)		(0.433)		(0.360)		(0.317)		(1.188)		(0.178)		(0.371)		(0.152)
Female FFI & Female Marine		1.223		1.577		0.193		0.234		3.932		0.418		0.579		-0.465
		(3.086)		(1.168)		(0.950)		(0.835)		(3.082)		(0.461)		(0.964)		(0.394)
Age		5.293***		3.505***		0.588***		0.906***		2.684***		0.703***		0.512***		0.966***
		(0.332)		(0.123)		(0.102)		(0.0897)		(0.336)		(0.0503)		(0.105)		(0.0430)
Age Squared		-0.116***		-0.0606***		-0.0165***		-0.0181***		-0.0729***		-0.0108***		-0.0170***		-0.0136***
		(0.00518)		(0.00193)		(0.00160)		(0.00140)		(0.00528)		(0.000789)		(0.00165)		(0.000676)
CFT Treated Year									-10.34***	-14.20***	-7.943***	-7.589***	0.369	-0.856*	-9.138***	-8.583***
									(1.543)	(1.517)	(0.227)	(0.227)	(0.482)	(0.474)	(0.196)	(0.194)
CFT FFI 30 day									-1.436*	-0.323	0.278**	0.0335	-0.363	0.104	0.128	-0.181*
									(0.827)	(0.823)	(0.122)	(0.123)	(0.258)	(0.257)	(0.105)	(0.105)
Constant	239.4***	187.8***	80.71***	31.75***	92.99***	90.83***	72.30***	61.73***	275.3***	262.1***	94.08***	83.04***	95.34***	95.76***	96.00***	79.91***
	(0.428)	(5.101)	(0.156)	(1.897)	(0.129)	(1.570)	(0.114)	(1.380)	(0.429)	(5.155)	(0.0631)	(0.770)	(0.134)	(1.612)	(0.0544)	(0.660)
Observations	46,817	46,817	45,843	45,843	46,096	46,096	46,757	46,757	41,518	41,518	41,518	41,518	41,518	41,518	41,518	41,518
R-squared	0.004	0.053	0.004	0.039	0.002	0.031	0.029	0.045	0.022	0.064	0.153	0.164	0.003	0.044	0.217	0.237
Mean control t(0)	239.4	187.8	80.71	31.75	92.99	90.83	72.30	61.73	275.3	262.1	94.08	83.04	95.34	95.76	96	79.91
Mean treated t(0)	242.6	190.9	81.49	32.02	92.74	90.76	73.82	62.91	273.8	261.7	94.36	83.08	94.98	95.87	96.13	79.72
Diff t(0)	3.184	3.122	0.782	0.275	-0.257	-0.0719	1.519	1.180	-1.436	-0.323	0.278	0.0335	-0.363	0.104	0.128	-0.181
Mean control t(1)	236.9	183.4	84.43	35.44	95.21	92.42	66.42	55.71	264.9	247.9	86.14	75.45	95.71	94.91	86.86	71.32
Mean treated t(1)	228.5	177.5	84.53	35.16	94.13	92.05	65.45	54.74	251.6	238.1	84.82	73.73	92.52	92.90	86.18	70.05
Diff t(1)	-8.368	-5.879	0.0962	-0.287	-1.081	-0.375	-0.971	-0.962	-13.29	-9.744	-1.316	-1.724	-3.185	-2.007	-0.681	-1.274

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Supporting Establishment taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 36. Support Establishment Elements with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-5.505***	-7.249***	3.607***	3.503***	1.964***	1.392***	-6.462***	-6.617***								
	(0.890)	(0.870)	(0.330)	(0.326)	(0.273)	(0.270)	(0.236)	(0.235)								
PFT FFI 60 day	3.173***	3.149***	0.792***	0.285	-0.264	-0.0743	1.511***	1.178***								
	(0.839)	(0.832)	(0.306)	(0.306)	(0.253)	(0.253)	(0.223)	(0.225)								
Diff-in-diff	-5.525***	-3.106**	-0.395	-0.152	-0.357	0.115	-1.246***	-0.877**	-12.27***	-9.685***	-1.222***	-1.335***	-3.041***	-2.309***	-0.903***	-1.141***
	(1.466)	(1.436)	(0.545)	(0.538)	(0.450)	(0.446)	(0.390)	(0.388)	(1.649)	(1.626)	(0.243)	(0.243)	(0.515)	(0.508)	(0.209)	(0.208)
Officer		24.76***		8.980***		3.868***		5.809***		14.51***		2.429***		3.383***		1.573***
		(1.079)		(0.400)		(0.332)		(0.292)		(1.092)		(0.163)		(0.342)		(0.140)
Female		-11.86***		4.198***		-6.209***		-0.933***		-14.46***		0.362**		-5.674***		1.330***
		(1.023)		(0.388)		(0.316)		(0.277)		(1.038)		(0.155)		(0.325)		(0.133)
Female Officer		-13.08***		-2.089		-1.657		4.345***		-13.11***		1.060**		-4.109***		-0.403
		(3.460)		(1.342)		(1.070)		(0.935)		(3.529)		(0.528)		(1.103)		(0.452)
Female FFI		-4.136***		-0.876**		-0.933***		-1.365***		-4.337***		-0.337*		-0.861**		-0.313**
		(1.170)		(0.433)		(0.360)		(0.317)		(1.188)		(0.178)		(0.371)		(0.152)
Female FFI & Female Marine		0.851		1.549		0.165		0.153		3.932		0.403		0.581		-0.470
		(3.087)		(1.168)		(0.950)		(0.835)		(3.082)		(0.461)		(0.964)		(0.394)
Age		5.221***		3.500***		0.583***		0.891***		2.681***		0.703***		0.513***		0.970***
		(0.332)		(0.123)		(0.102)		(0.0897)		(0.336)		(0.0503)		(0.105)		(0.0431)
Age Squared		-0.115***		-0.0606***		-0.0164***		-0.0180***		-0.0729***		-0.0108***		-0.0170***		-0.0136***
		(0.00518)		(0.00193)		(0.00160)		(0.00140)		(0.00528)		(0.000789)		(0.00165)		(0.000676)
CFT Treated Year									-12.13***	-15.64***	-8.322***	-8.041***	0.0401	-1.051***	-9.134***	-8.667***
									(1.300)	(1.280)	(0.191)	(0.191)	(0.406)	(0.400)	(0.165)	(0.164)
CFT FFI 60 day									0.769	1.466*	0.266**	0.0337	0.139	0.481*	0.149	-0.134
									(0.839)	(0.834)	(0.123)	(0.125)	(0.262)	(0.261)	(0.106)	(0.107)
Constant	239.4***	189.1***	80.70***	31.84***	93.00***	90.93***	72.30***	62.01***	274.7***	261.6***	94.09***	83.06***	95.20***	95.65***	96.00***	79.83***
	(0.429)	(5.100)	(0.156)	(1.896)	(0.129)	(1.569)	(0.114)	(1.380)	(0.426)	(5.156)	(0.0627)	(0.771)	(0.133)	(1.612)	(0.0540)	(0.660)
Observations	46,817	46,817	45,843	45,843	46,096	46,096	46,757	46,757	41,518	41,518	41,518	41,518	41,518	41,518	41,518	41,518
R-squared	0.003	0.053	0.004	0.039	0.002	0.031	0.028	0.044	0.022	0.064	0.153	0.164	0.003	0.044	0.217	0.238
Mean control t(0)	239.4	189.1	80.70	31.84	93	90.93	72.30	62.01	274.7	261.6	94.09	83.06	95.20	95.65	96	79.83
Mean treated t(0)	242.6	192.3	81.50	32.13	92.73	90.85	73.81	63.19	275.4	263.1	94.35	83.09	95.34	96.13	96.15	79.70
Diff t(0)	3.173	3.149	0.792	0.285	-0.264	-0.0743	1.511	1.178	0.769	1.466	0.266	0.0337	0.139	0.481	0.149	-0.134
Mean control t(1)	233.9	181.9	84.31	35.34	94.96	92.32	65.84	55.39	262.5	246	85.77	75.01	95.24	94.60	86.86	71.16
Mean treated t(1)	231.5	181.9	84.71	35.48	94.34	92.36	66.11	55.70	251	237.8	84.81	73.71	92.34	92.77	86.11	69.89
Diff t(1)	-2.352	0.0423	0.397	0.133	-0.621	0.0404	0.264	0.302	-11.50	-8.220	-0.956	-1.301	-2.902	-1.829	-0.754	-1.276

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Supporting Establishment taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 37. Support Establishment Elements with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.955***	-6.486***	3.686***	3.611***	2.007***	1.491***	-6.318***	-6.440***								
	(0.870)	(0.851)	(0.323)	(0.318)	(0.267)	(0.264)	(0.231)	(0.230)								
PFT FFI 90 day	3.173***	3.130***	0.792***	0.283	-0.264	-0.0766	1.511***	1.175***								
	(0.839)	(0.832)	(0.306)	(0.306)	(0.253)	(0.253)	(0.223)	(0.225)								
Diff-in-diff	-7.154***	-5.061***	-0.566	-0.420	-0.529	-0.141	-1.597***	-1.304***	-10.54***	-7.982***	-1.272***	-1.408***	-2.553***	-1.817***	-0.809***	-1.072***
	(1.480)	(1.446)	(0.551)	(0.542)	(0.455)	(0.449)	(0.393)	(0.391)	(1.555)	(1.535)	(0.229)	(0.229)	(0.485)	(0.480)	(0.197)	(0.196)
Officer		24.80***		8.985***		3.872***		5.816***		14.51***		2.436***		3.381***		1.577***
		(1.079)		(0.400)		(0.332)		(0.292)		(1.092)		(0.163)		(0.342)		(0.140)
Female		-11.82***		4.201***		-6.205***		-0.927***		-14.46***		0.368**		-5.675***		1.334***
		(1.023)		(0.388)		(0.316)		(0.277)		(1.038)		(0.155)		(0.325)		(0.133)
Female Officer		-13.11***		-2.094		-1.662		4.341***		-13.10***		1.053**		-4.105***		-0.406
		(3.460)		(1.342)		(1.070)		(0.935)		(3.529)		(0.528)		(1.103)		(0.452)
Female FFI		-4.238***		-0.887**		-0.947***		-1.379***		-4.326***		-0.323*		-0.862**		-0.305**
		(1.172)		(0.434)		(0.360)		(0.317)		(1.188)		(0.178)		(0.372)		(0.152)
Female FFI & Female Marine		0.925		1.563		0.176		0.178		3.927		0.408		0.578		-0.467
		(3.086)		(1.167)		(0.950)		(0.835)		(3.083)		(0.461)		(0.964)		(0.394)
Age		5.241***		3.503***		0.586***		0.895***		2.683***		0.708***		0.512***		0.973***
		(0.332)		(0.123)		(0.102)		(0.0897)		(0.337)		(0.0503)		(0.105)		(0.0431)
Age Squared		-0.115***		-0.0606***		-0.0164***		-0.0180***		-0.0729***		-0.0108***		-0.0170***		-0.0137***
		(0.00518)		(0.00193)		(0.00160)		(0.00140)		(0.00528)		(0.000790)		(0.00165)		(0.000676)
CFT Treated Year									-14.21***	-17.44***	-8.365***	-8.095***	-0.518	-1.527***	-9.257***	-8.815***
									(1.152)	(1.136)	(0.170)	(0.170)	(0.360)	(0.355)	(0.146)	(0.145)
CFT FFI 90 day									0.769	1.468*	0.266**	0.0341	0.139	0.481*	0.149	-0.134
									(0.839)	(0.834)	(0.123)	(0.125)	(0.262)	(0.261)	(0.106)	(0.107)
Constant	239.4***	188.7***	80.70***	31.79***	93.00***	90.88***	72.30***	61.93***	274.7***	261.6***	94.09***	82.96***	95.20***	95.68***	96.00***	79.77***
	(0.429)	(5.100)	(0.156)	(1.896)	(0.129)	(1.569)	(0.114)	(1.380)	(0.426)	(5.160)	(0.0626)	(0.771)	(0.133)	(1.613)	(0.0540)	(0.660)
Observations	46,817	46,817	45,843	45,843	46,096	46,096	46,757	46,757	41,518	41,518	41,518	41,518	41,518	41,518	41,518	41,518
R-squared	0.003	0.053	0.004	0.039	0.002	0.031	0.028	0.044	0.021	0.064	0.153	0.164	0.003	0.044	0.217	0.238
Mean control t(0)	239.4	188.7	80.70	31.79	93	90.88	72.30	61.93	274.7	261.6	94.09	82.96	95.20	95.68	96	79.77
Mean treated t(0)	242.6	191.9	81.50	32.07	92.73	90.80	73.81	63.11	275.4	263.1	94.35	82.99	95.34	96.16	96.15	79.64
Diff t(0)	3.173	3.130	0.792	0.283	-0.264	-0.0766	1.511	1.175	0.769	1.468	0.266	0.0341	0.139	0.481	0.149	-0.134
Mean control t(1)	234.4	182.3	84.39	35.40	95	92.37	65.99	55.49	260.5	244.2	85.72	74.86	94.69	94.16	86.74	70.96
Mean treated t(1)	230.5	180.3	84.62	35.26	94.21	92.15	65.90	55.36	250.7	237.7	84.72	73.49	92.27	92.82	86.08	69.75
Diff t(1)	-3.981	-1.931	0.226	-0.136	-0.793	-0.217	-0.0860	-0.129	-9.775	-6.514	-1.006	-1.374	-2.414	-1.336	-0.659	-1.206

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Supporting Establishment taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 38. Support Establishment Elements with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-6.568***	-7.865***	3.544***	3.444***	1.883***	1.428***	-6.749***	-6.846***								
	(0.845)	(0.826)	(0.314)	(0.309)	(0.259)	(0.256)	(0.225)	(0.223)								
PFT FFI 120 day	3.173***	3.174***	0.792***	0.289	-0.264	-0.0753	1.511***	1.191***								
	(0.839)	(0.832)	(0.306)	(0.306)	(0.253)	(0.253)	(0.223)	(0.225)								
Diff-in-diff	-2.953*	-1.279	-0.106	0.0573	-0.272	0.0176	-0.329	-0.126	-8.919***	-6.817***	-0.731***	-0.874***	-2.479***	-1.865***	-0.282	-0.538***
	(1.511)	(1.473)	(0.562)	(0.553)	(0.465)	(0.458)	(0.401)	(0.398)	(1.515)	(1.493)	(0.223)	(0.223)	(0.473)	(0.467)	(0.192)	(0.191)
Officer		24.72***		8.974***		3.869***		5.790***		14.52***		2.430***		3.391***		1.570***
		(1.079)		(0.400)		(0.332)		(0.292)		(1.093)		(0.163)		(0.342)		(0.140)
Female		-11.89***		4.193***		-6.207***		-0.949***		-14.47***		0.360**		-5.673***		1.326***
		(1.023)		(0.388)		(0.316)		(0.277)		(1.038)		(0.155)		(0.325)		(0.133)
Female Officer		-13.05***		-2.084		-1.659		4.358***		-13.13***		1.057**		-4.120***		-0.402
		(3.460)		(1.342)		(1.070)		(0.935)		(3.530)		(0.528)		(1.104)		(0.452)
Female FFI		-3.985***		-0.852**		-0.939***		-1.287***		-4.488***		-0.361**		-0.892**		-0.338**
		(1.174)		(0.435)		(0.361)		(0.318)		(1.188)		(0.178)		(0.371)		(0.152)
Female FFI & Female Marine		0.867		1.561		0.168		0.181		4.063		0.423		0.619		-0.457
		(3.086)		(1.167)		(0.950)		(0.835)		(3.083)		(0.461)		(0.964)		(0.395)
Age		5.208***		3.498***		0.584***		0.886***		2.672***		0.701***		0.515***		0.965***
		(0.331)		(0.123)		(0.102)		(0.0896)		(0.337)		(0.0503)		(0.105)		(0.0431)
Age Squared		-0.115***		-0.0606***		-0.0164***		-0.0179***		-0.0728***		-0.0107***		-0.0171***		-0.0136***
		(0.00518)		(0.00193)		(0.00160)		(0.00140)		(0.00529)		(0.000790)		(0.00165)		(0.000677)
CFT Treated Year									-15.79***	-18.55***	-8.755***	-8.505***	-0.711**	-1.579***	-9.617***	-9.215***
									(1.072)	(1.055)	(0.158)	(0.158)	(0.335)	(0.330)	(0.136)	(0.135)
CFT FFI 120 day									0.769	1.454*	0.266**	0.0318	0.139	0.478*	0.149	-0.136
									(0.839)	(0.834)	(0.123)	(0.125)	(0.262)	(0.261)	(0.106)	(0.107)
Constant	239.4***	189.3***	80.70***	31.86***	93.00***	90.91***	72.30***	62.08***	274.7***	261.9***	94.09***	83.09***	95.20***	95.64***	96.00***	79.91***
	(0.429)	(5.098)	(0.156)	(1.895)	(0.129)	(1.569)	(0.114)	(1.379)	(0.426)	(5.161)	(0.0627)	(0.772)	(0.133)	(1.614)	(0.0540)	(0.661)
Observations	46,817	46,817	45,843	45,843	46,096	46,096	46,757	46,757	41,518	41,518	41,518	41,518	41,518	41,518	41,518	41,518
R-squared	0.003	0.053	0.004	0.039	0.002	0.031	0.029	0.045	0.021	0.064	0.152	0.163	0.003	0.044	0.216	0.237
Mean control t(0)	239.4	189.3	80.70	31.86	93	90.91	72.30	62.08	274.7	261.9	94.09	83.09	95.20	95.64	96	79.91
Mean treated t(0)	242.6	192.5	81.50	32.15	92.73	90.84	73.81	63.28	275.4	263.3	94.35	83.13	95.34	96.12	96.15	79.78
Diff t(0)	3.173	3.174	0.792	0.289	-0.264	-0.0753	1.511	1.191	0.769	1.454	0.266	0.0318	0.139	0.478	0.149	-0.136
Mean control t(1)	232.8	181.5	84.25	35.31	94.88	92.34	65.55	55.24	258.9	243.3	85.33	74.59	94.49	94.06	86.38	70.70
Mean treated t(1)	233.1	183.4	84.93	35.65	94.34	92.28	66.74	56.30	250.7	238	84.87	73.75	92.15	92.67	86.25	70.03
Diff t(1)	0.220	1.895	0.687	0.346	-0.536	-0.0577	1.182	1.065	-8.150	-5.362	-0.466	-0.842	-2.341	-1.387	-0.133	-0.674

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Supporting Establishment taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

Table 39. Support Establishment Elements Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-3.220***	-5.071***	3.559***	3.637***	2.322***	1.674***	-6.067***	-6.179***								
	(0.973)	(0.953)	(0.361)	(0.356)	(0.298)	(0.296)	(0.259)	(0.258)								
PFT FFI Ever	3.202***	3.151***	0.789***	0.285	-0.254	-0.0704	1.523***	1.187***								
	(0.839)	(0.831)	(0.306)	(0.306)	(0.253)	(0.253)	(0.223)	(0.225)								
Diff-in-diff	-9.267***	-7.142***	-0.390	-0.430	-0.900**	-0.422	-2.044***	-1.757***	-14.81***	-12.64***	-2.021***	-2.162***	-3.843***	-3.212***	-0.880***	-1.104***
	(1.456)	(1.428)	(0.540)	(0.534)	(0.447)	(0.443)	(0.387)	(0.386)	(2.257)	(2.214)	(0.332)	(0.331)	(0.705)	(0.692)	(0.286)	(0.283)
Officer		24.89***		8.986***		3.882***		5.830***		14.60***		2.431***		3.397***		1.568***
		(1.079)		(0.400)		(0.332)		(0.292)		(1.092)		(0.163)		(0.341)		(0.140)
Female		-11.78***		4.201***		-6.200***		-0.919***		-14.45***		0.354**		-5.676***		1.321***
		(1.023)		(0.388)		(0.316)		(0.277)		(1.038)		(0.155)		(0.324)		(0.133)
Female Officer		-13.19***		-2.096		-1.674		4.328***		-13.05***		1.074**		-4.094***		-0.386
		(3.460)		(1.342)		(1.070)		(0.935)		(3.529)		(0.528)		(1.103)		(0.452)
Female FFI		-4.140***		-0.879**		-0.935***		-1.371***		-4.728***		-0.359**		-0.919**		-0.350**
		(1.170)		(0.433)		(0.360)		(0.317)		(1.188)		(0.178)		(0.372)		(0.152)
Female FFI & Female Marine		1.060		1.566		0.194		0.203		3.942		0.415		0.589		-0.470
		(3.086)		(1.168)		(0.950)		(0.835)		(3.082)		(0.461)		(0.964)		(0.395)
Age		5.282***		3.504***		0.591***		0.903***		2.638***		0.695***		0.504***		0.959***
		(0.332)		(0.124)		(0.102)		(0.0897)		(0.336)		(0.0502)		(0.105)		(0.0430)
Age Squared		-0.116***		-0.0606***		-0.0165***		-0.0181***		-0.0723***		-0.0107***		-0.0169***		-0.0135***
		(0.00518)		(0.00193)		(0.00160)		(0.00140)		(0.00528)		(0.000789)		(0.00165)		(0.000676)
CFT Treated Year									-7.010***	-11.02***	-7.476***	-7.112***	1.398**	0.126	-9.046***	-8.496***
									(2.048)	(2.009)	(0.301)	(0.300)	(0.640)	(0.628)	(0.260)	(0.257)
CFT FFI Ever									-0.840	0.452	0.318***	0.0702	-0.140	0.376	0.171*	-0.151
									(0.817)	(0.813)	(0.120)	(0.122)	(0.255)	(0.254)	(0.104)	(0.104)
Constant	239.4***	188.0***	80.70***	31.77***	92.99***	90.79***	72.30***	61.79***	275.1***	262.6***	94.07***	83.17***	95.28***	95.84***	95.99***	80.02***
	(0.429)	(5.104)	(0.156)	(1.898)	(0.129)	(1.571)	(0.114)	(1.381)	(0.433)	(5.149)	(0.0636)	(0.770)	(0.135)	(1.610)	(0.0549)	(0.659)
Observations	46,817	46,817	45,843	45,843	46,096	46,096	46,757	46,757	41,518	41,518	41,518	41,518	41,518	41,518	41,518	41,518
R-squared	0.003	0.053	0.004	0.039	0.002	0.031	0.028	0.044	0.021	0.064	0.153	0.164	0.003	0.044	0.217	0.237
Mean control t(0)	239.4	188	80.70	31.77	92.99	90.79	72.30	61.79	275.1	262.6	94.07	83.17	95.28	95.84	95.99	80.02
Mean treated t(0)	242.6	191.2	81.49	32.06	92.74	90.72	73.82	62.98	274.3	263.1	94.38	83.24	95.14	96.22	96.16	79.87
Diff t(0)	3.202	3.151	0.789	0.285	-0.254	-0.0704	1.523	1.187	-0.840	0.452	0.318	0.0702	-0.140	0.376	0.171	-0.151
Mean control t(1)	236.2	182.9	84.26	35.41	95.32	92.46	66.23	55.61	268.1	251.6	86.59	76.06	96.68	95.97	86.94	71.53
Mean treated t(1)	230.1	179	84.66	35.26	94.16	91.97	65.71	55.04	252.4	239.4	84.89	73.97	92.69	93.13	86.23	70.27
Diff t(1)	-6.066	-3.991	0.399	-0.145	-1.154	-0.493	-0.521	-0.570	-15.65	-12.19	-1.703	-2.092	-3.984	-2.835	-0.709	-1.256

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Observations are only Marines within the Supporting Establishment taken from the total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, having a Female FFI, and having a Female FFI and being a Female Marine.

APPENDIX C. UNIT TYPE KERNEL DENSITIES

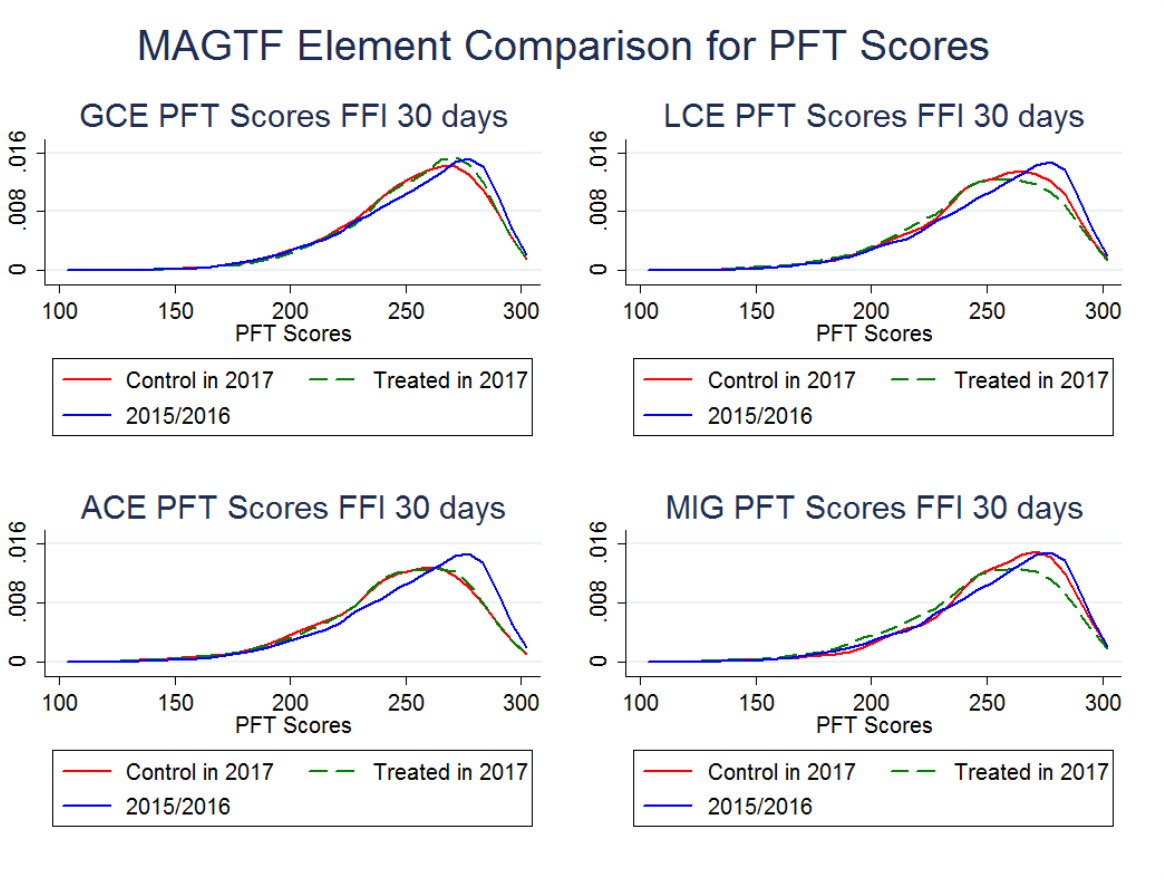

Figure 43. MAGTF Element Comparison of Physical Fitness Test Scores with FFI 30 Days or Greater

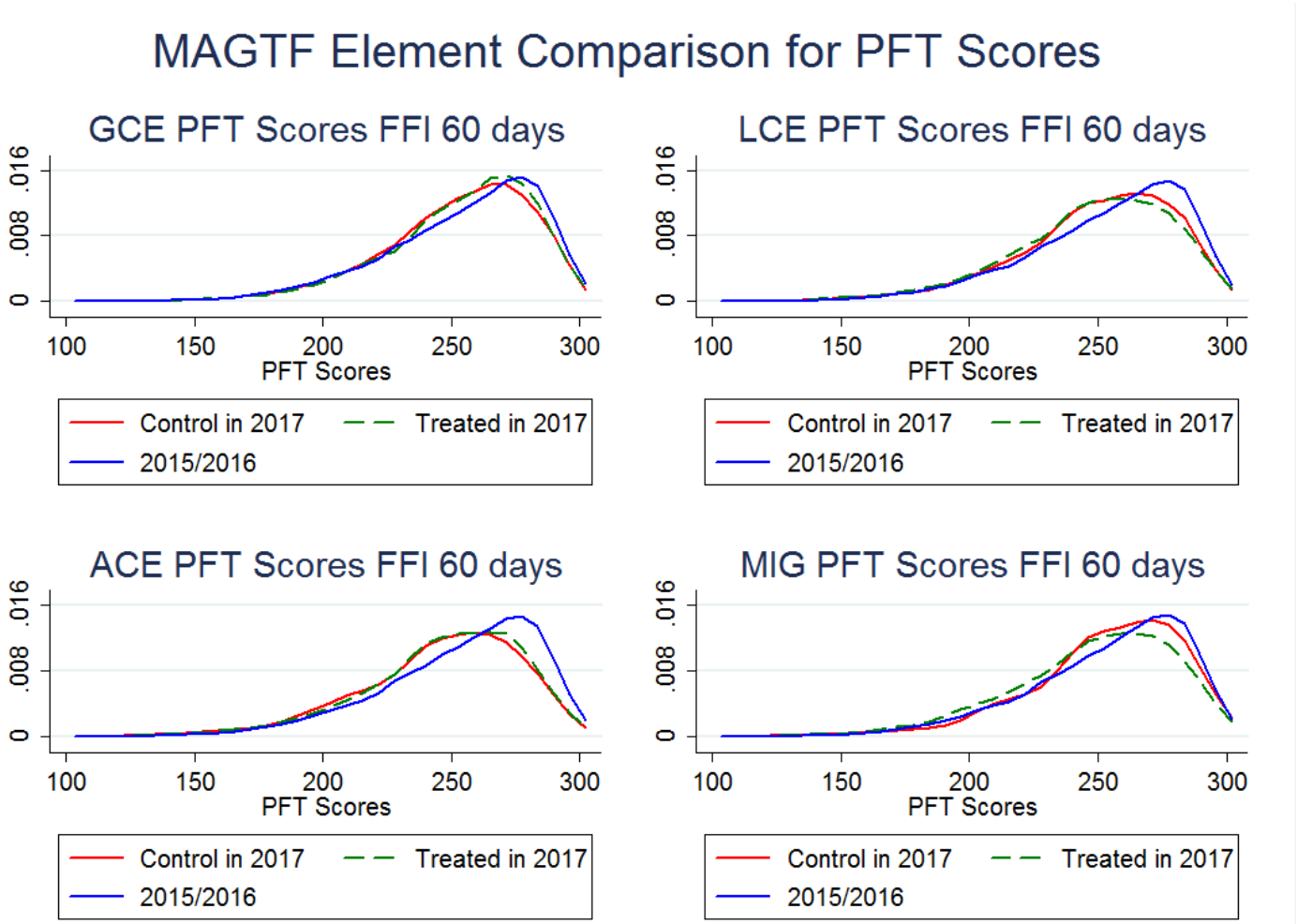

Figure 44. MAGTF Element Comparison of Physical Fitness Test Scores with FFI 60 Days or Greater

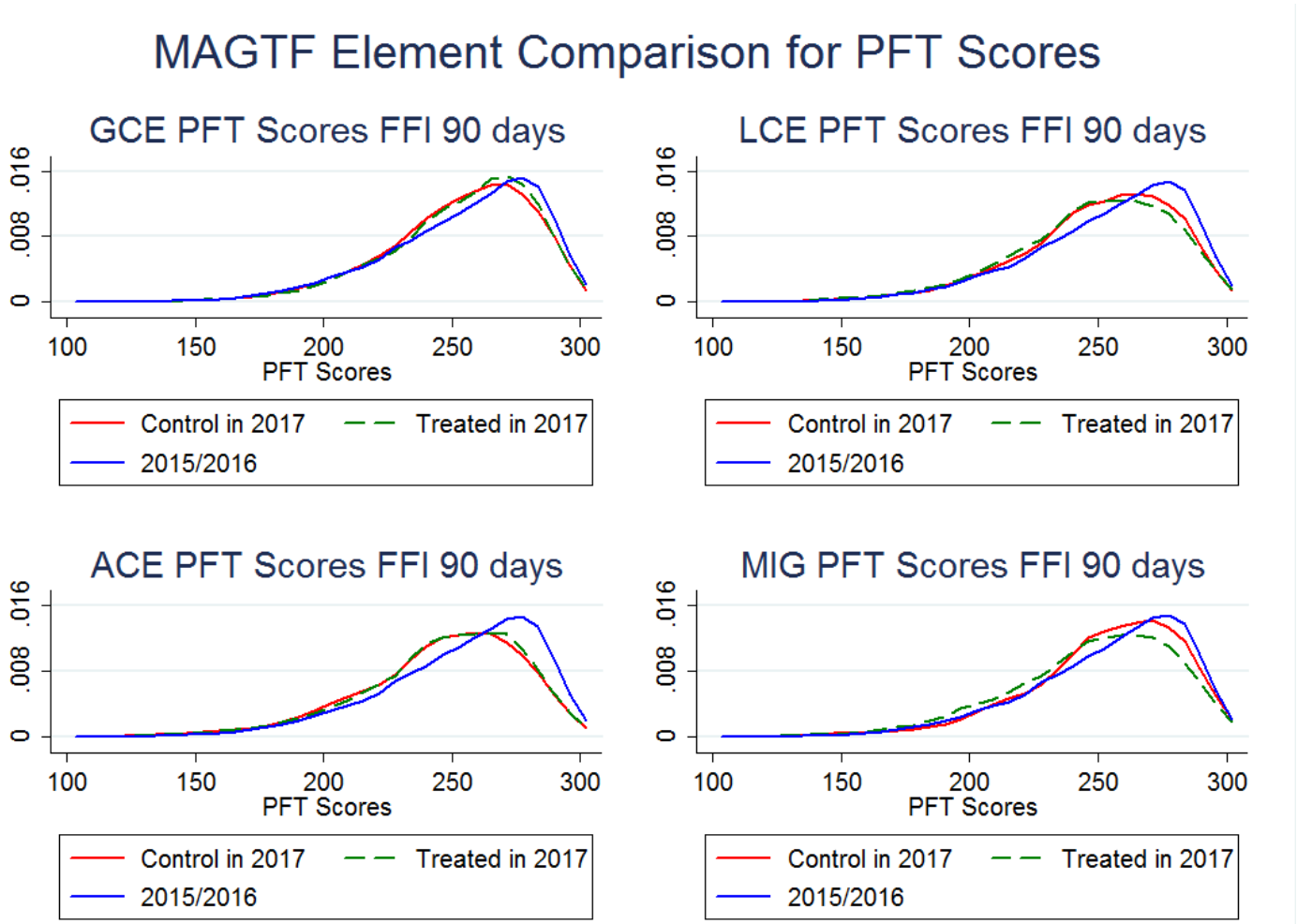

Figure 45. MAGTF Element Comparison of Physical Fitness Test Scores with FFI 90 Days or Greater

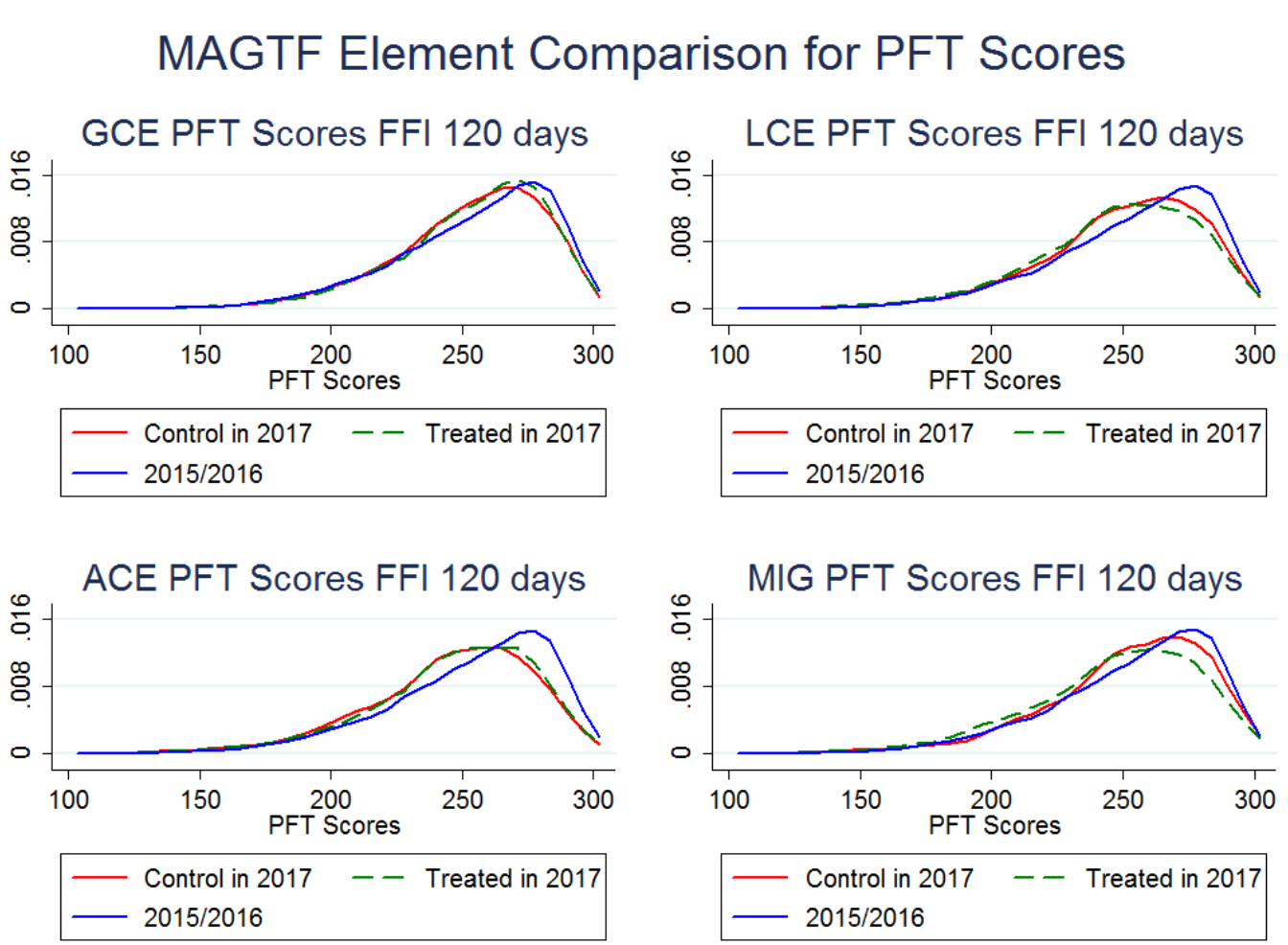

Figure 46. MAGTF Element Comparison of Physical Fitness Test Scores with FFI 120 Days or Greater

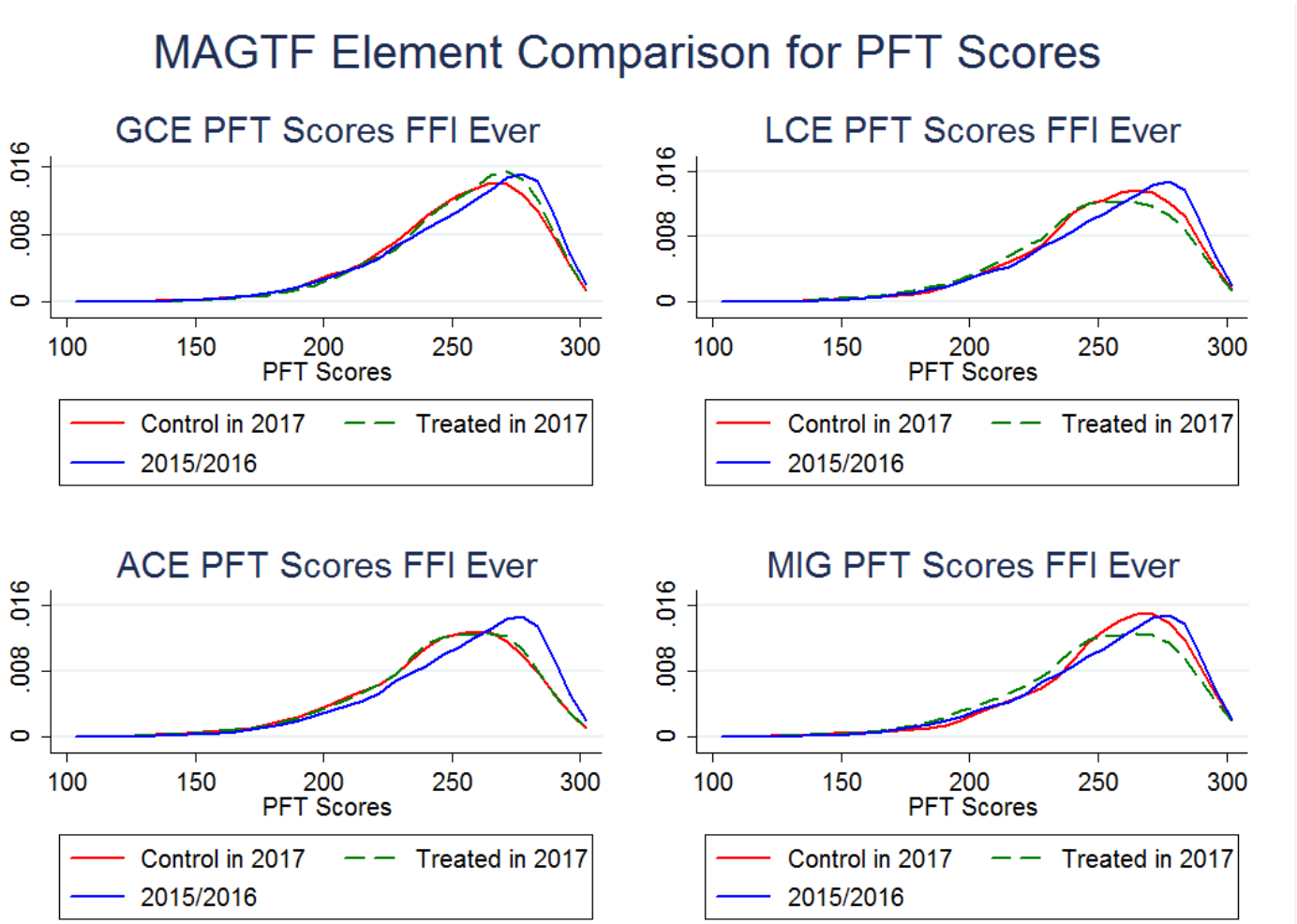

Figure 47. MAGTF Element Comparison of Physical Fitness Test Scores Ever Having an FFI

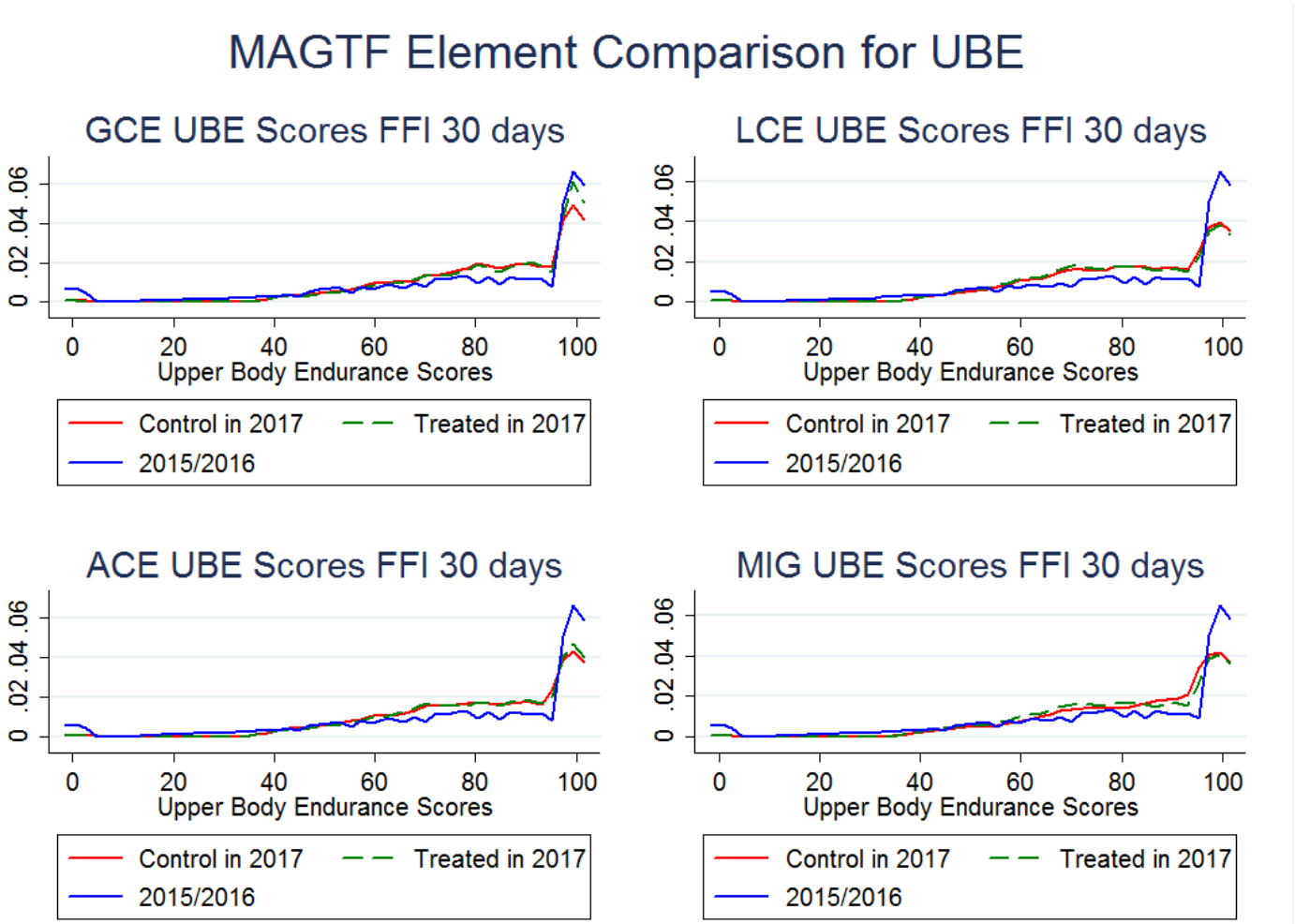

Figure 48. MAGTF Element Comparison of Upper Body Endurance Scores with FFI 30 Days or Greater

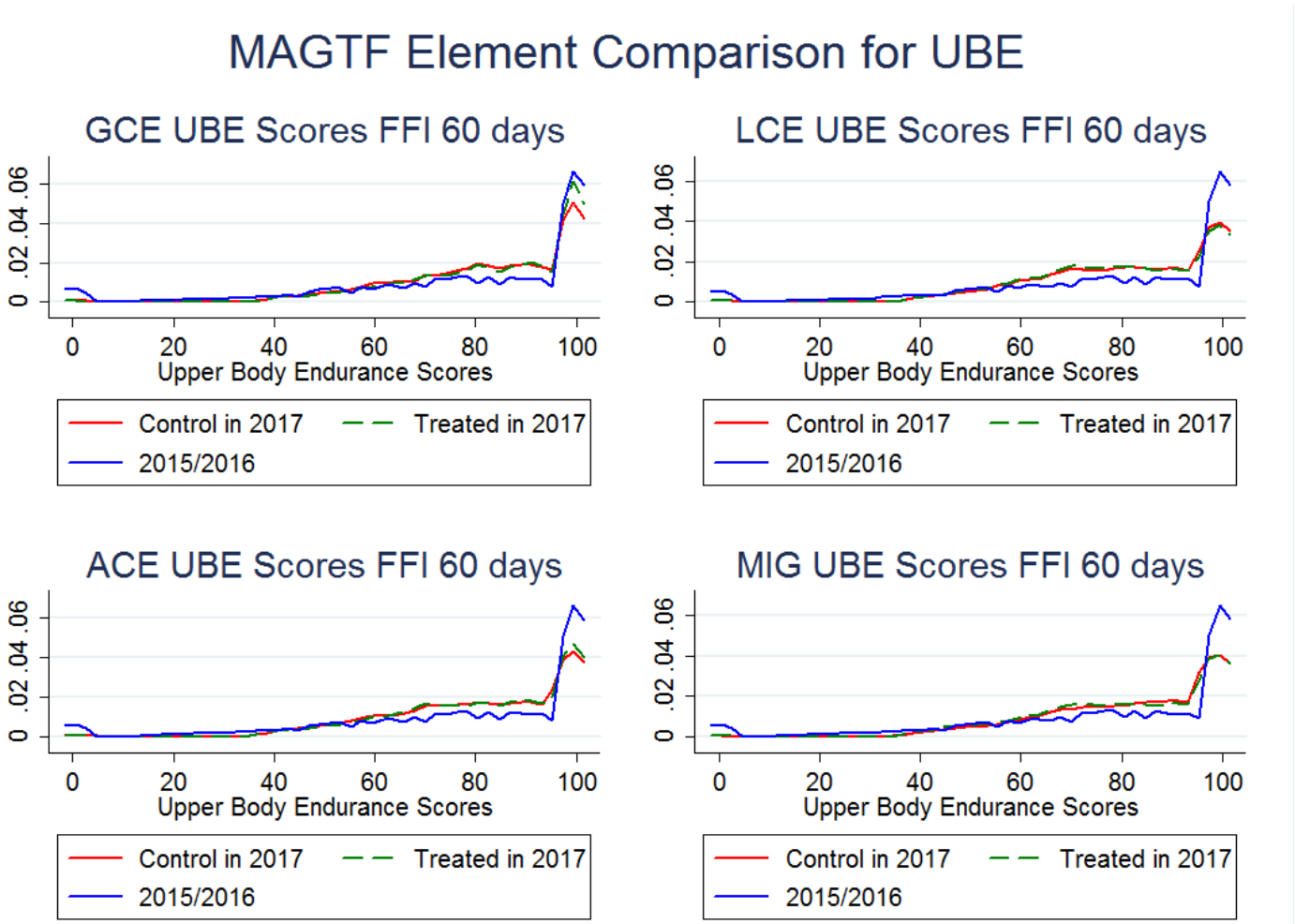

Figure 49. MAGTF Element Comparison of Upper Body Endurance Scores with FFI 60 Days or Greater

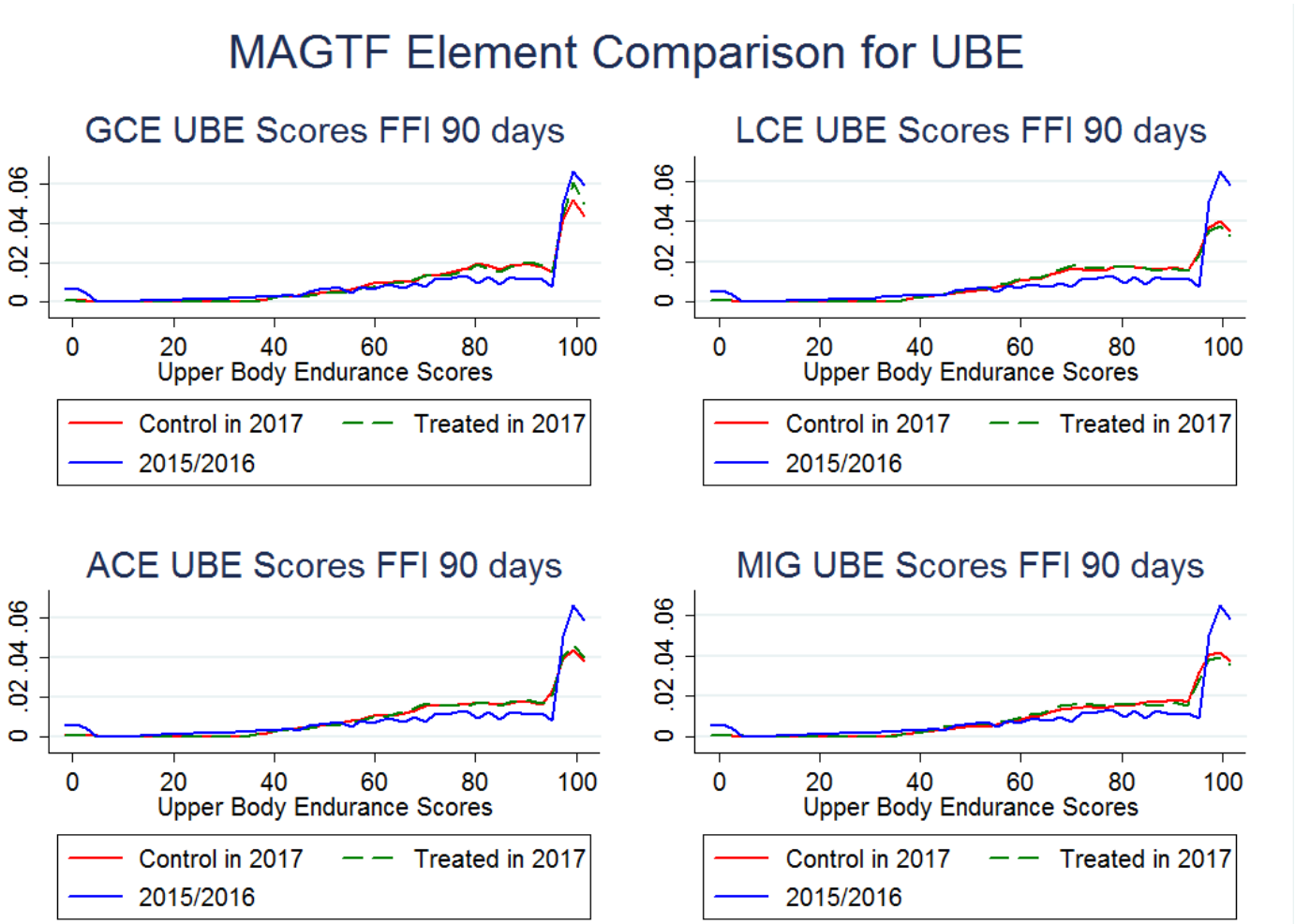

Figure 50. MAGTF Element Comparison of Upper Body Endurance Scores with FFI 90 Days or Greater

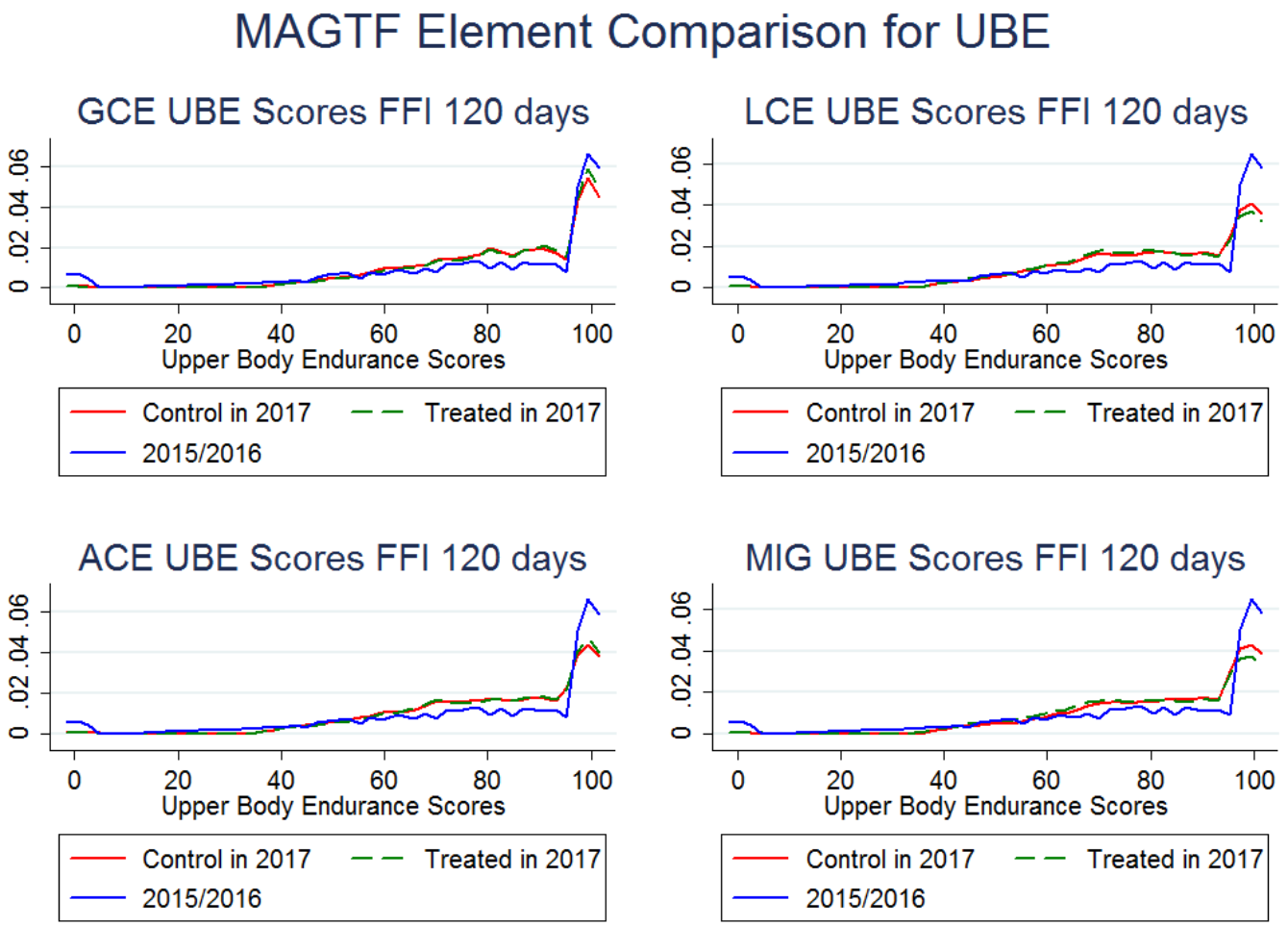

Figure 51. MAGTF Element Comparison of Upper Body Endurance Scores with FFI 120 Days or Greater

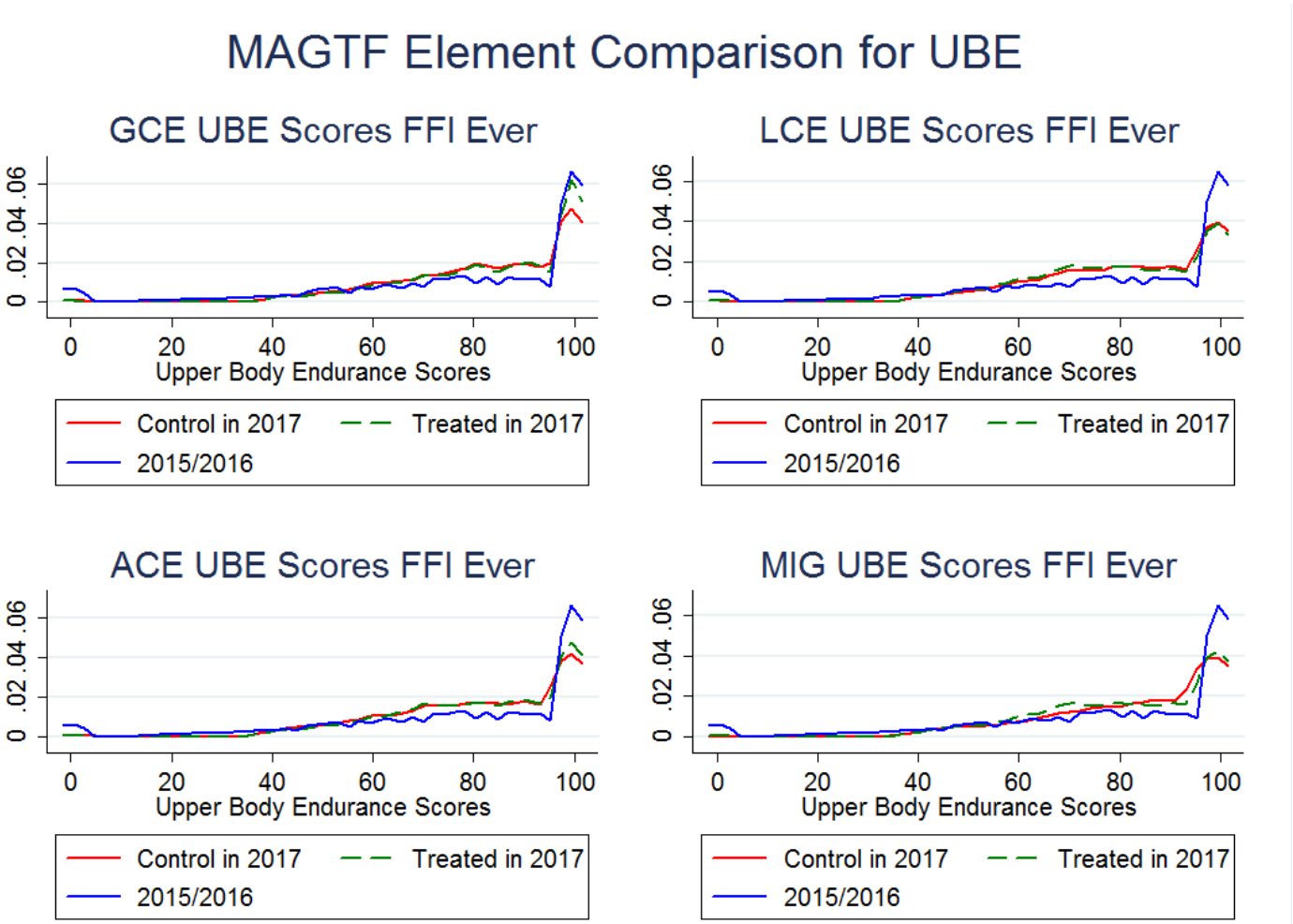

Figure 52. MAGTF Element Comparison of Upper Body Endurance Scores Ever Having an FFI

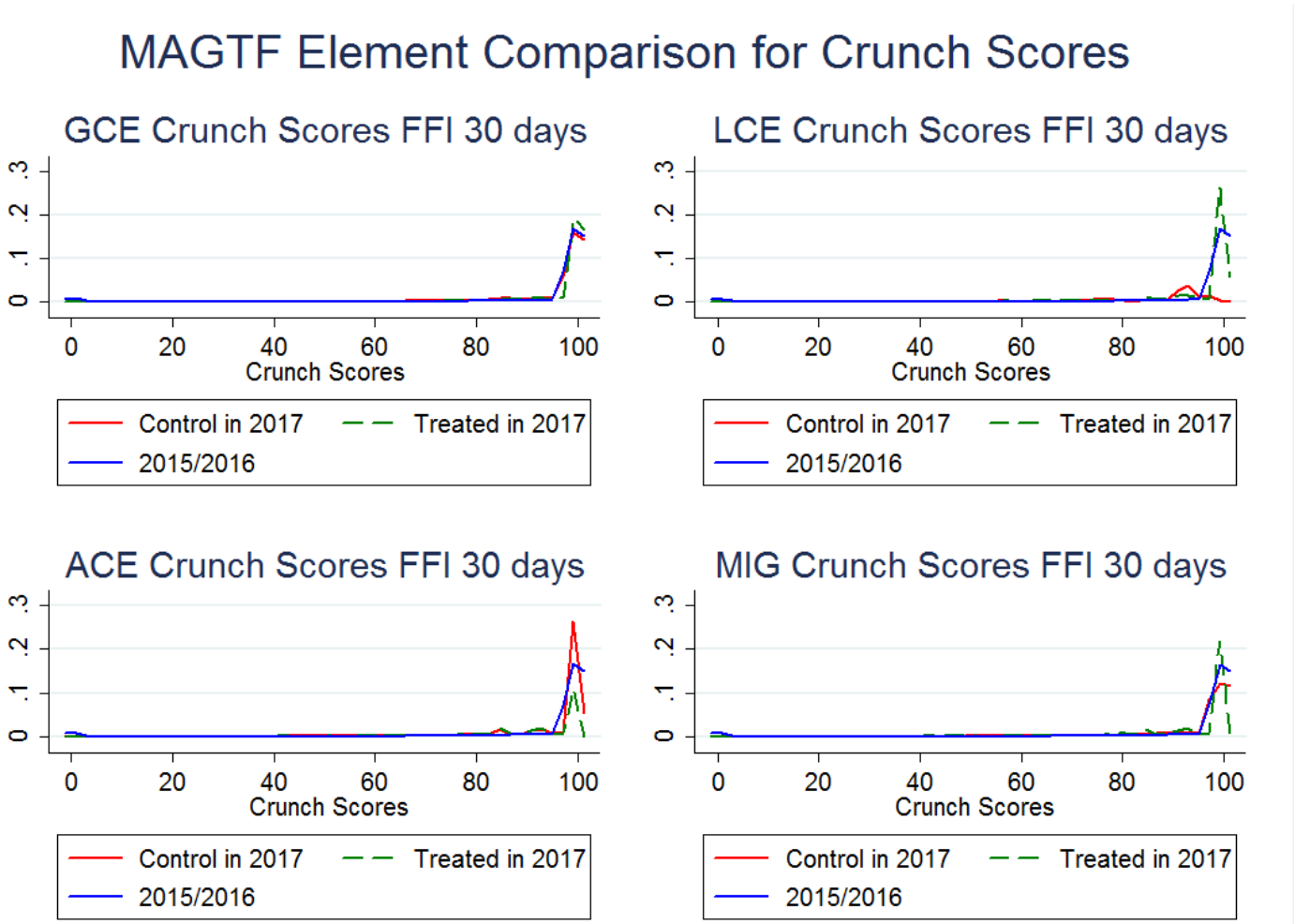

Figure 53. MAGTF Element Comparison of Crunch Scores with FFI 30 Days or Greater

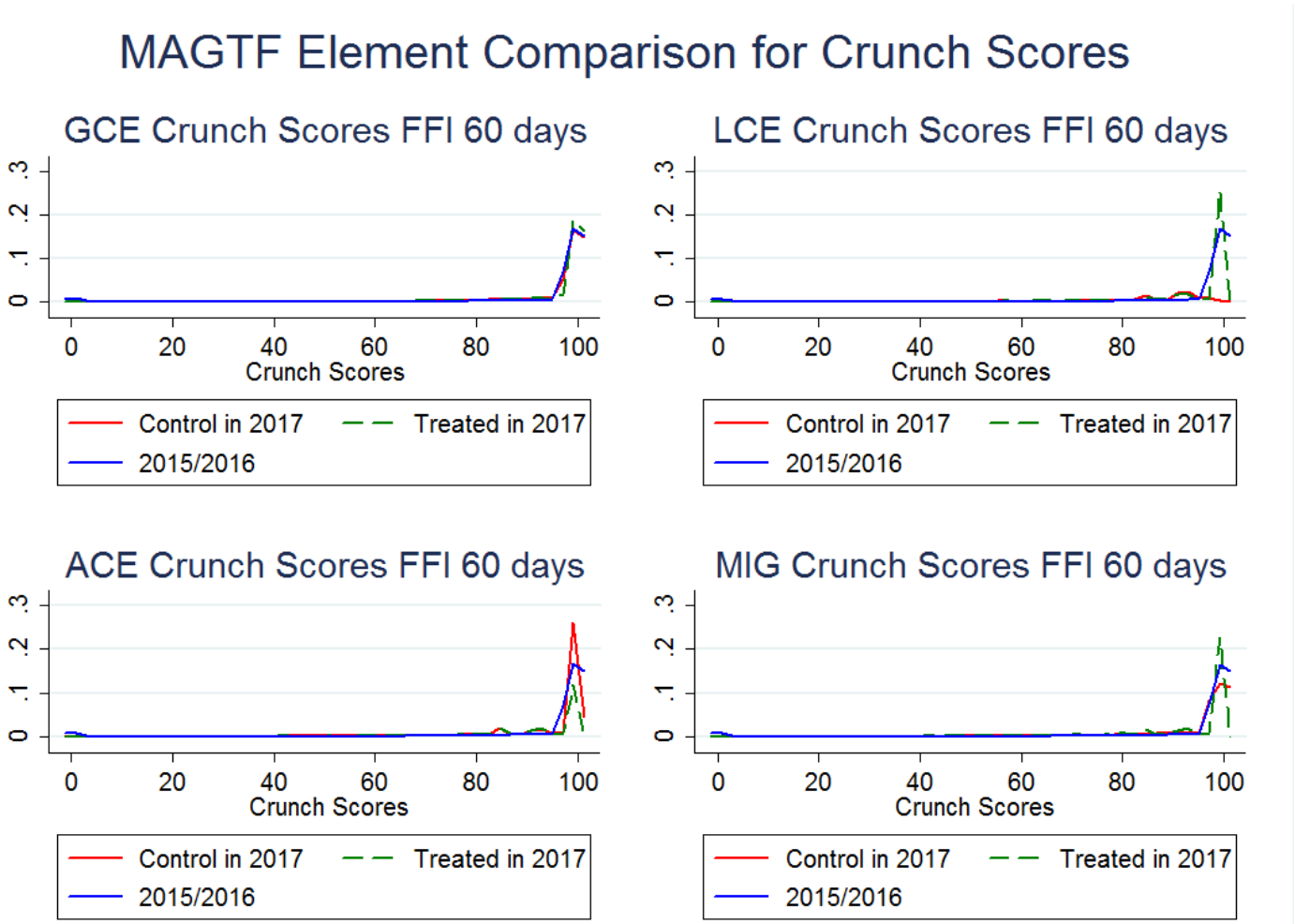

Figure 54. MAGTF Element Comparison of Crunch Scores with FFI 60 Days or Greater

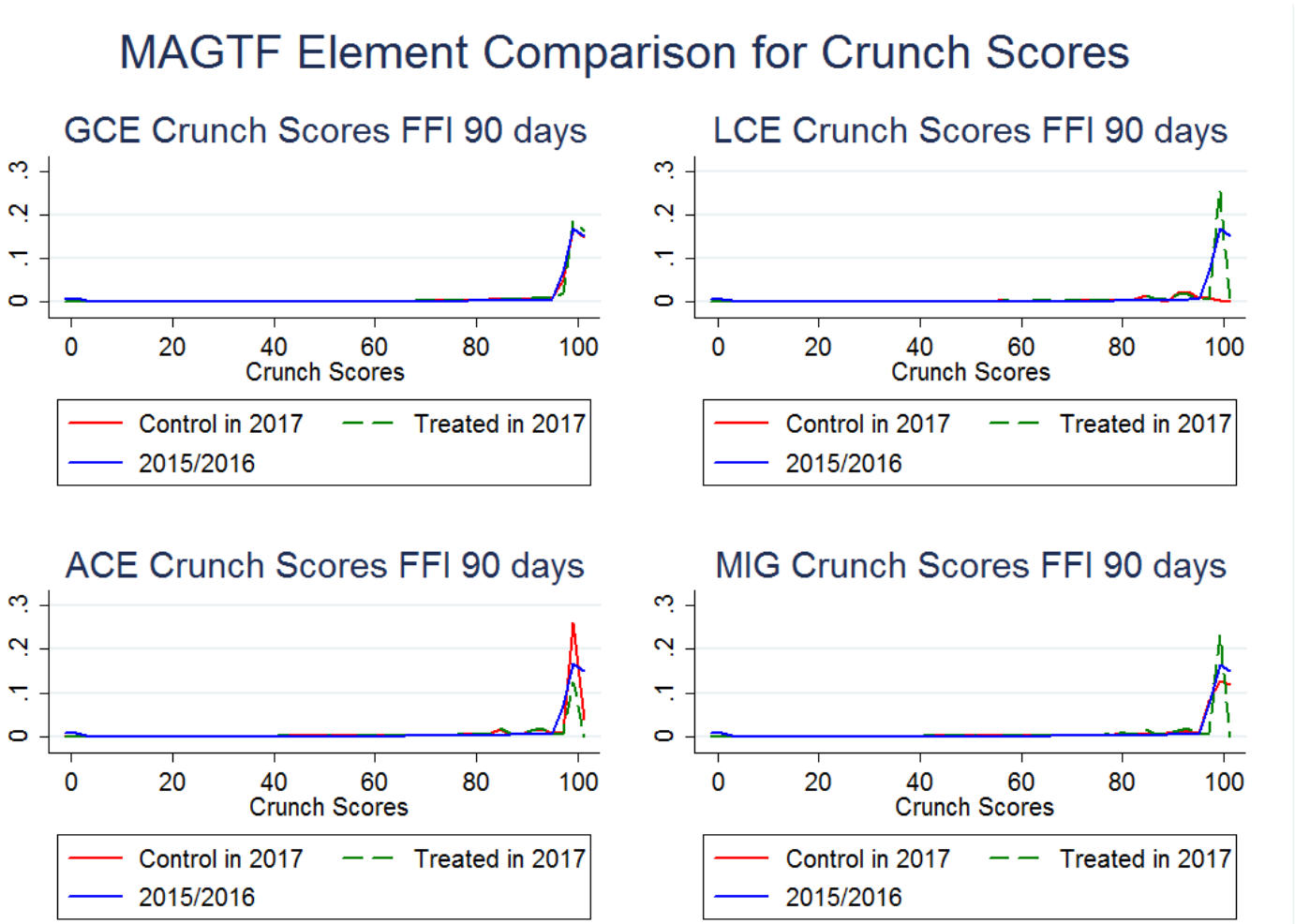

Figure 55. MAGTF Element Comparison of Crunch Scores with FFI 90 Days or Greater

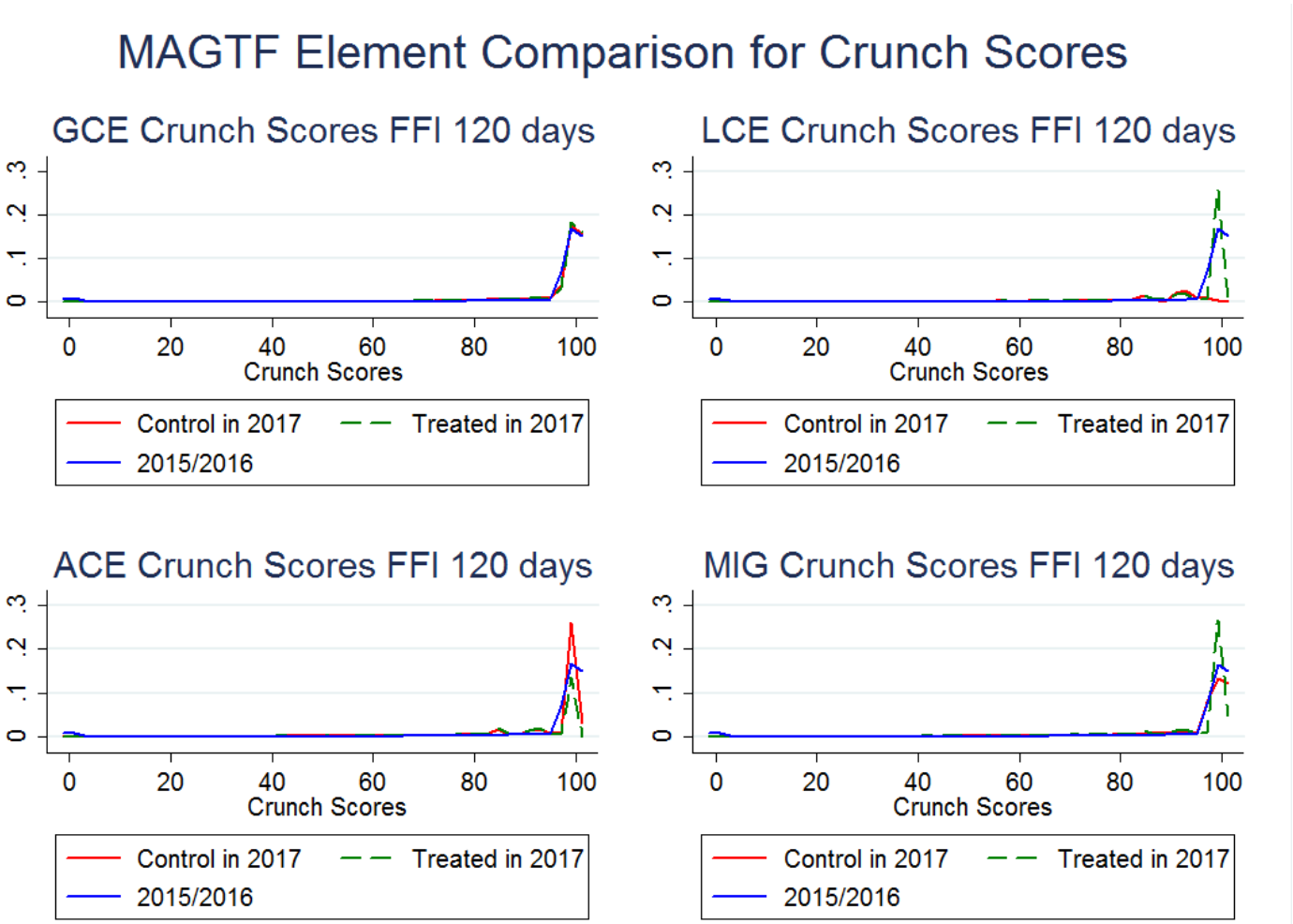

Figure 56. MAGTF Element Comparison of Crunch Scores with FFI 120 Days or Greater

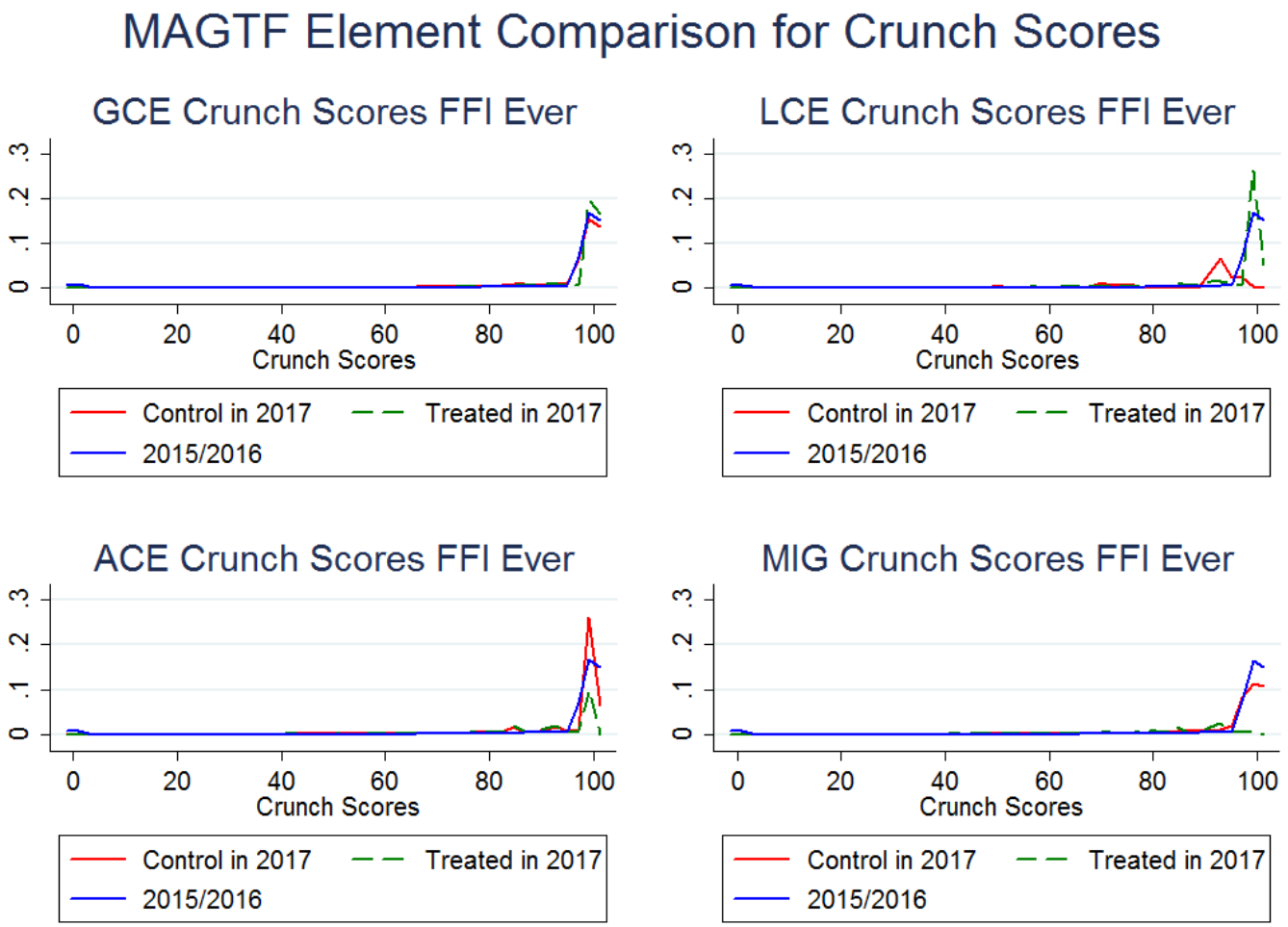

Figure 57. MAGTF Element Comparison of Crunch Scores Ever Having an FFI

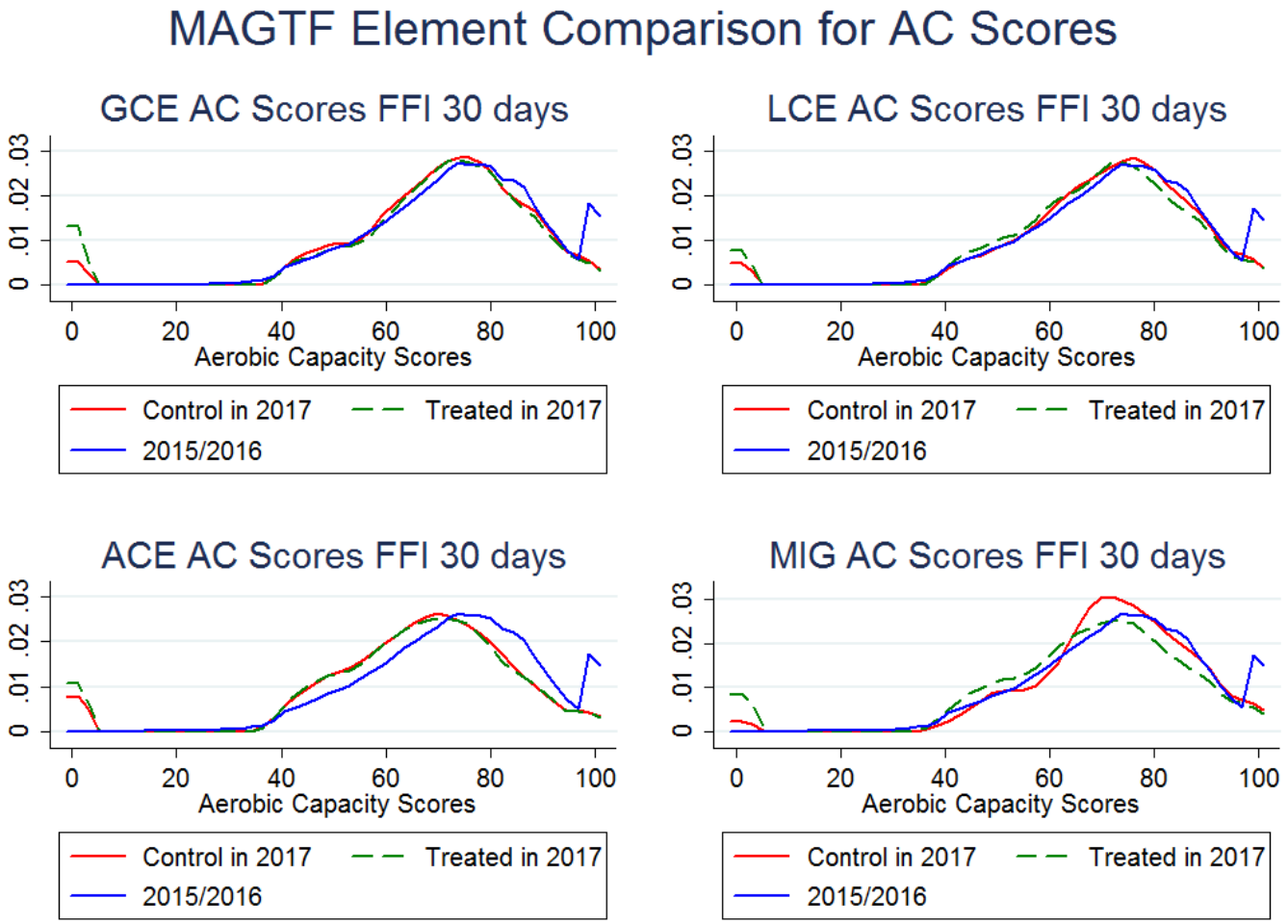

Figure 58. MAGTF Element Comparison of Aerobic Capacity Scores with FFI 30 Days or Greater

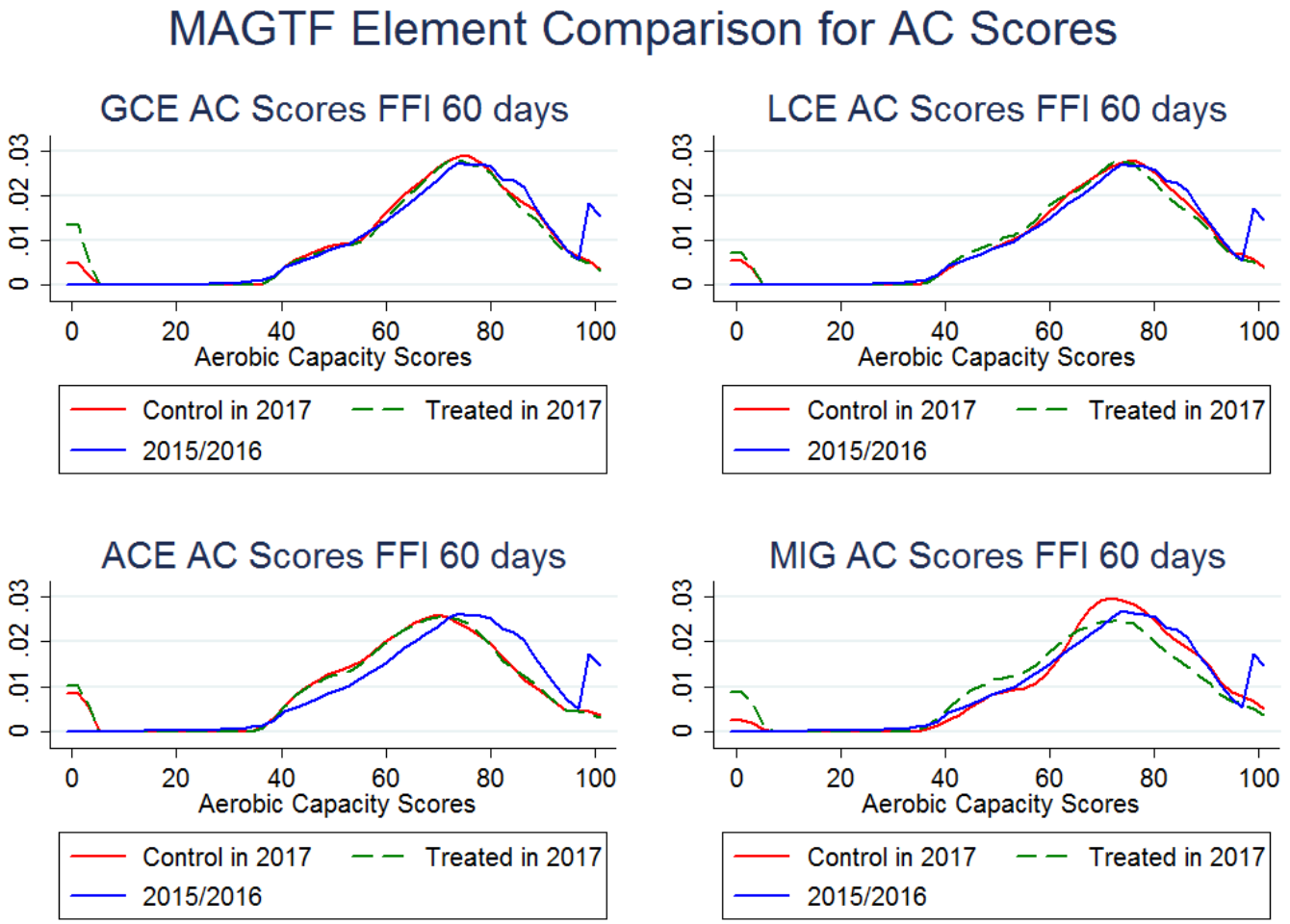

Figure 59. MAGTF Element Comparison of Aerobic Capacity Scores with FFI 60 Days or Greater

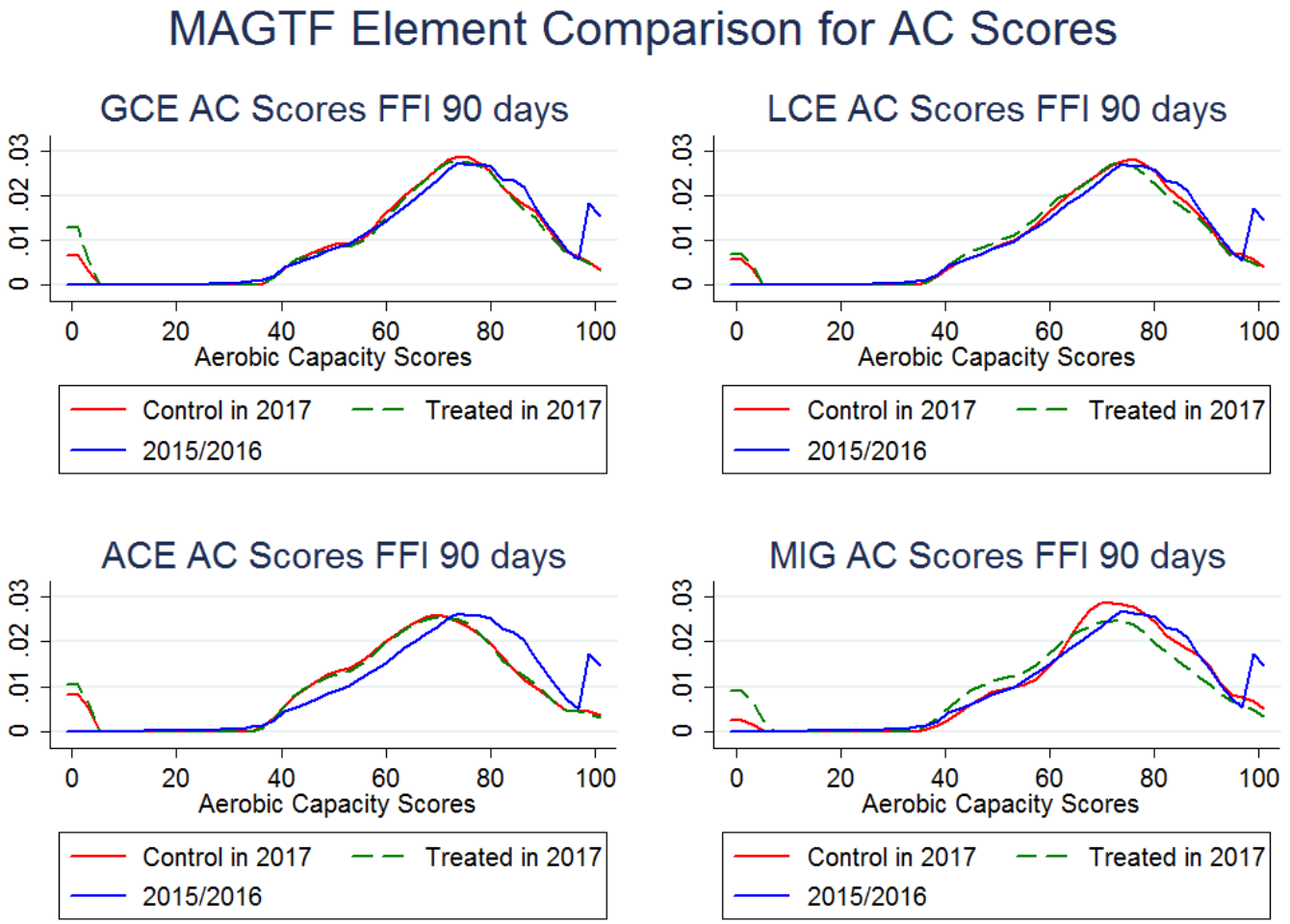

Figure 60. MAGTF Element Comparison of Aerobic Capacity Scores with FFI 90 Days or Greater

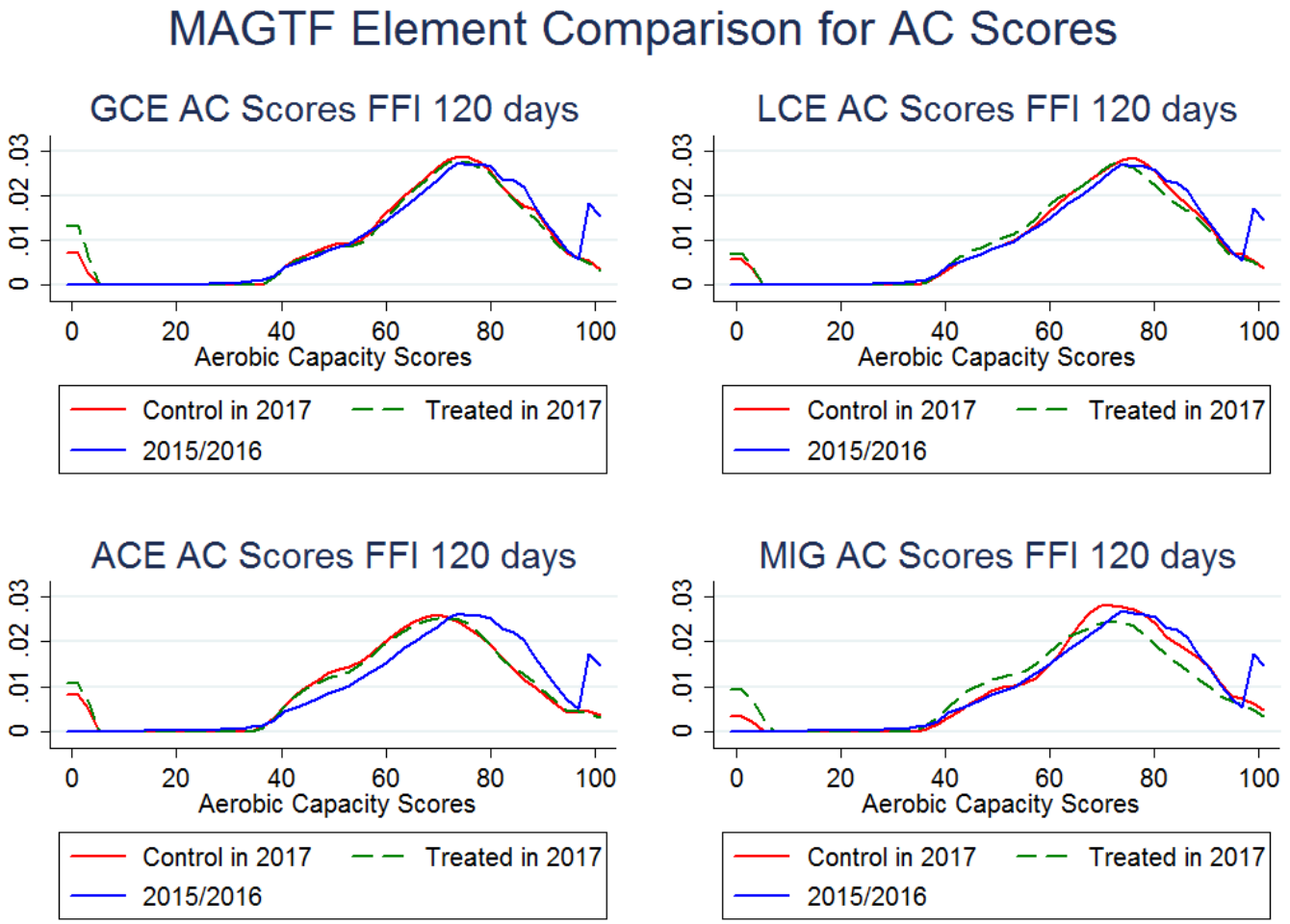

Figure 61. MAGTF Element Comparison of Aerobic Capacity Scores with FFI 120 Days or Greater

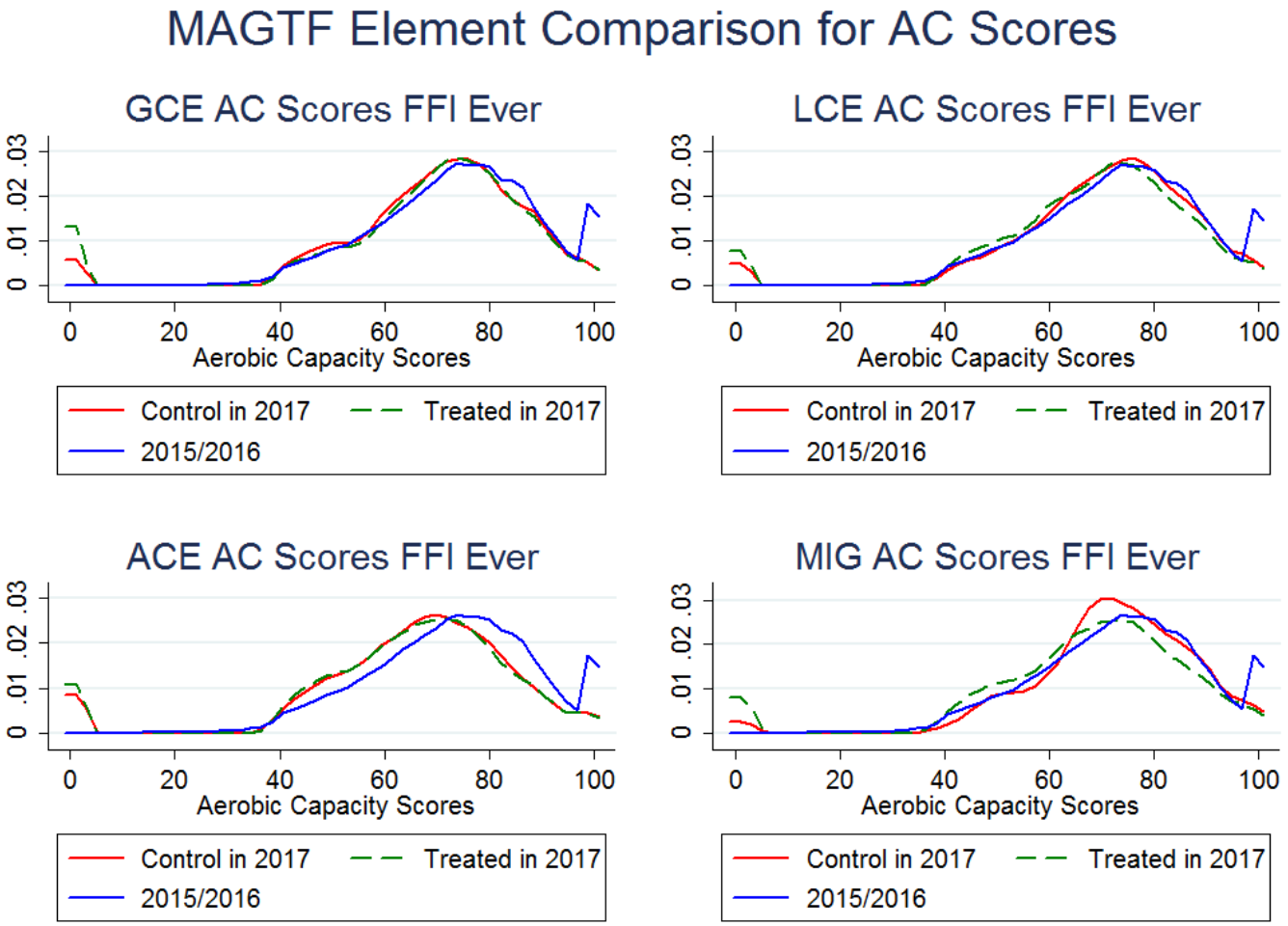

Figure 62. MAGTF Element Comparison of Aerobic Capacity Scores Ever Having an FFI

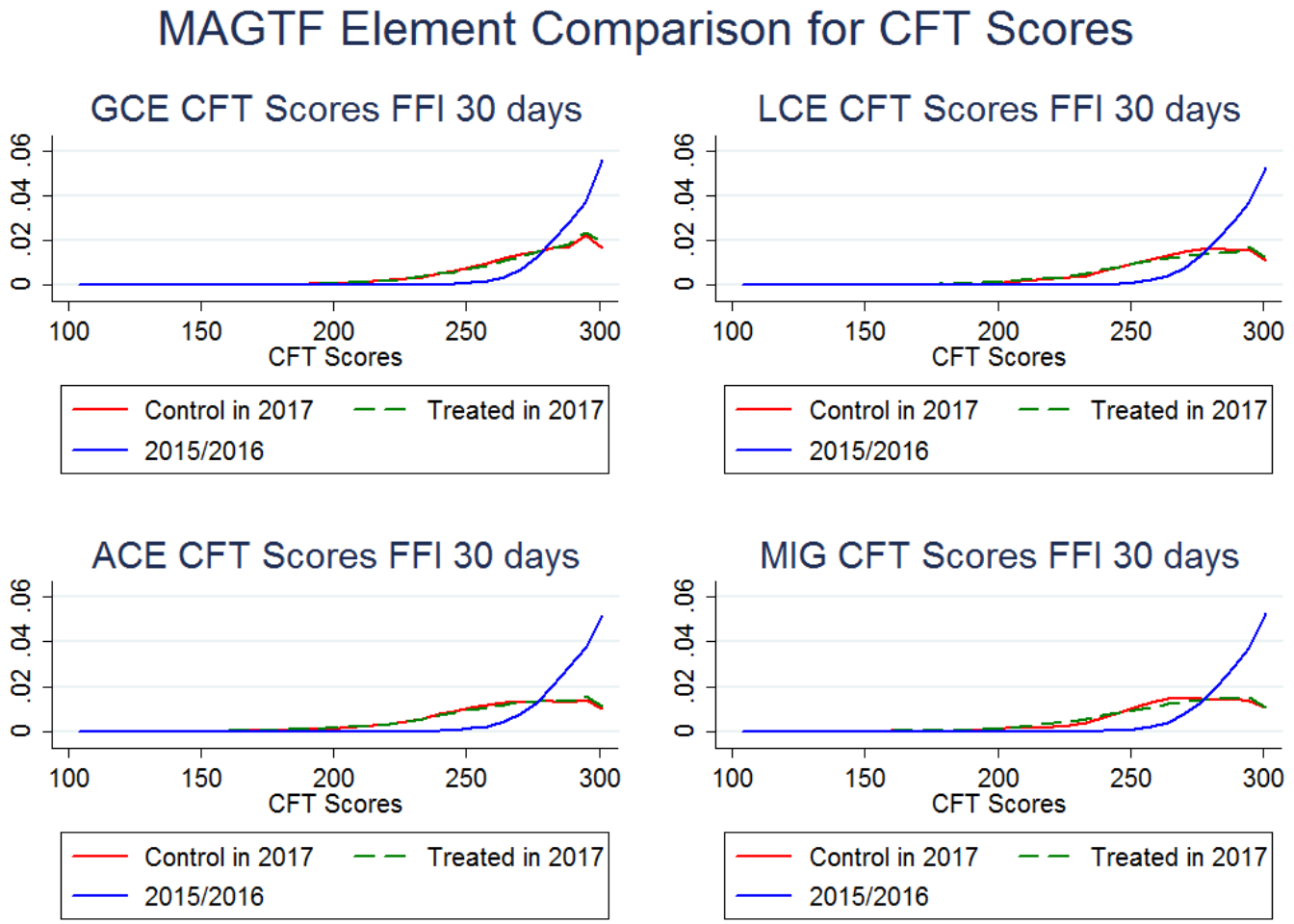

Figure 63. MAGTF Element Comparison of Combat Fitness Test Scores with FFI 30 Days or Greater

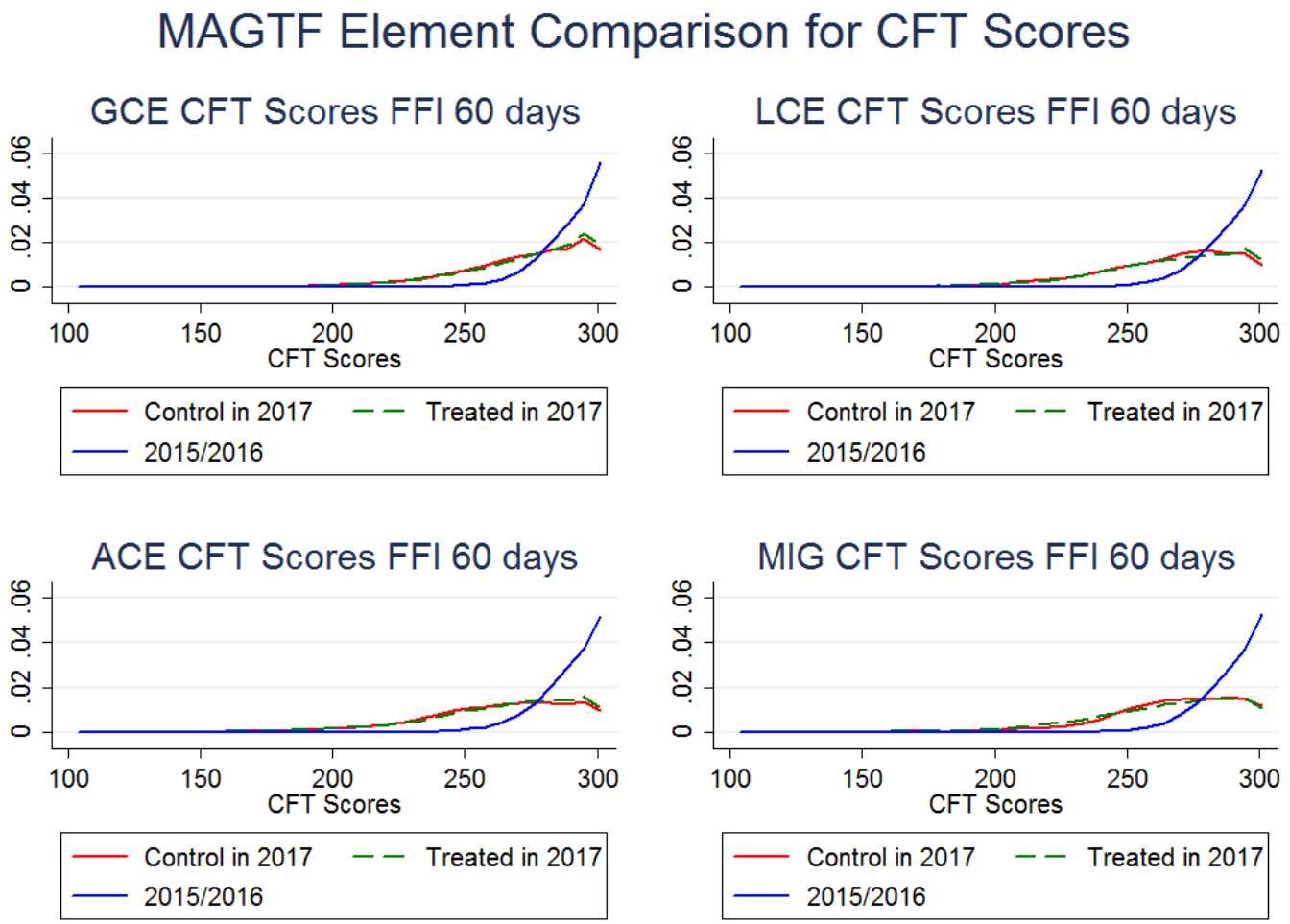

Figure 64. MAGTF Element Comparison of Combat Fitness Test Scores with FFI 60 Days or Greater

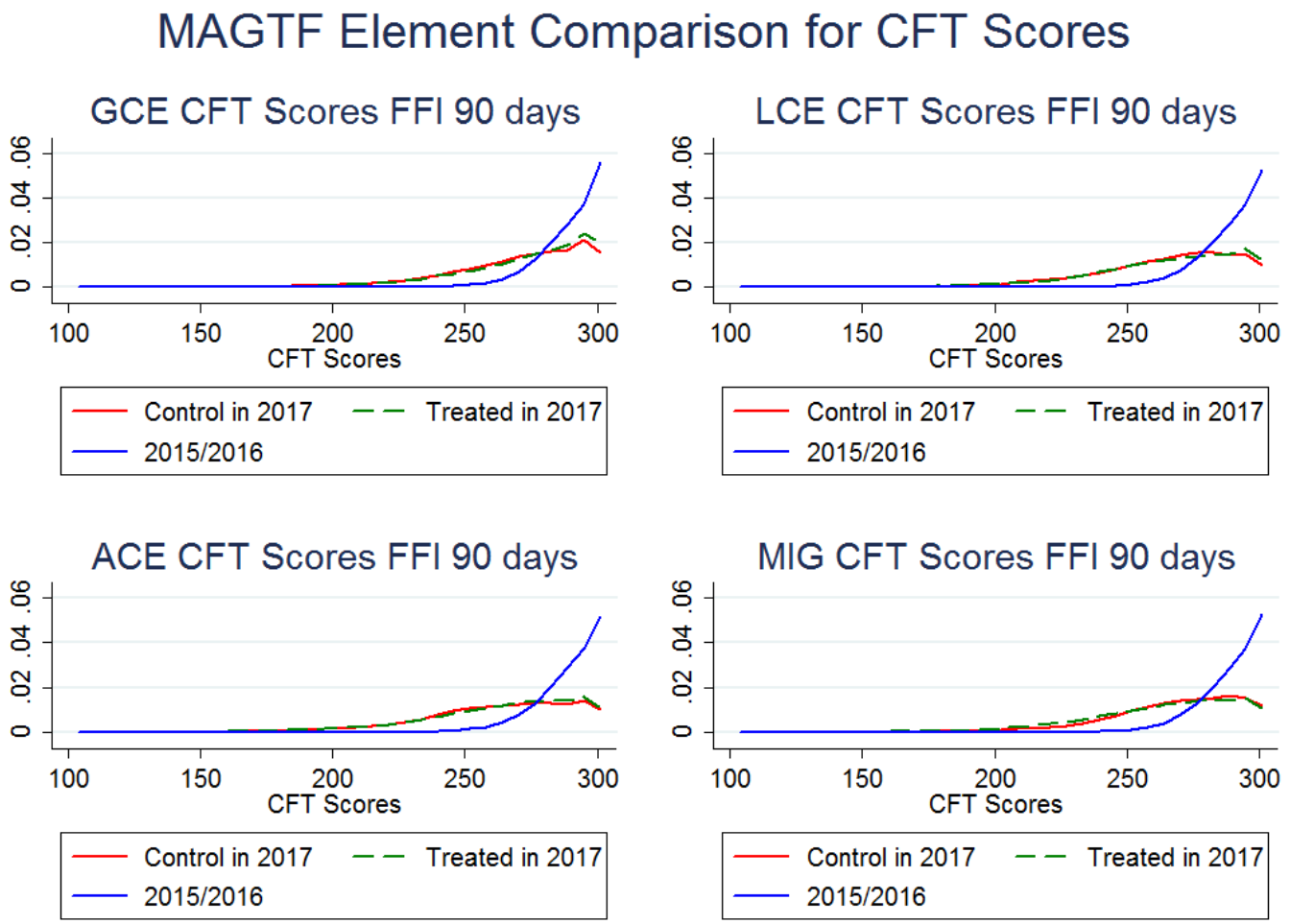

Figure 65. MAGTF Element Comparison of Combat Fitness Test Scores with FFI 90 Days or Greater

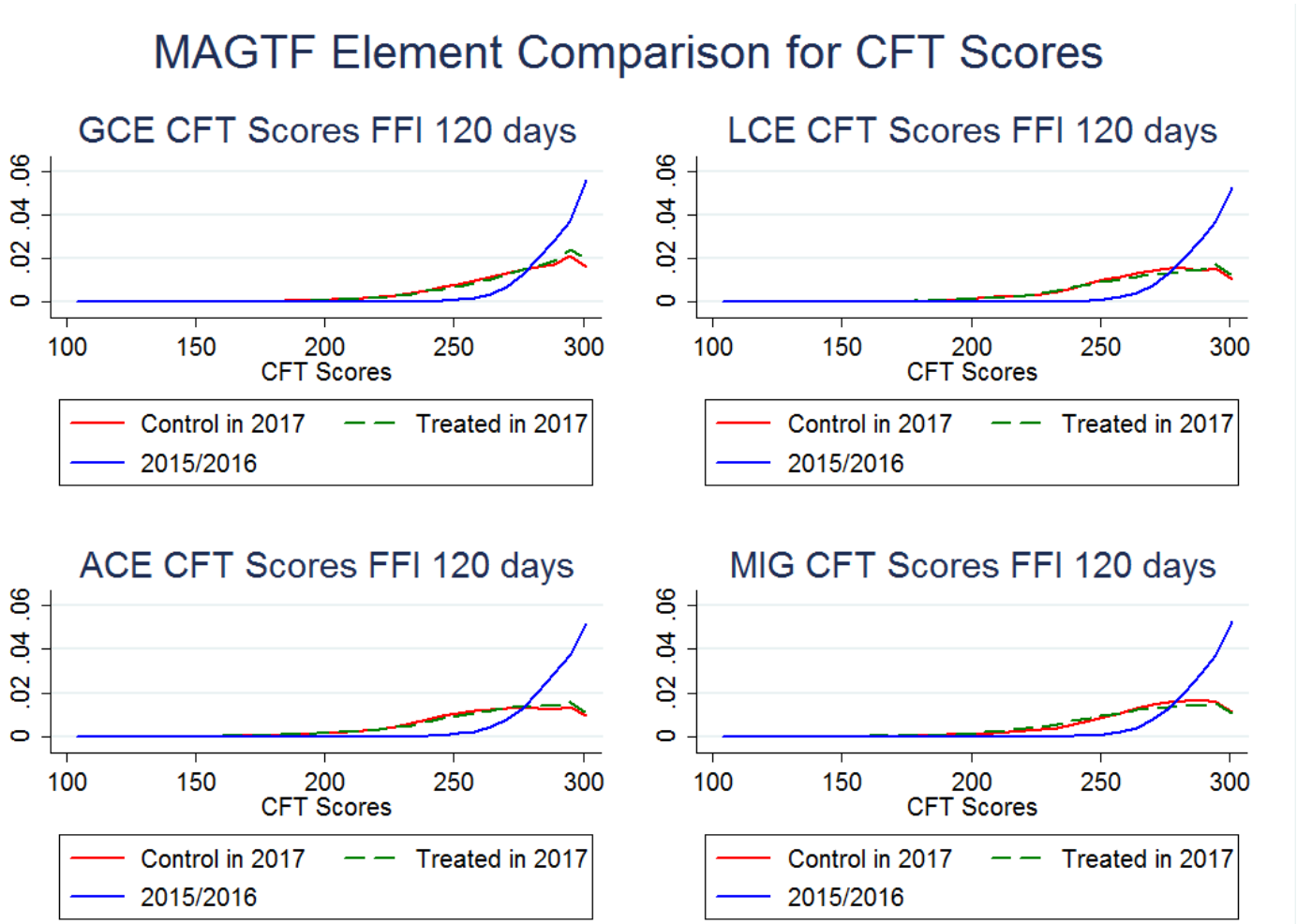

Figure 66. MAGTF Element Comparison of Combat Fitness Test Scores with FFI 120 Days or Greater

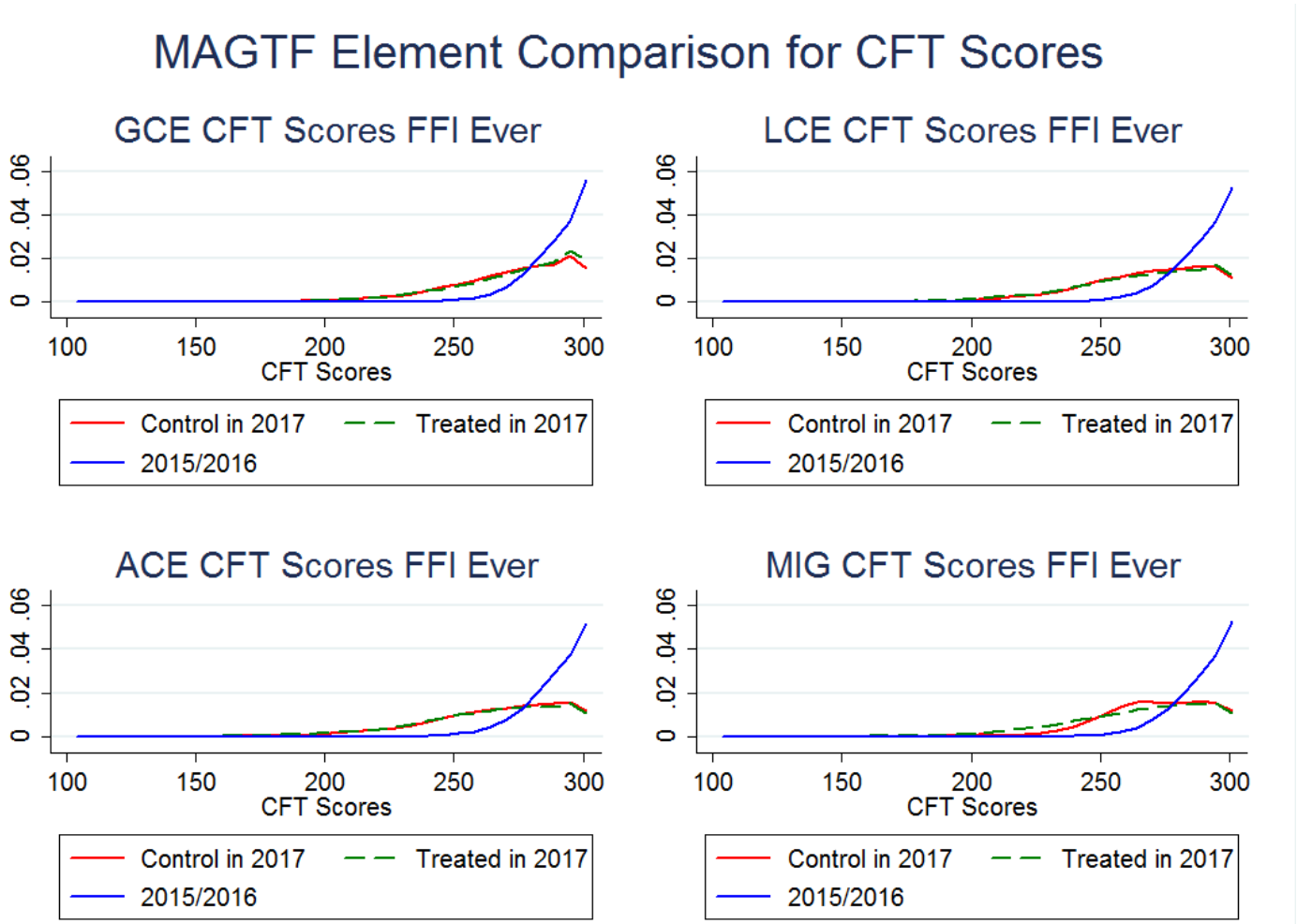

Figure 67. MAGTF Element Comparison of Combat Fitness Test Scores Ever Having an FFI

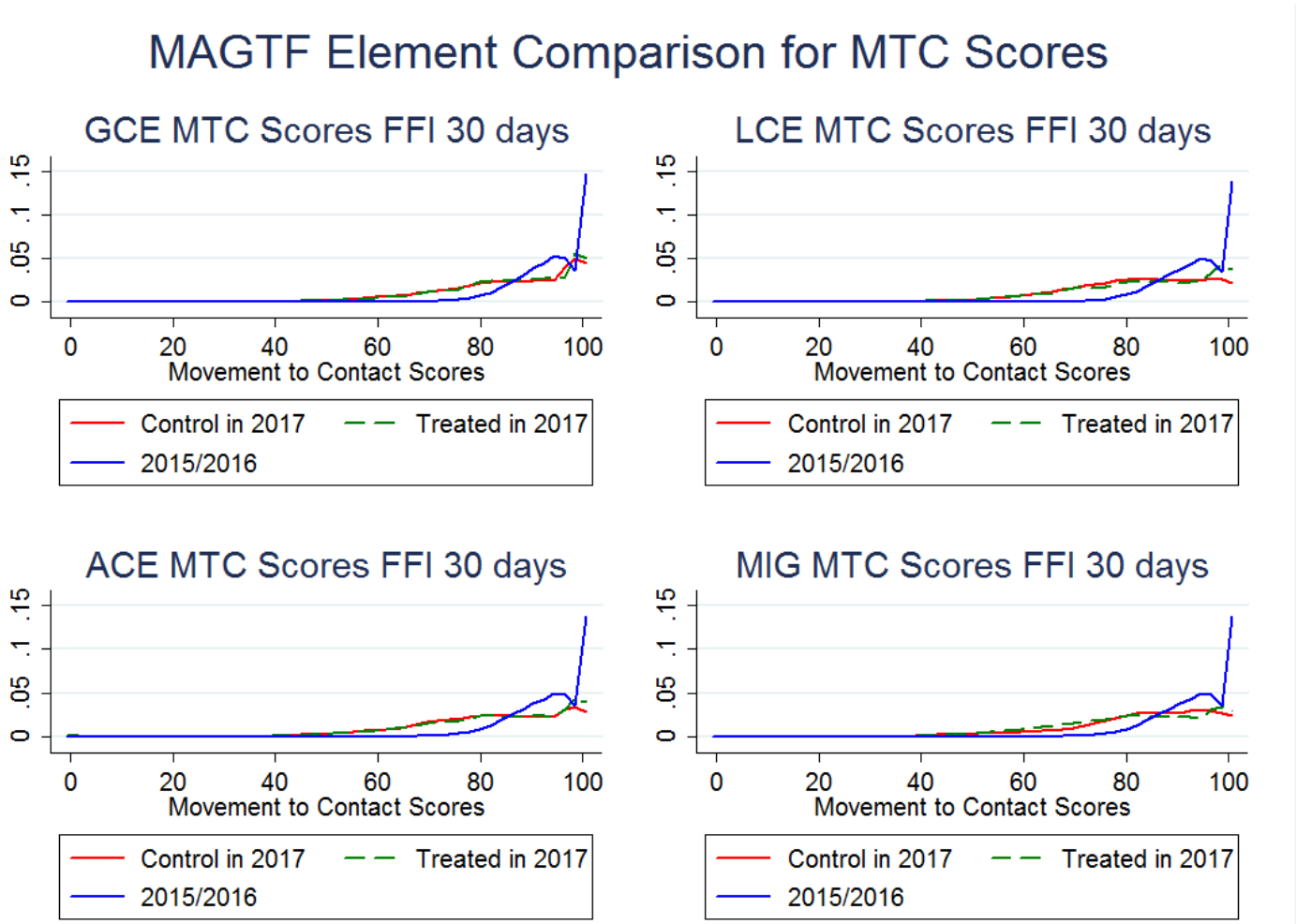

Figure 68. MAGTF Element Comparison of Movement to Contact Scores with FFI 30 Days or Greater

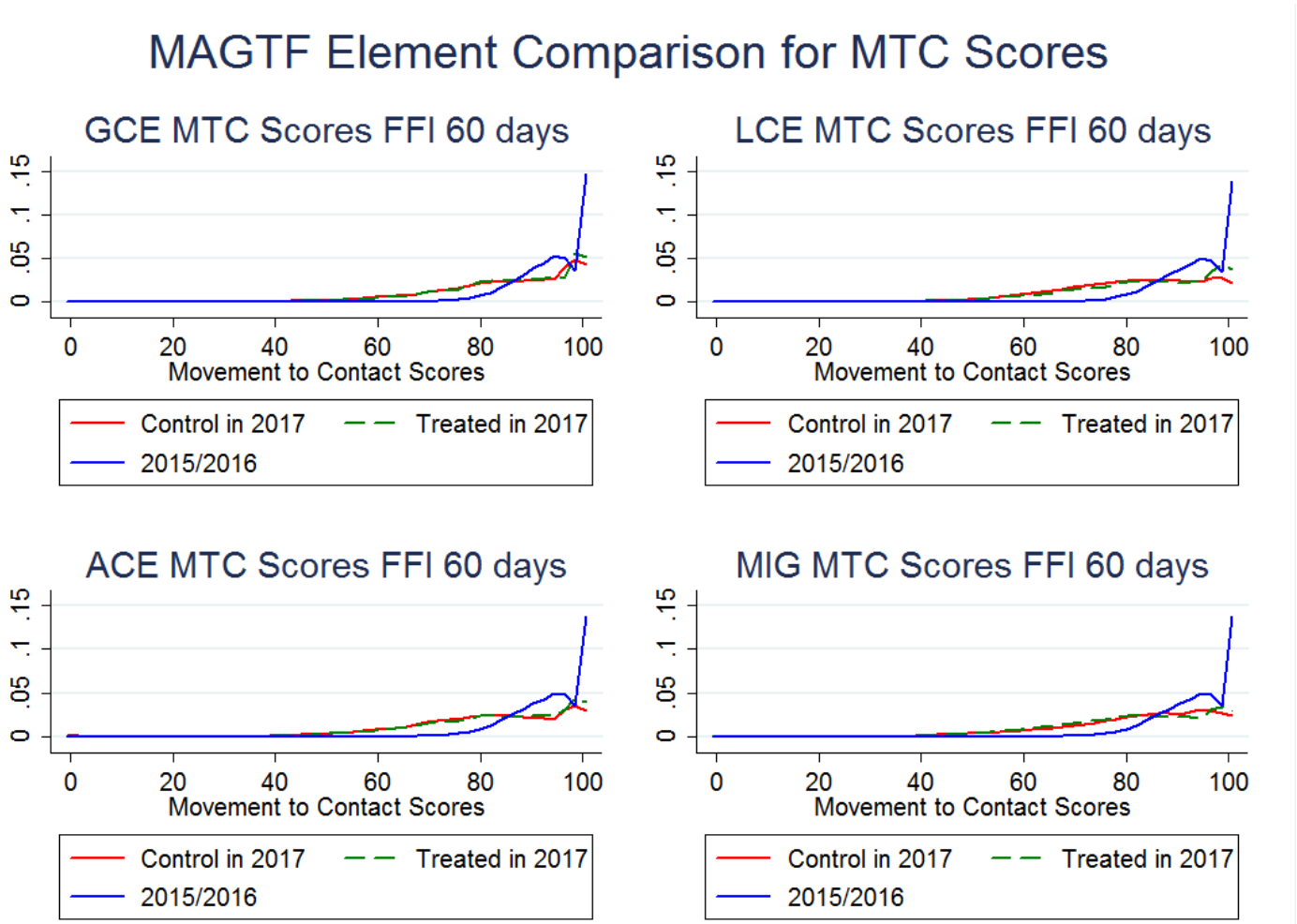

Figure 69. MAGTF Element Comparison of Movement to Contact Scores with FFI 60 Days or Greater

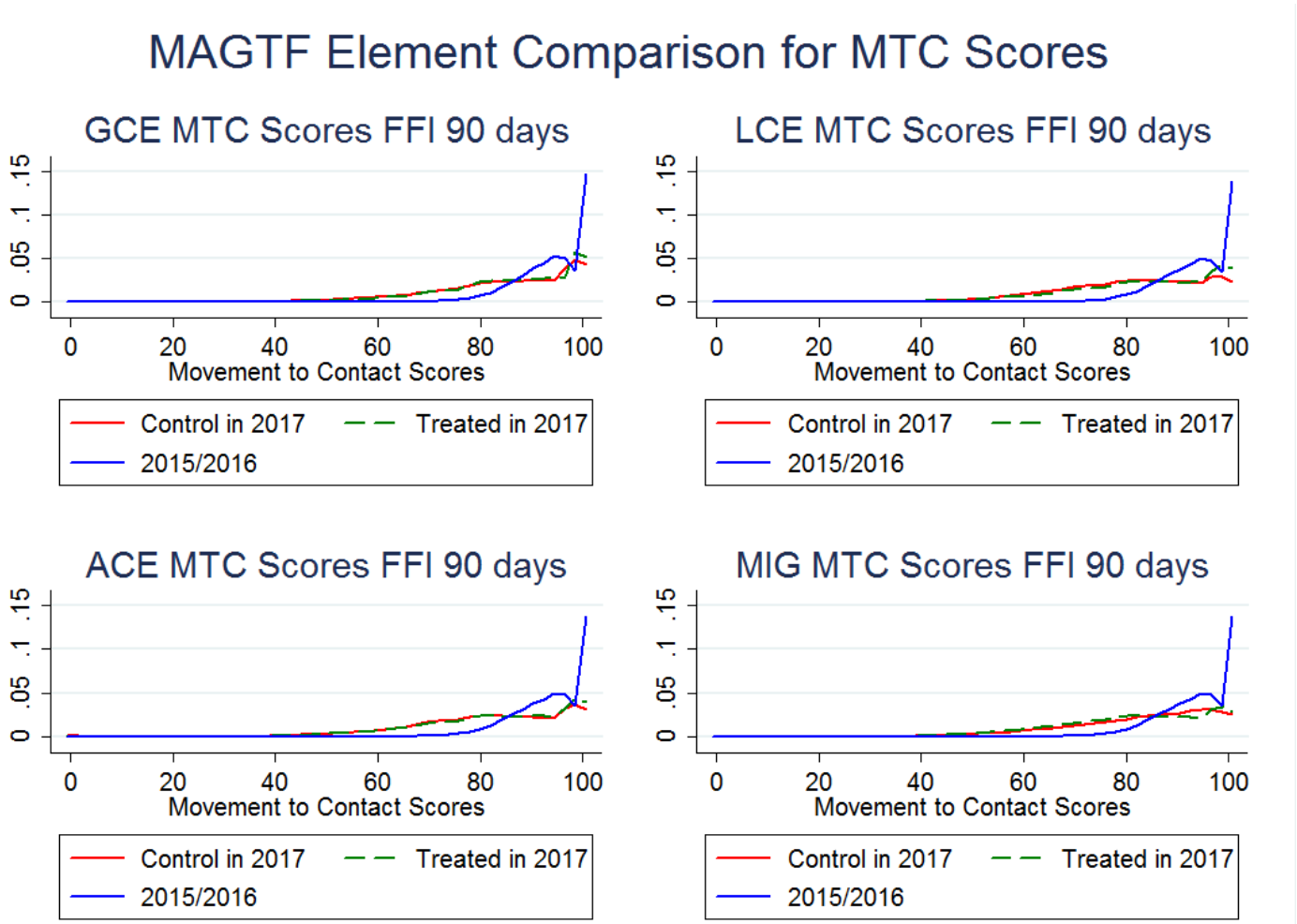

Figure 70. MAGTF Element Comparison of Movement to Contact Scores with FFI 90 Days or Greater

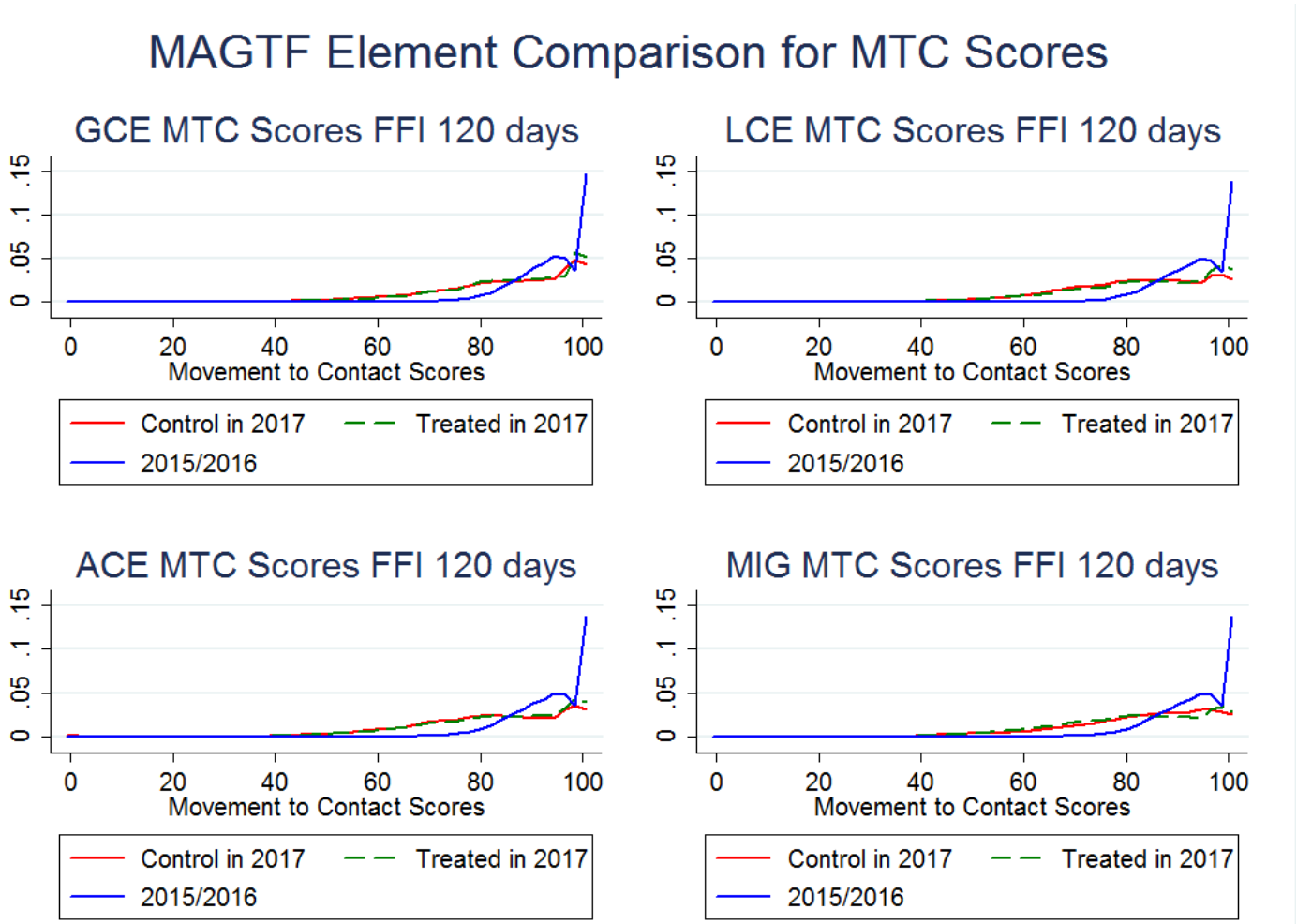

Figure 71. MAGTF Element Comparison of Movement to Contact Scores with FFI 120 Days or Greater

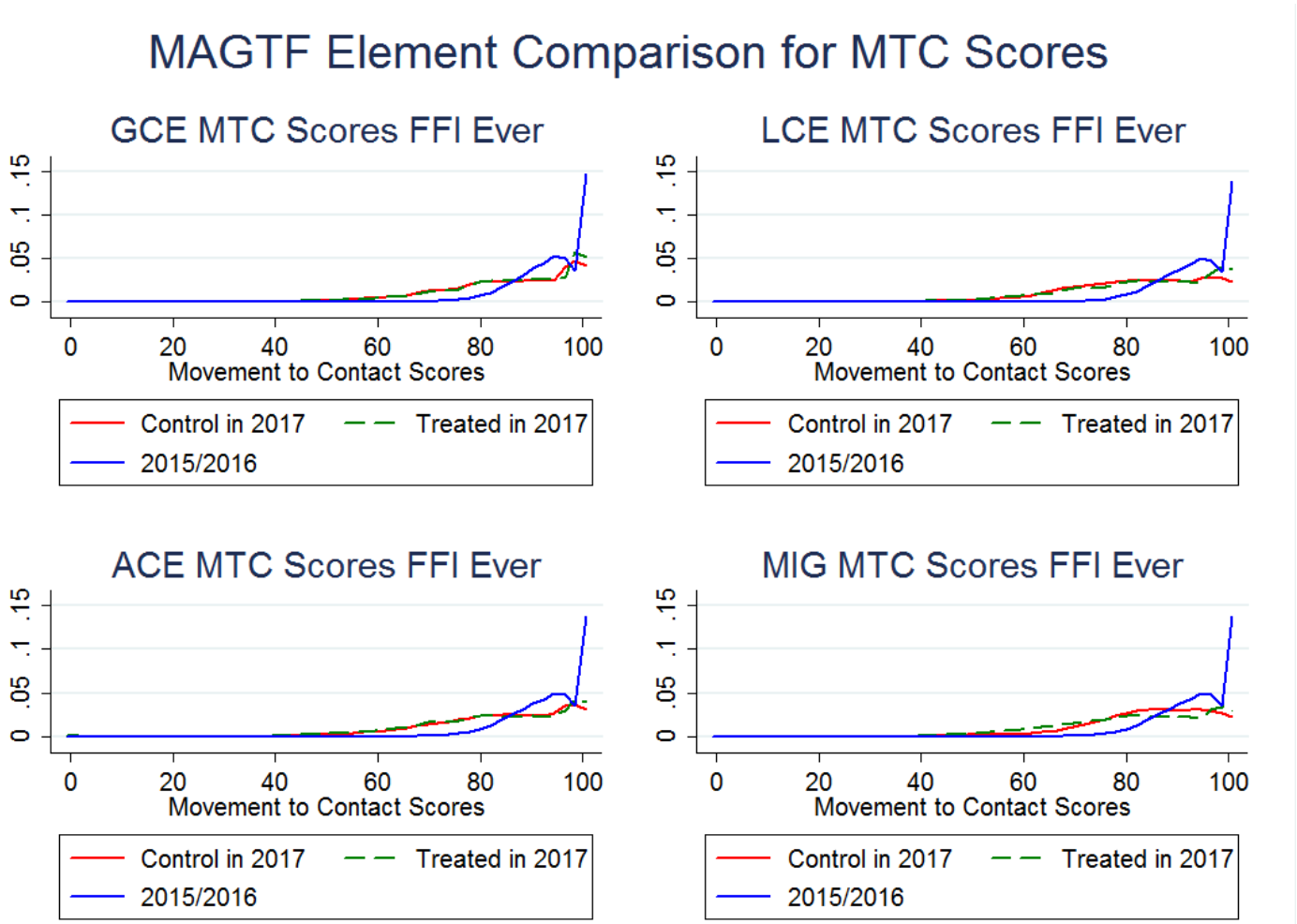

Figure 72. MAGTF Element Comparison of Movement to Contact Scores Ever Having an FFI

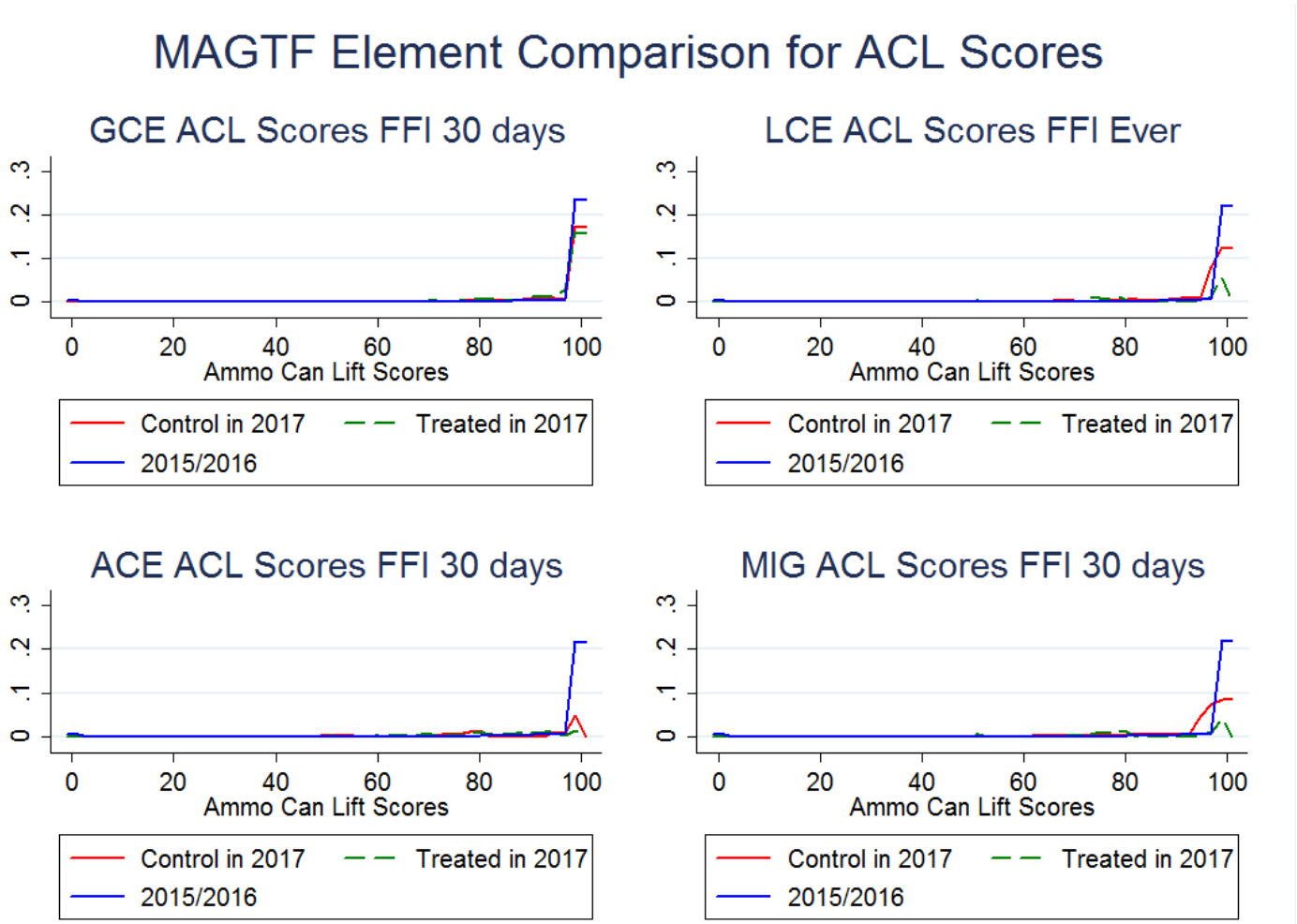

Figure 73. MAGTF Element Comparison of Ammo Can Lift Scores with FFI 30 Days or Greater

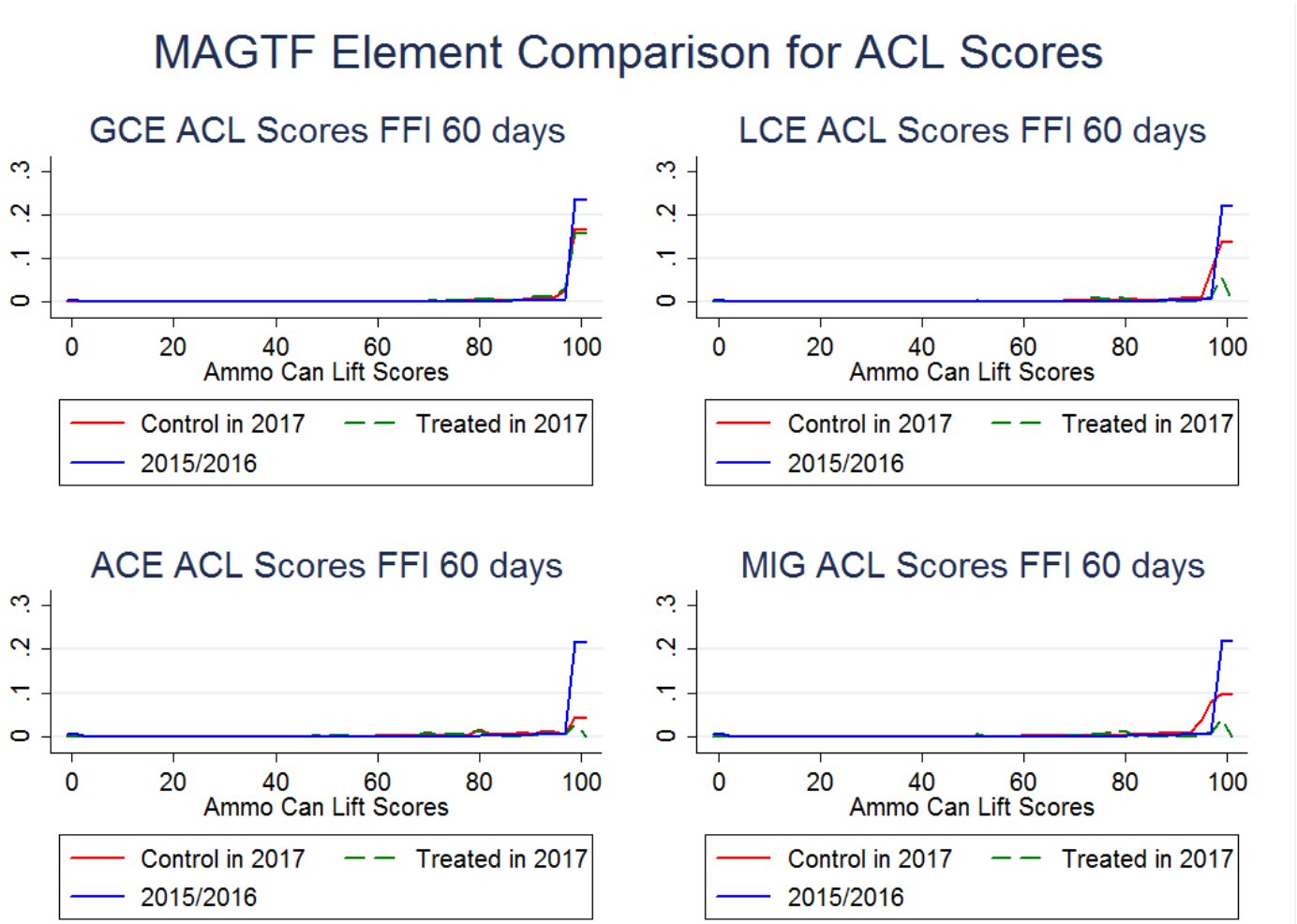

Figure 74. MAGTF Element Comparison of Ammo Can Lift Scores with FFI 60 Days or Greater

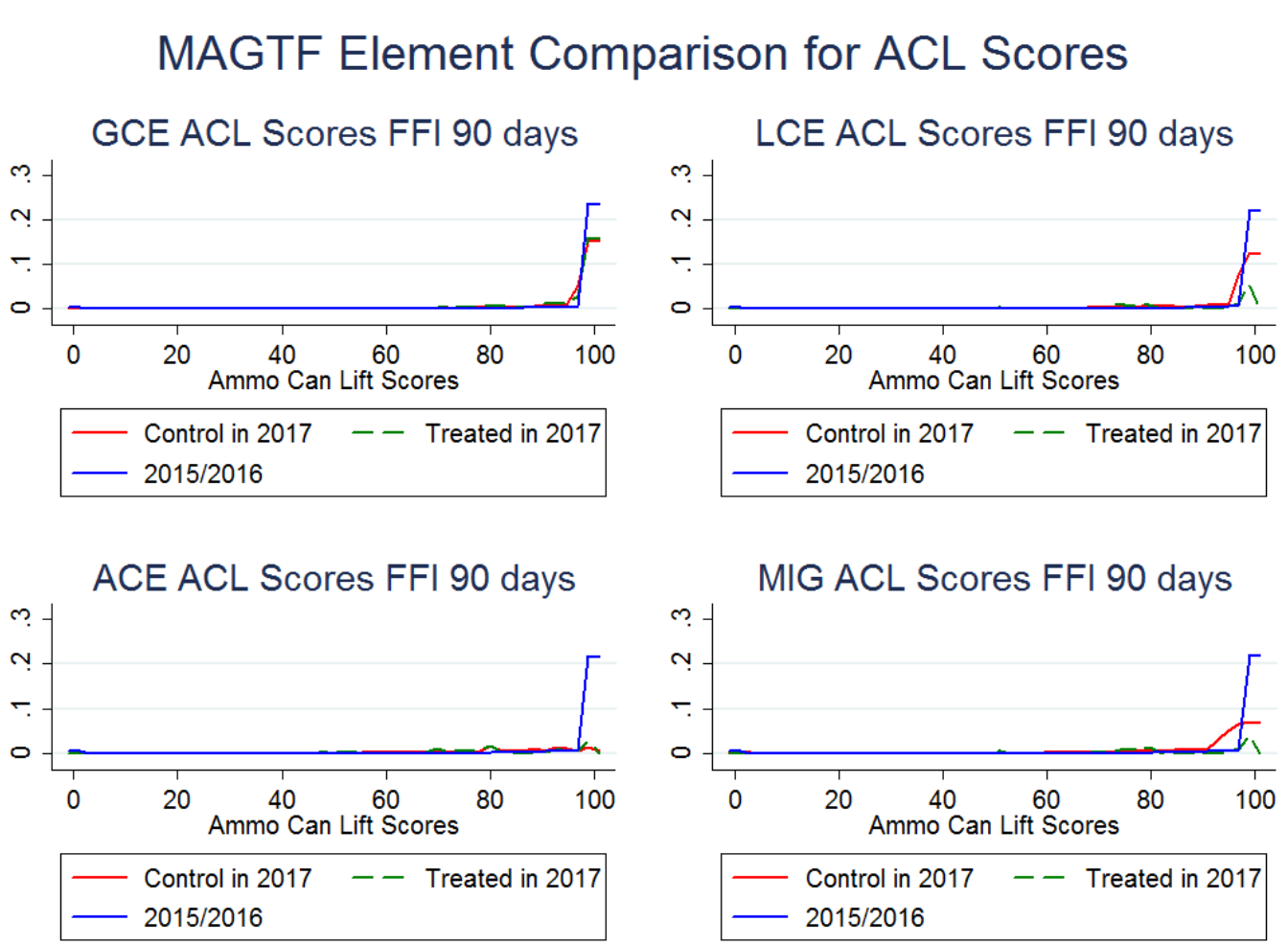

Figure 75. MAGTF Element Comparison of Ammo Can Lift Scores with FFI 90 Days or Greater

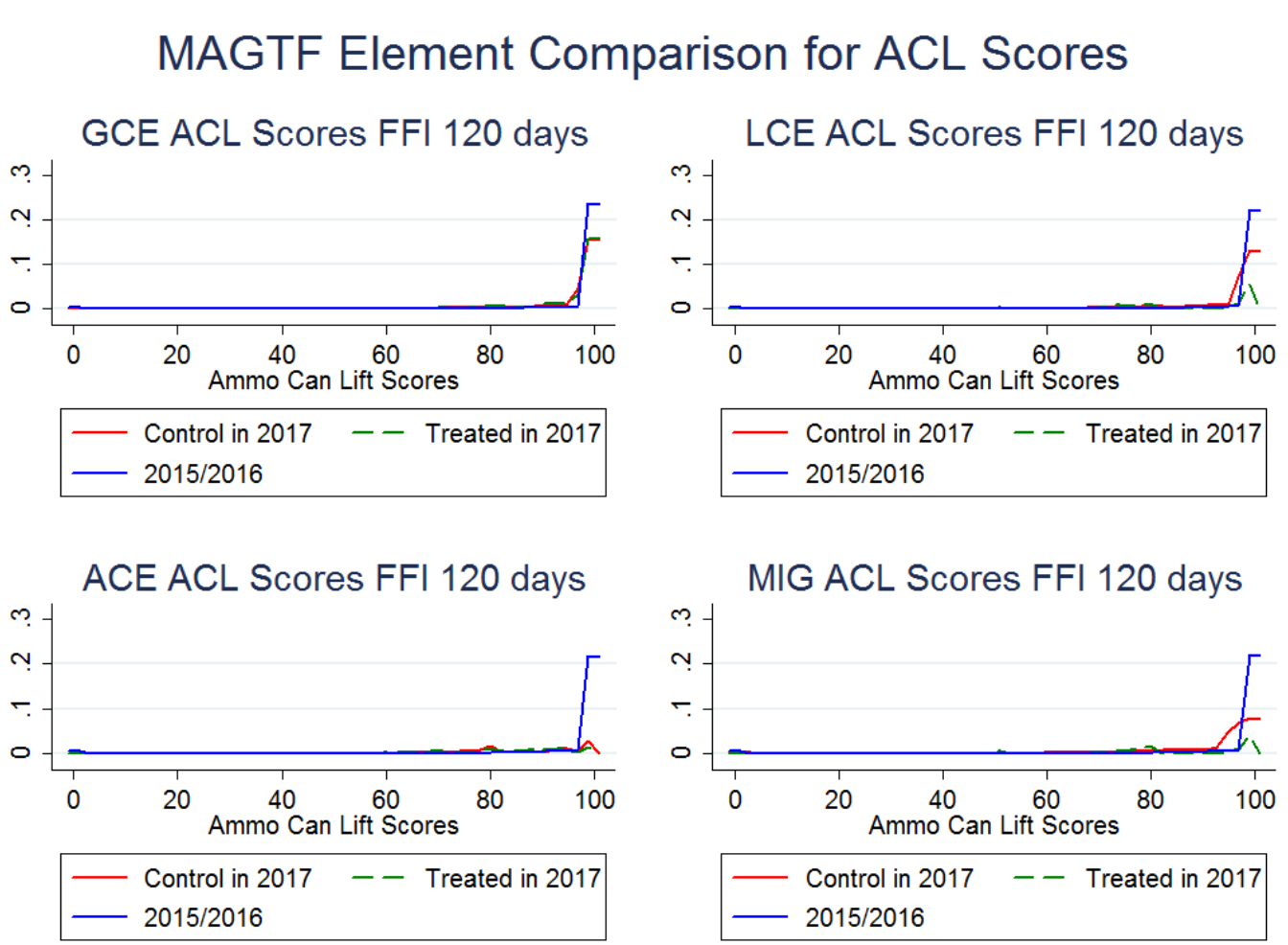

Figure 76. MAGTF Element Comparison of Ammo Can Lift Scores with FFI 120 Days or Greater

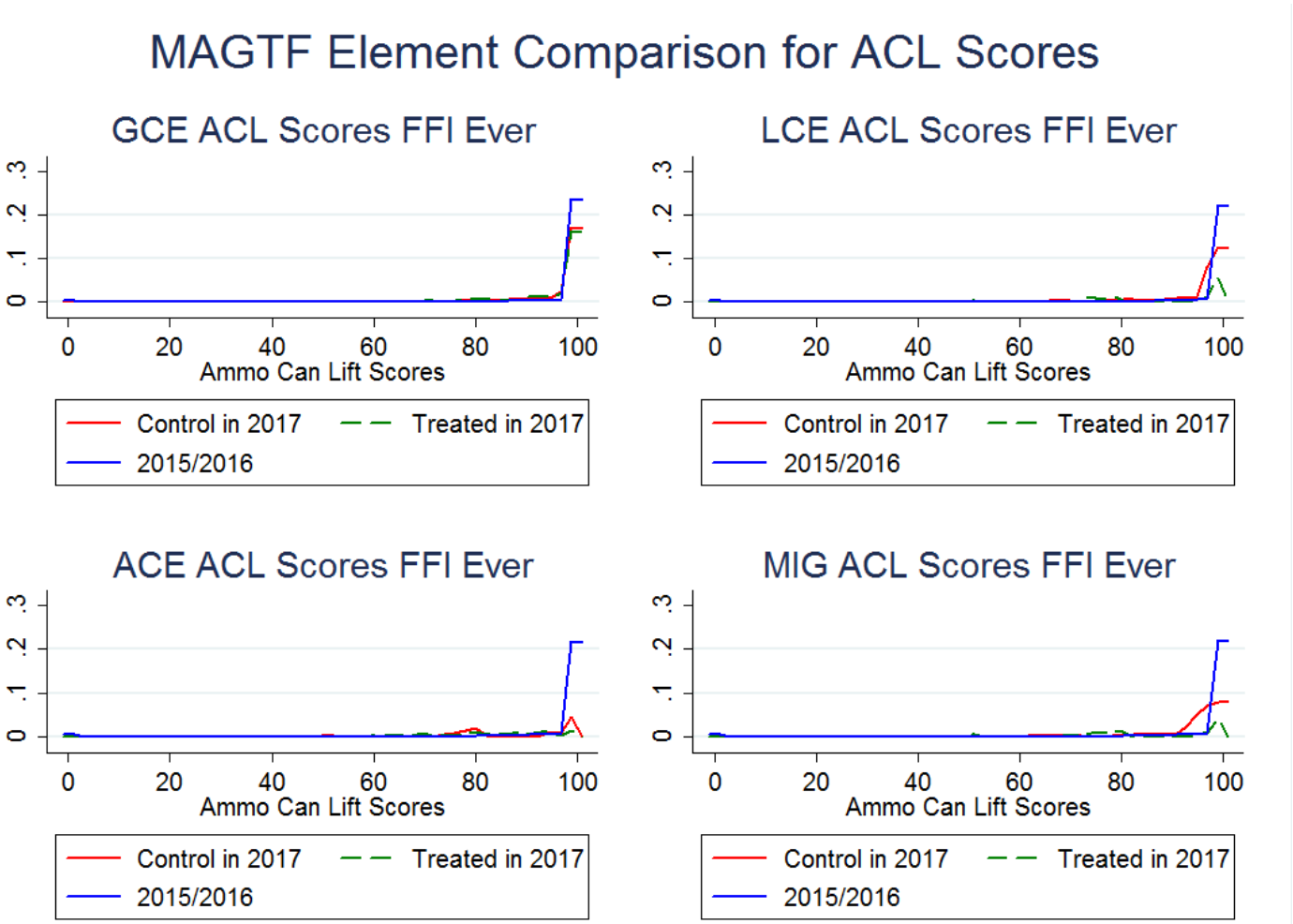

Figure 77. MAGTF Element Comparison of Ammo Can Lift Scores Ever Having an FFI

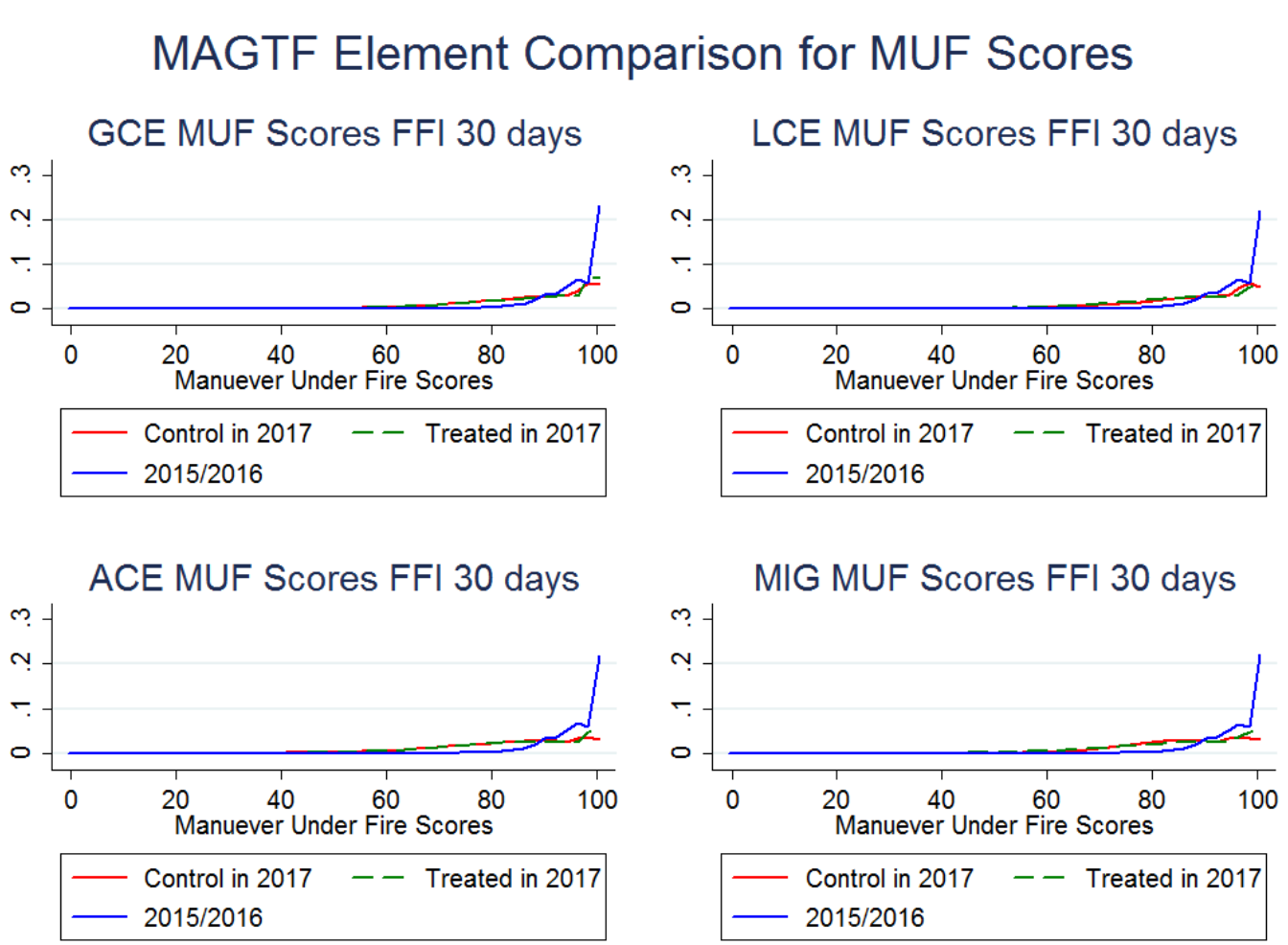

Figure 78. MAGTF Element Comparison of Maneuver under Fire Scores with FFI 30 Days or Greater

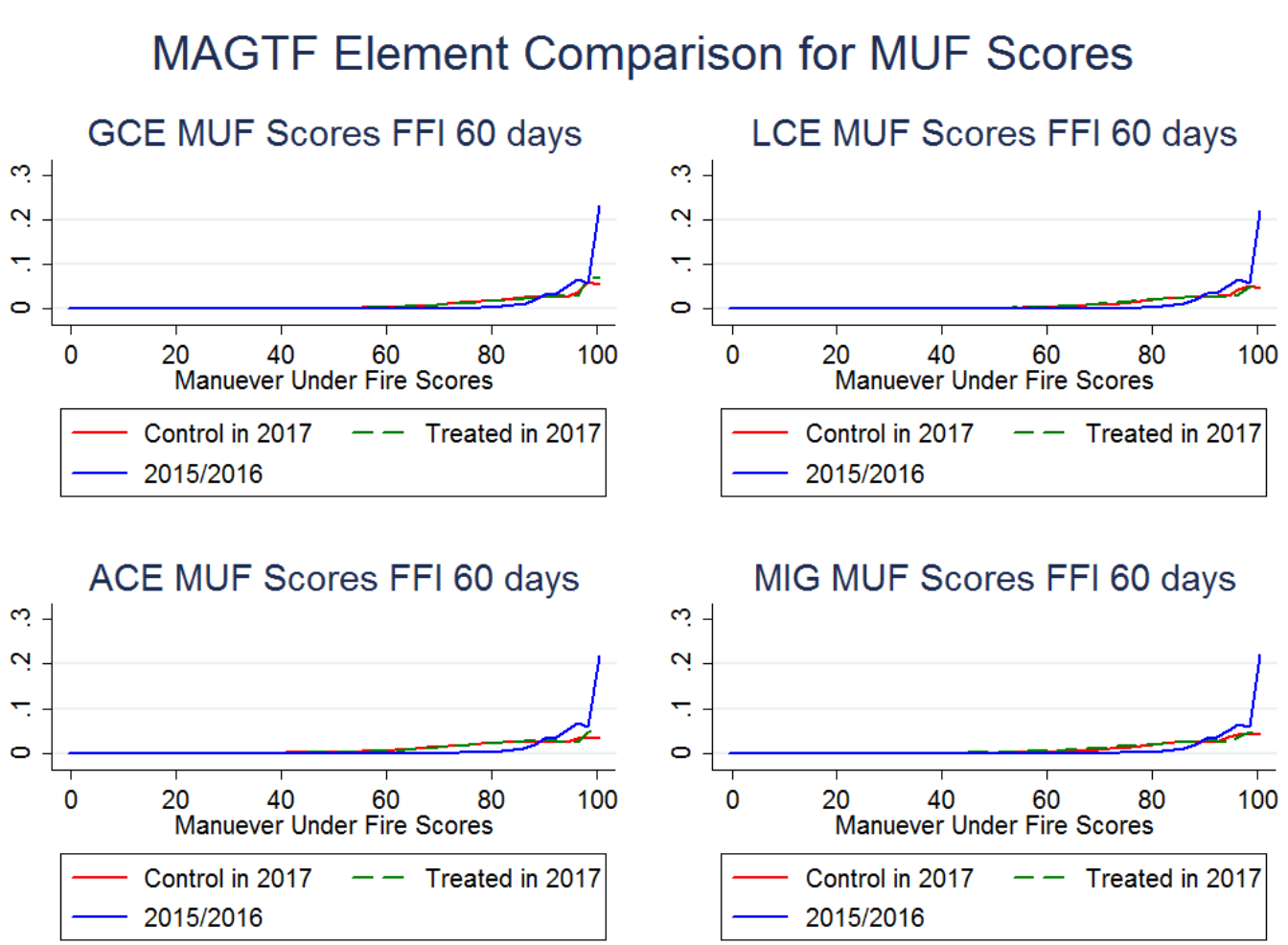

Figure 79. MAGTF Element Comparison of Maneuver under Fire Scores with FFI 60 Days or Greater

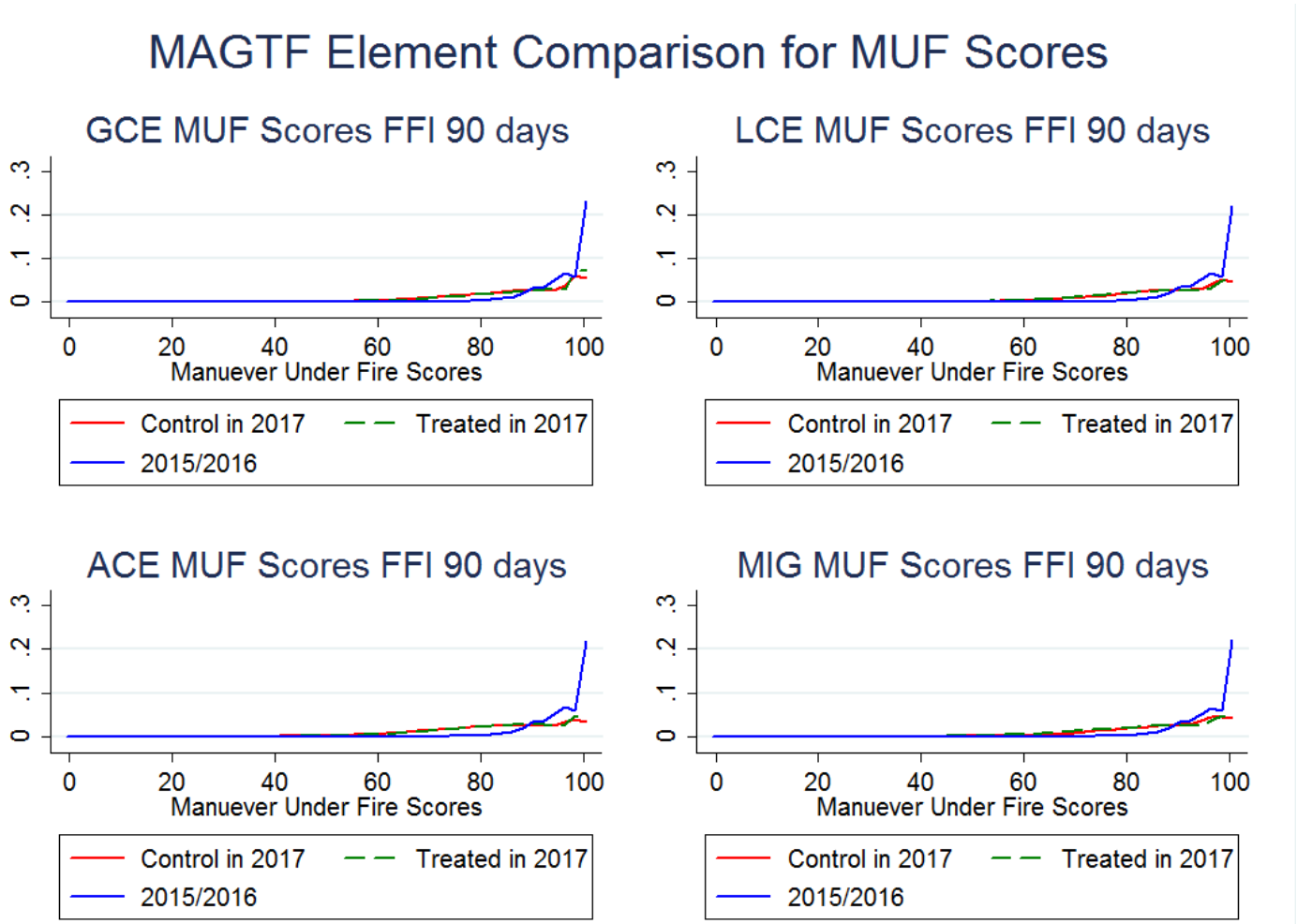

Figure 80. MAGTF Element Comparison of Maneuver under Fire Scores with FFI 90 Days or Greater

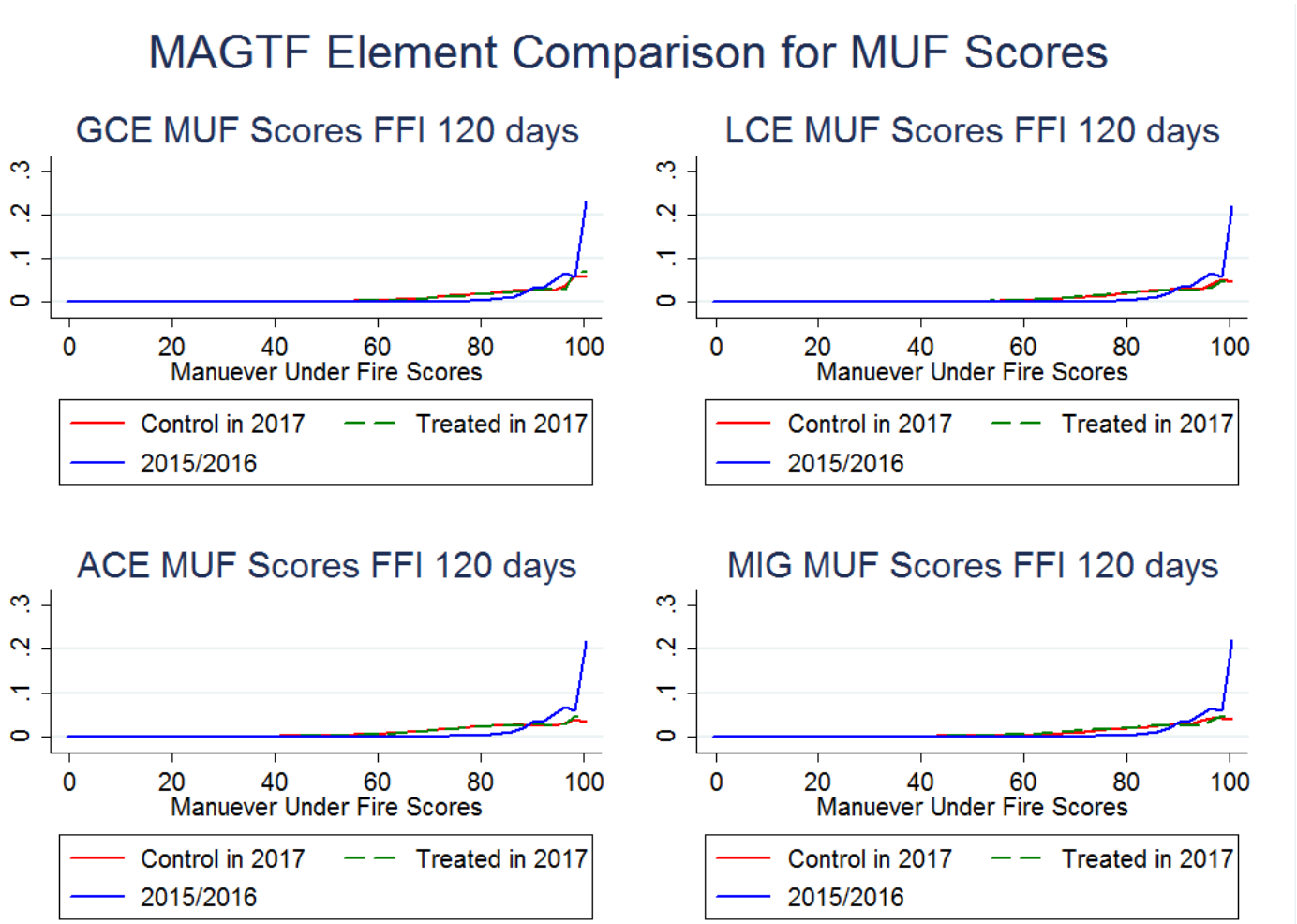

Figure 81. MAGTF Element Comparison of Maneuver under Fire Scores with FFI 120 Days or Greater

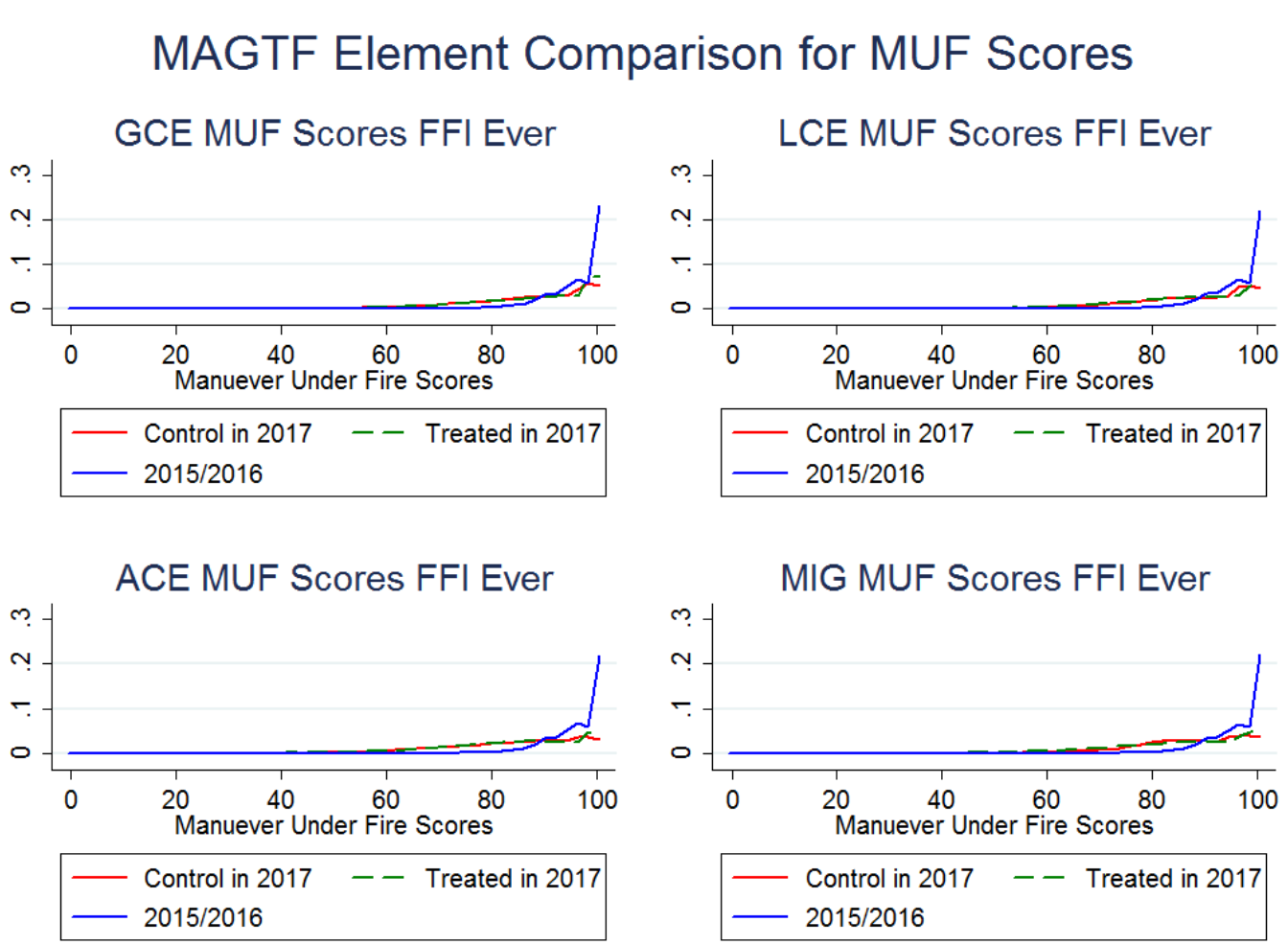

Figure 82. MAGTF Element Comparison of Maneuver under Fire Scores Ever Having an FFI

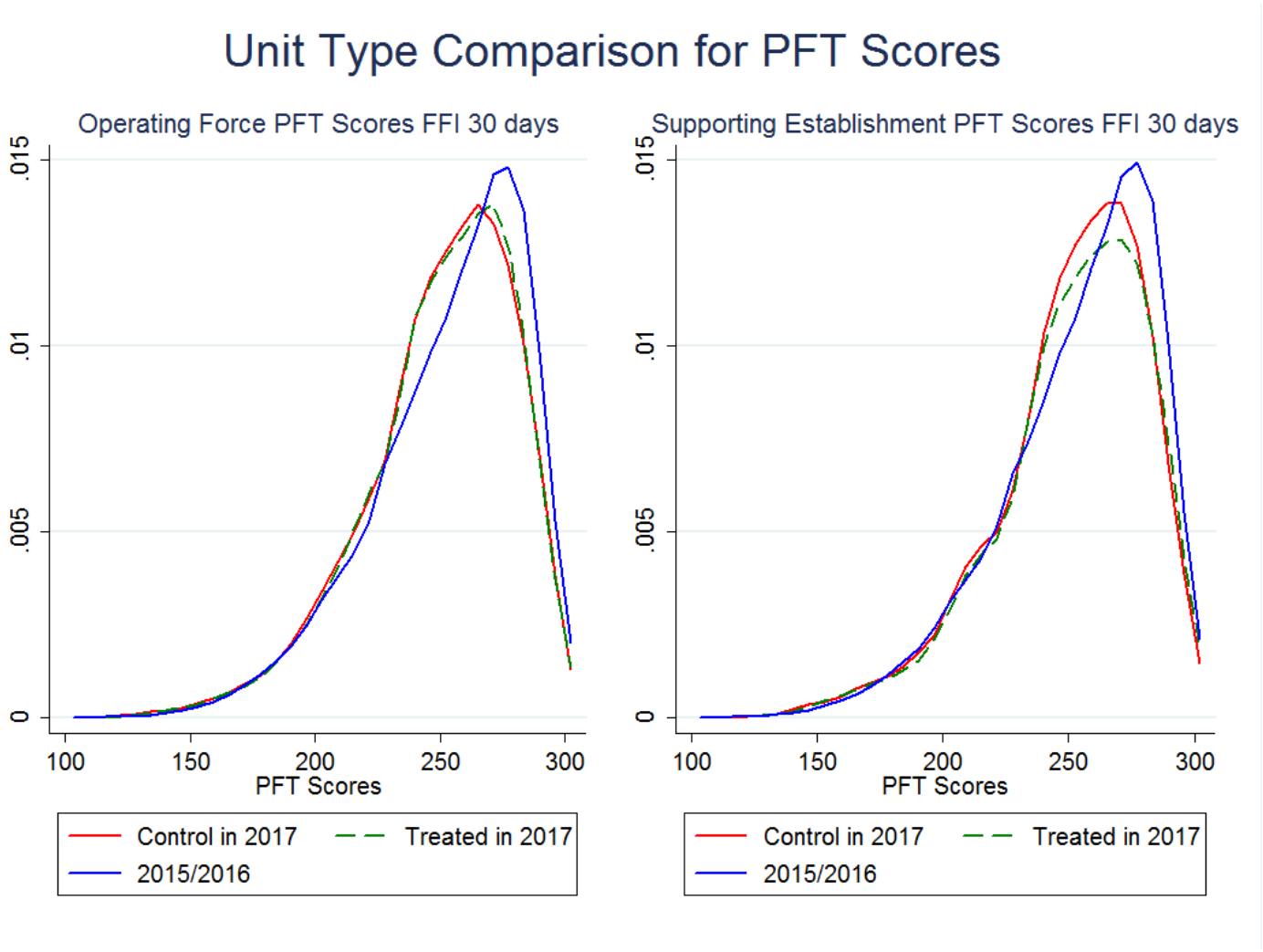

Figure 83. Operating Force and Supporting Establishment Comparison of Physical Fitness Test Scores with FFI 30 Days or Greater

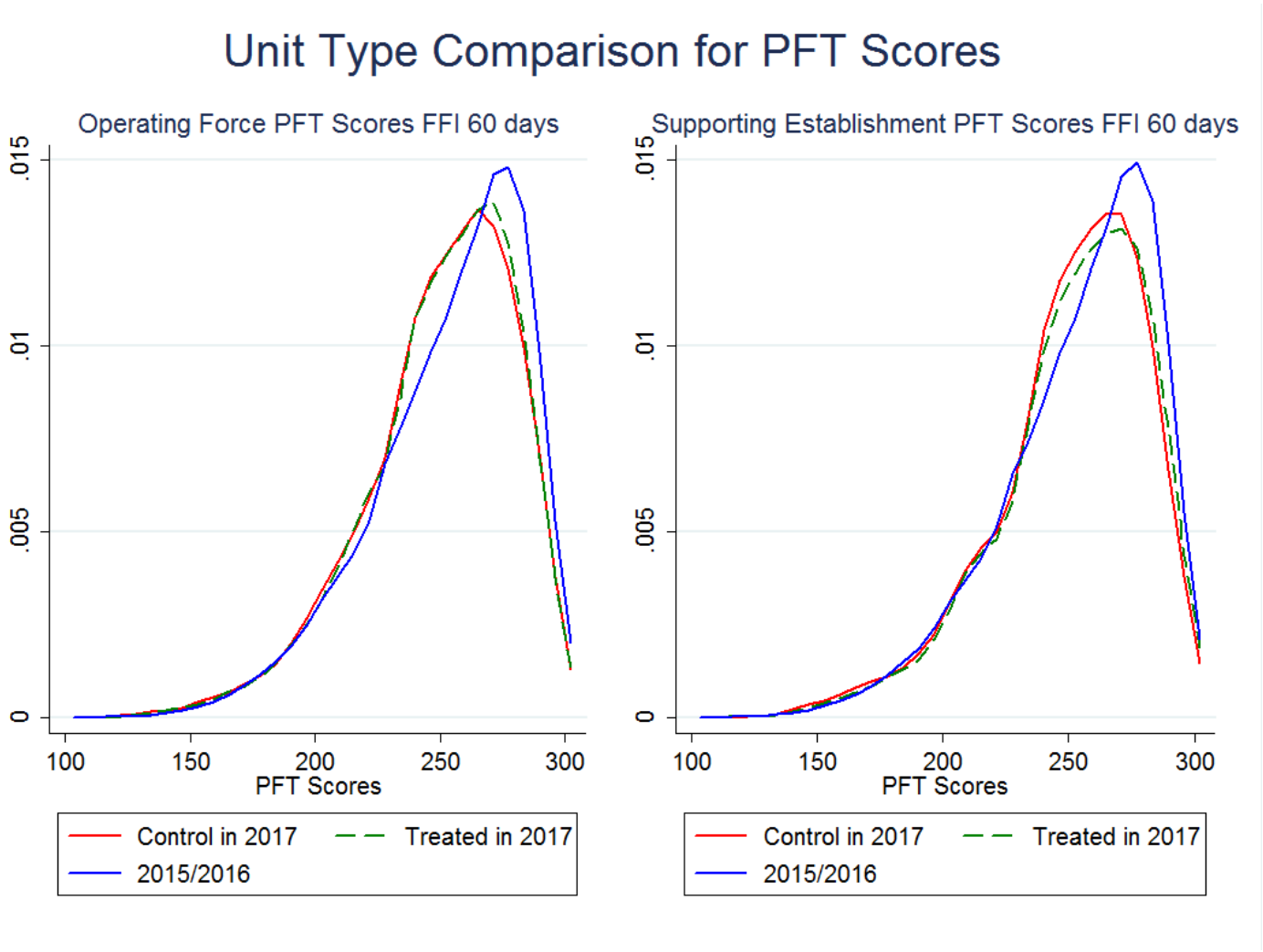

Figure 84. Operating Force and Supporting Establishment Comparison of Physical Fitness Test Scores with FFI 60 Days or Greater

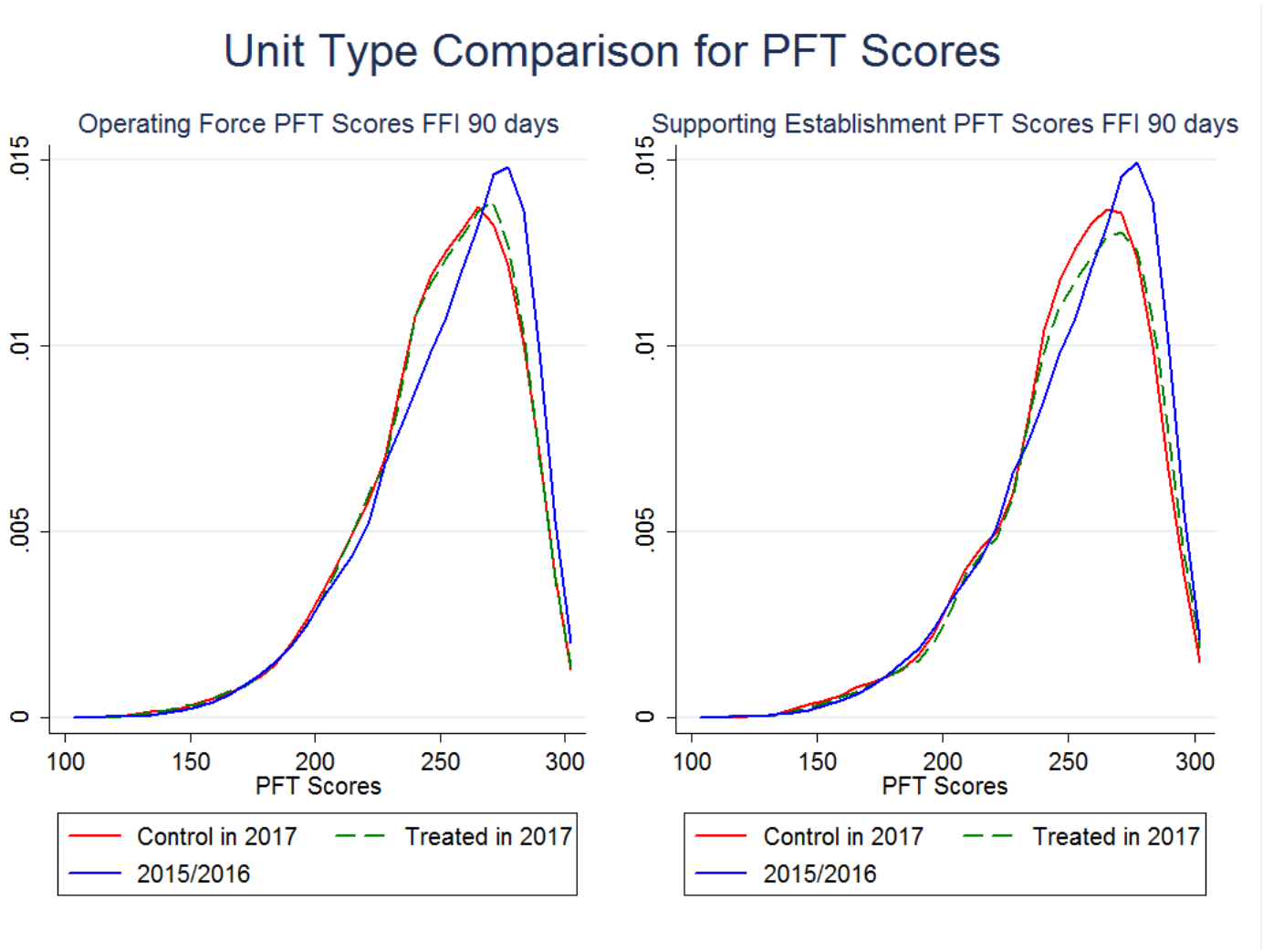

Figure 85. Operating Force and Supporting Establishment Comparison of Physical Fitness Test Scores with FFI 90 Days or Greater

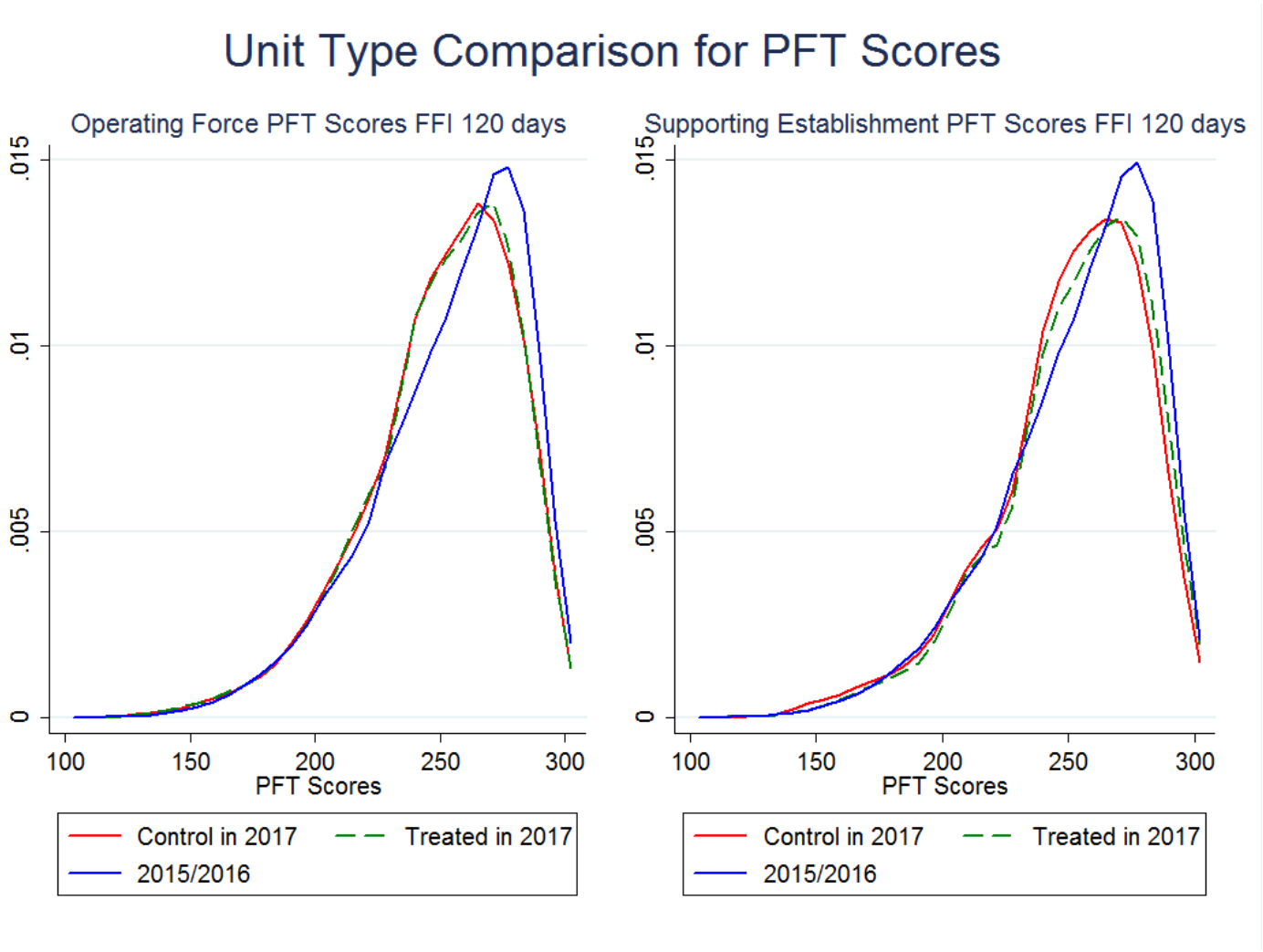

Figure 86. Operating Force and Supporting Establishment Comparison of Physical Fitness Test Scores with FFI 120 Days or Greater

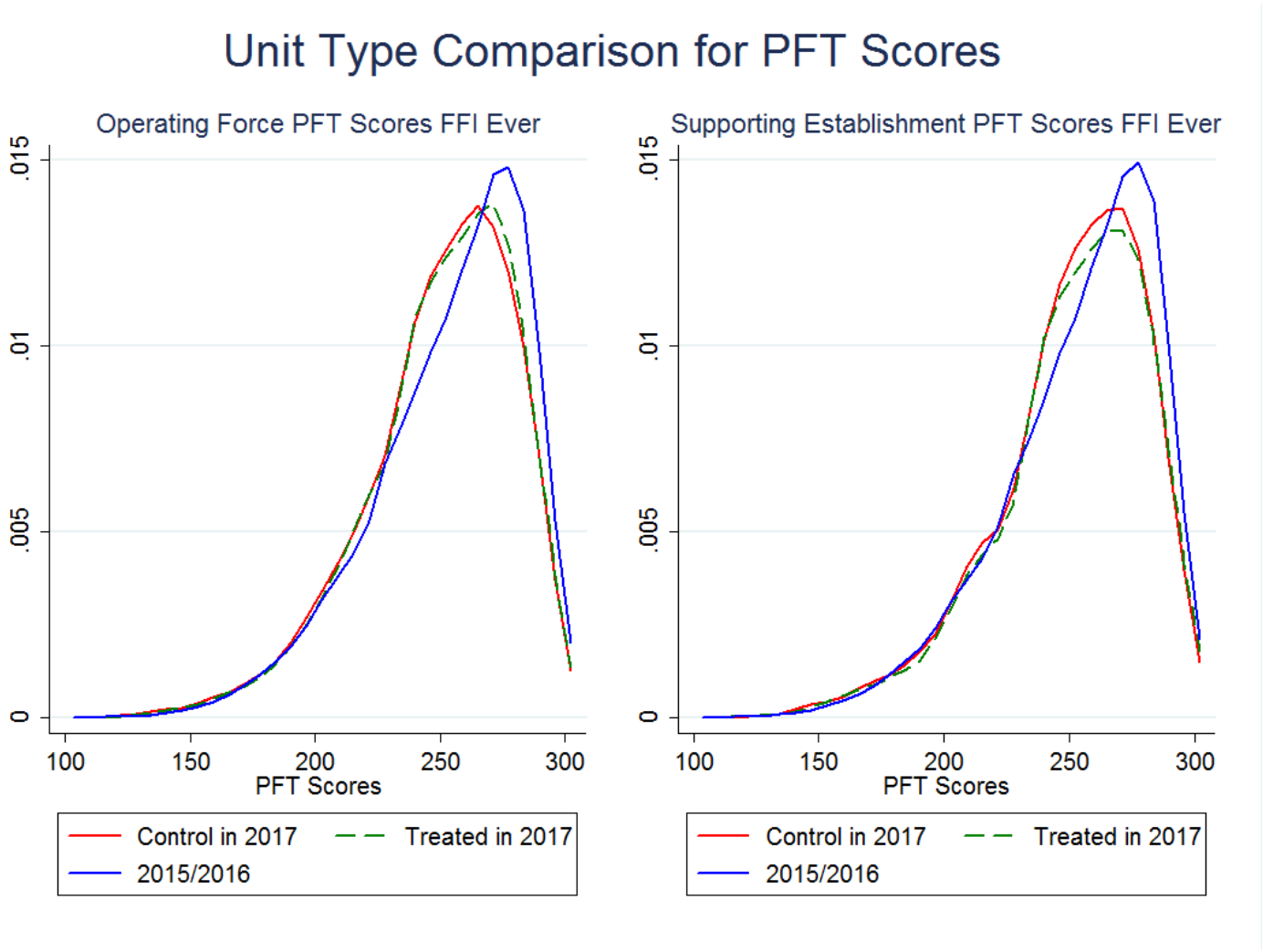

Figure 87. Operating Force and Supporting Establishment Comparison of Physical Fitness Test Scores Ever Having an FFI

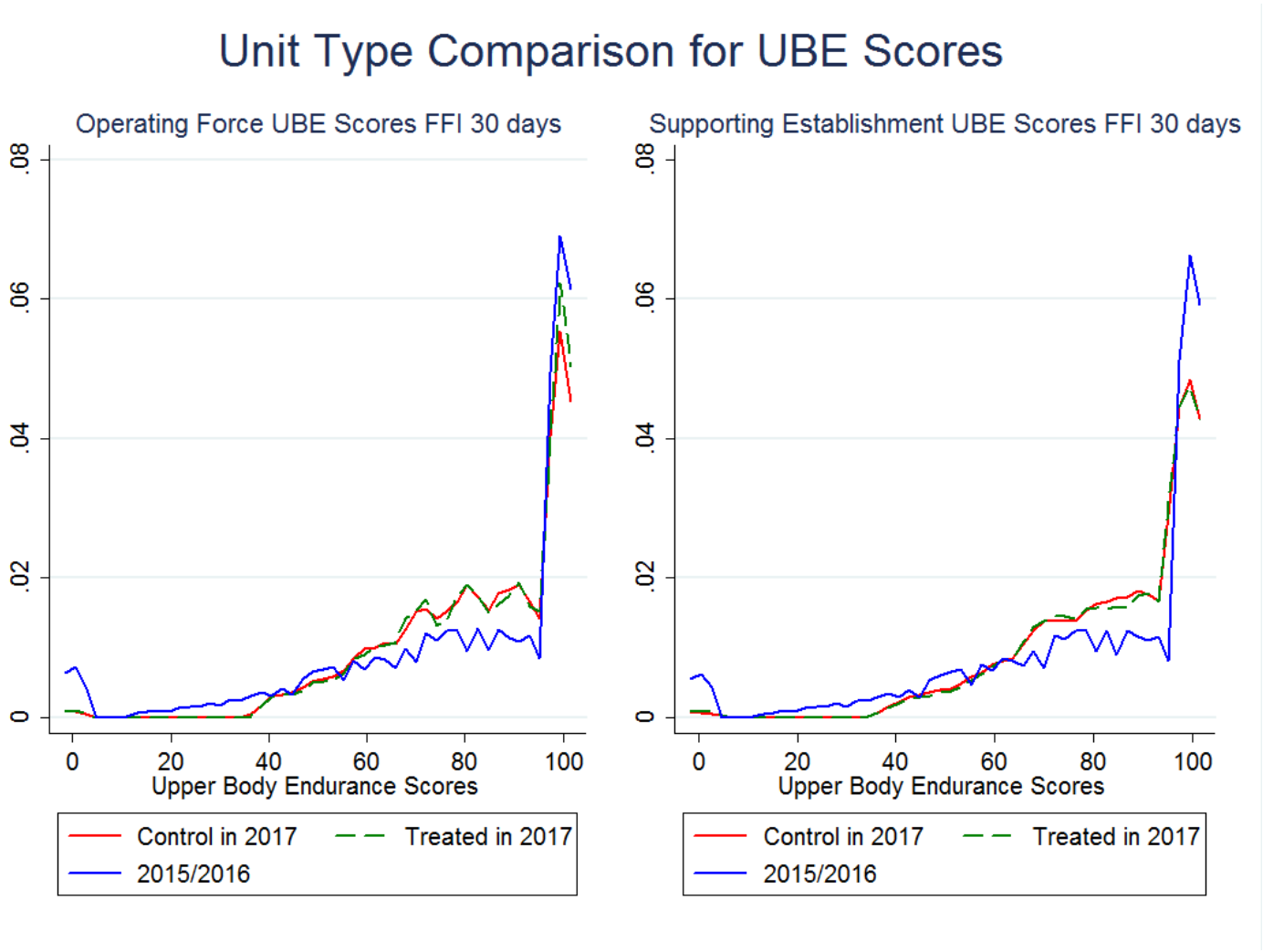

Figure 88. Operating Force and Supporting Establishment Comparison of Upper Body Endurance Scores with FFI 30 Days or Greater

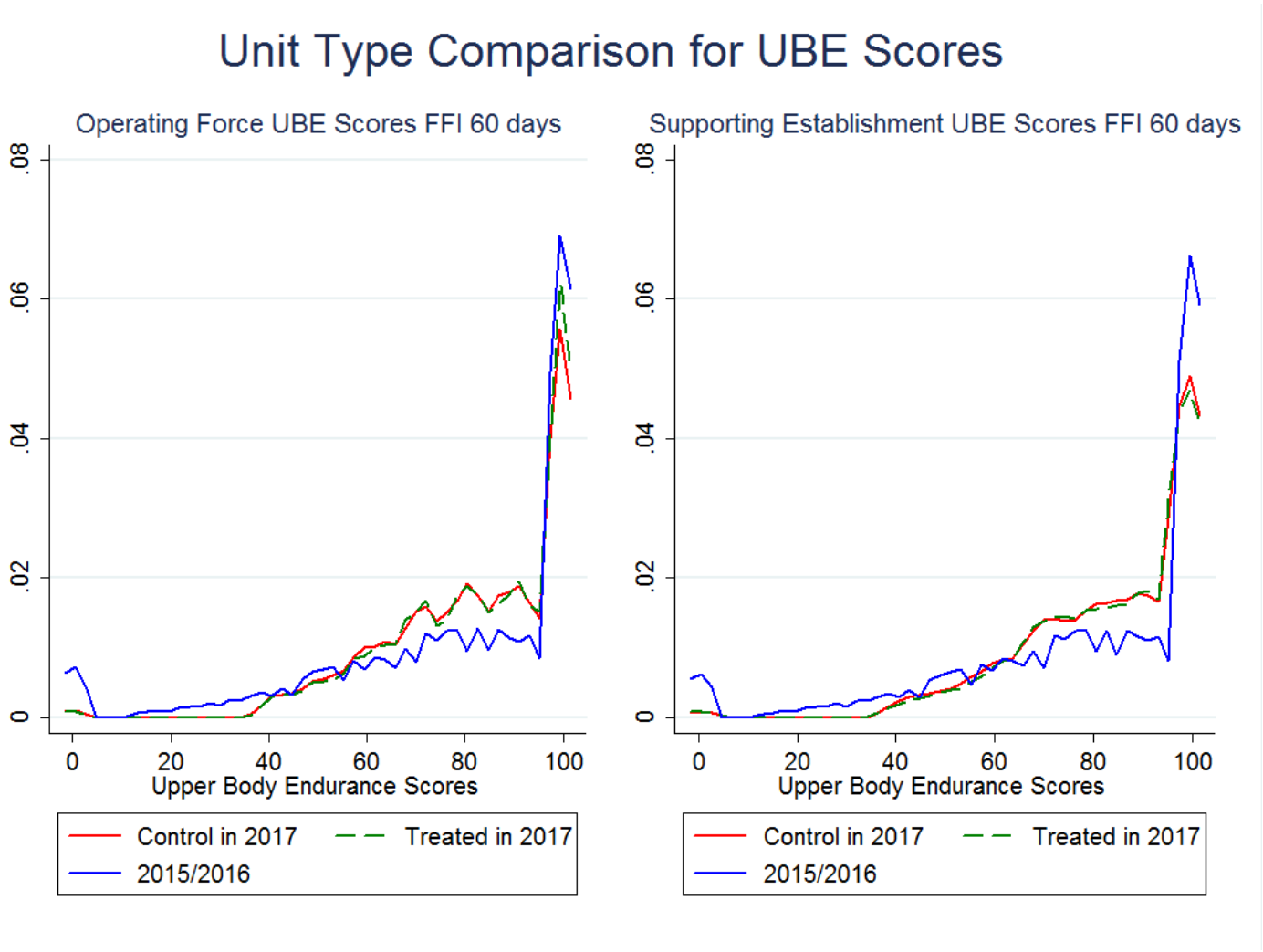

Figure 89. Operating Force and Supporting Establishment Comparison of Upper Body Endurance Scores with FFI 60 Days or Greater

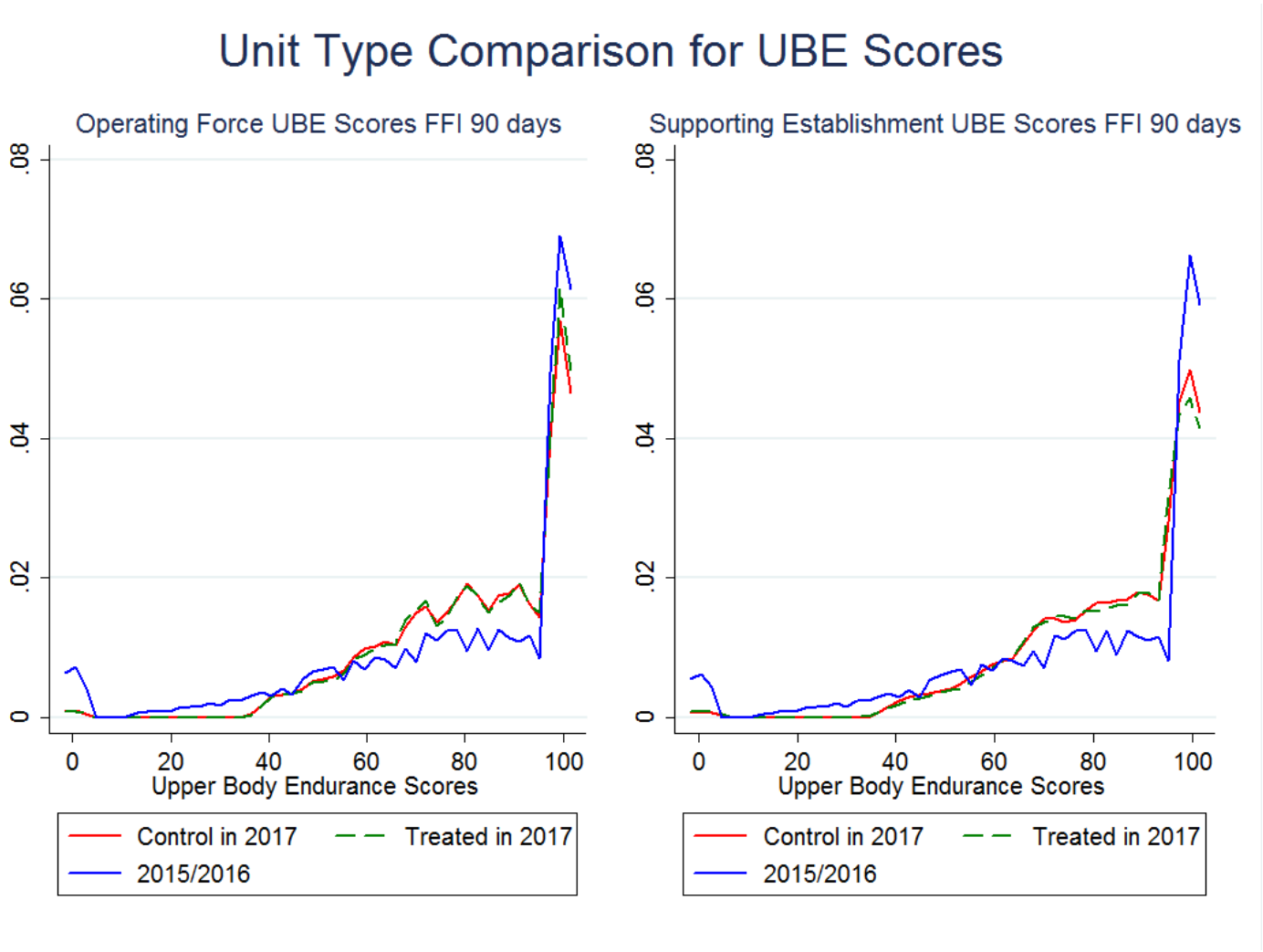

Figure 90. Operating Force and Supporting Establishment Comparison of Upper Body Endurance Scores with FFI 90 Days or Greater

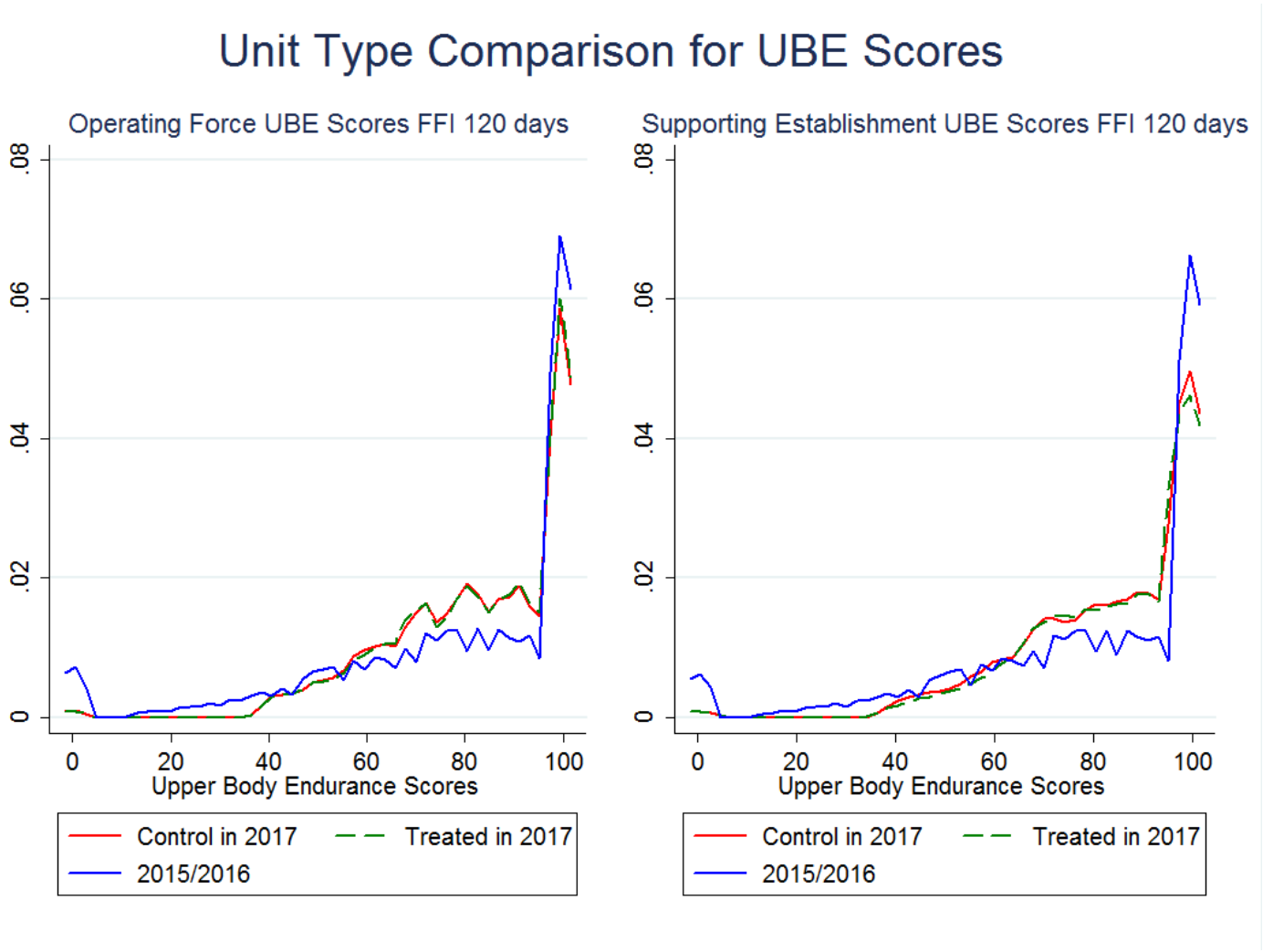

Figure 91. Operating Force and Supporting Establishment Comparison of Upper Body Endurance Scores with FFI 120 Days or Greater

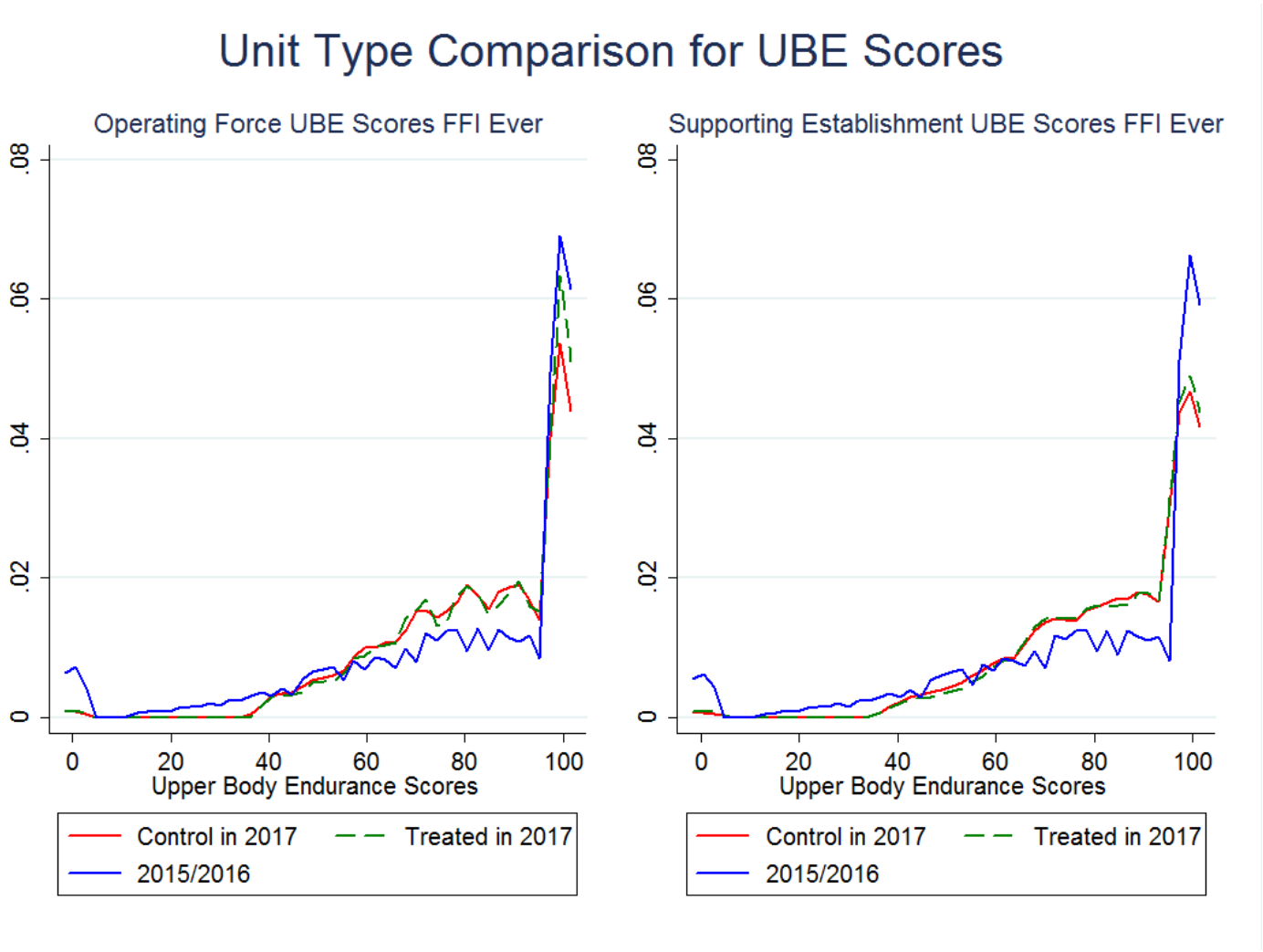

Figure 92. Operating Force and Supporting Establishment Comparison of Upper Body Endurance Scores Ever Having an FFI

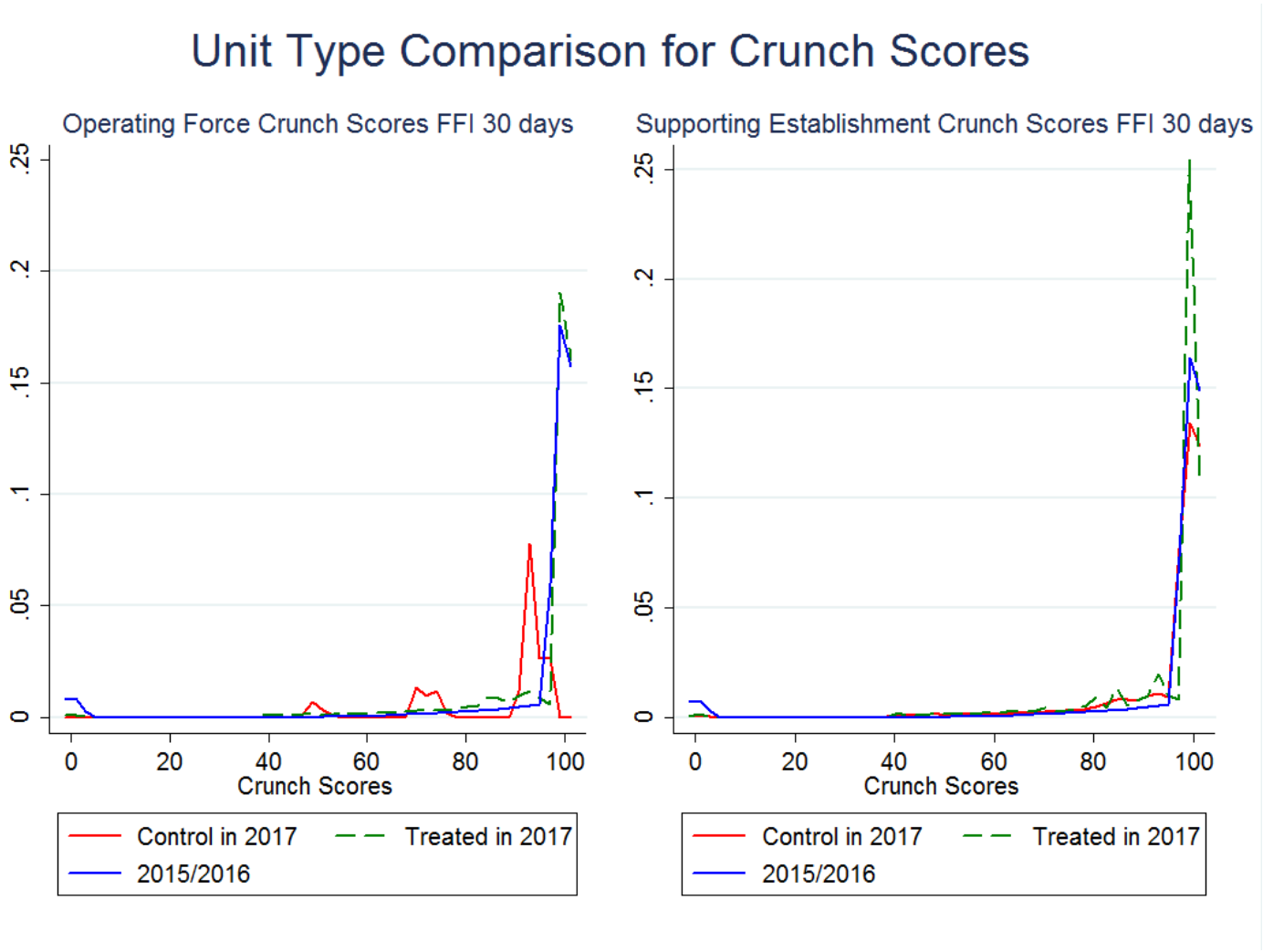

Figure 93. Operating Force and Supporting Establishment Comparison of Crunch Scores with FFI 30 Days or Greater

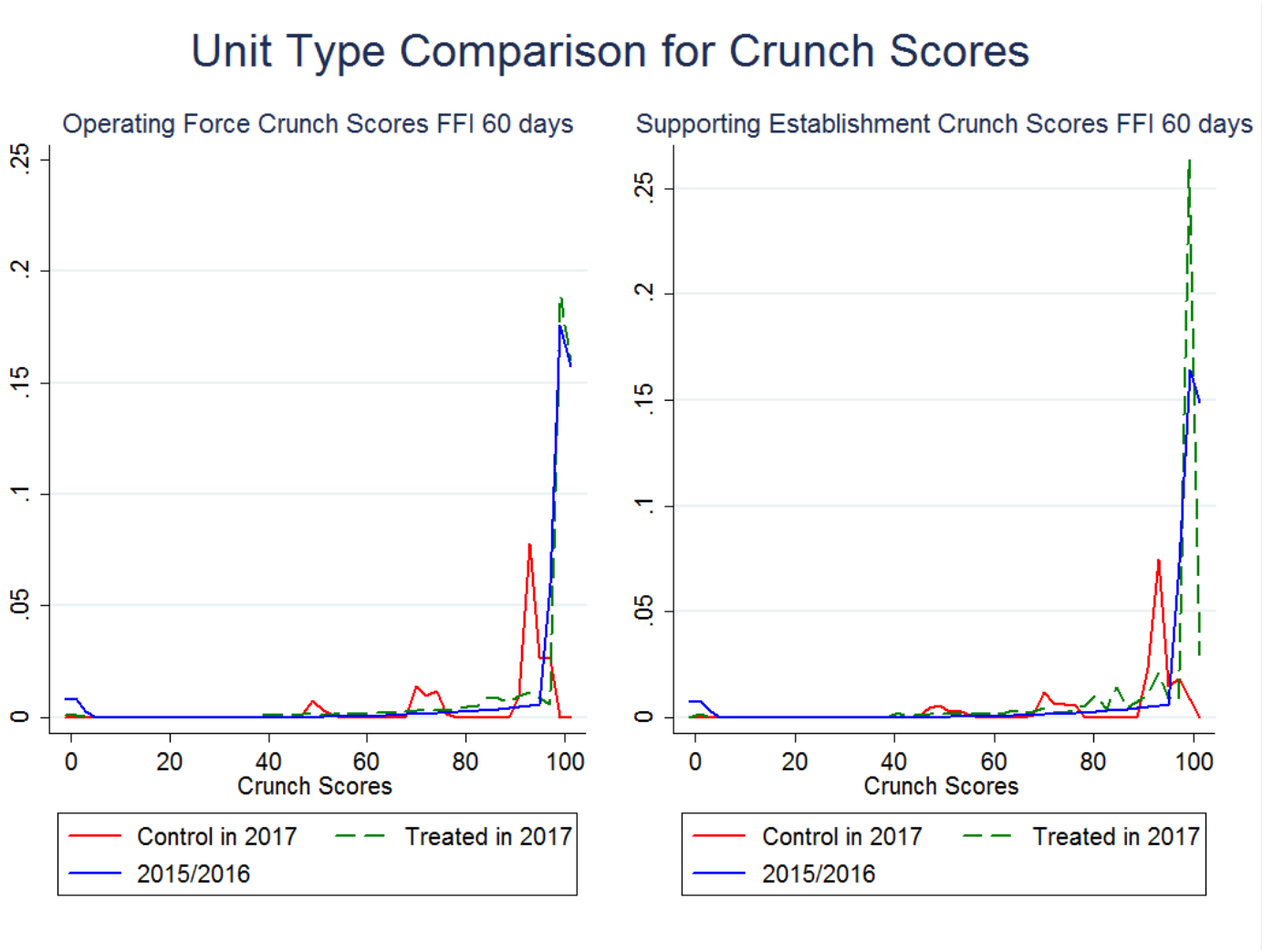

Figure 94. Operating Force and Supporting Establishment Comparison of Crunch Scores with FFI 60 Days or Greater

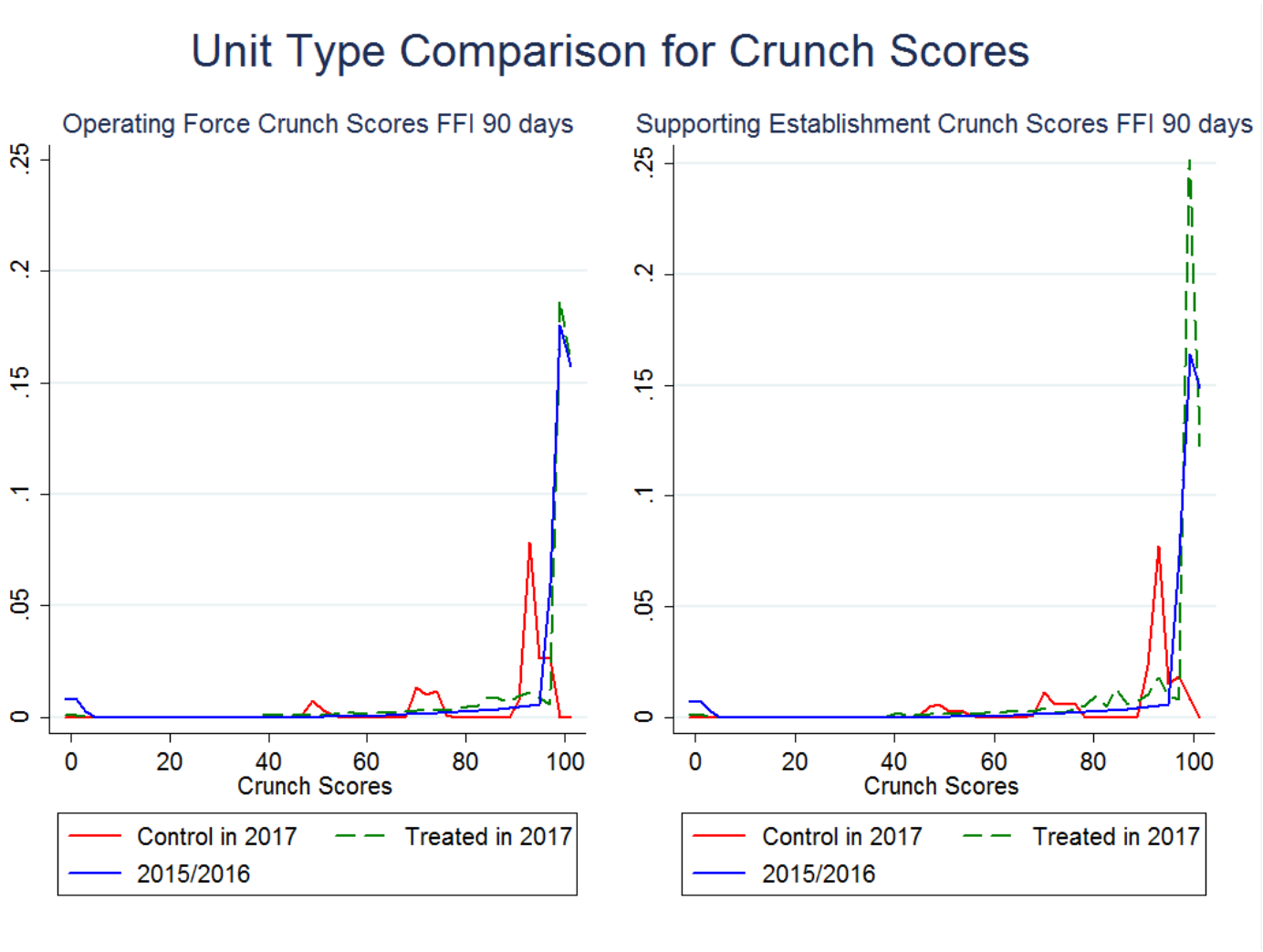

Figure 95. Operating Force and Supporting Establishment Comparison of Crunch Scores with FFI 90 Days or Greater

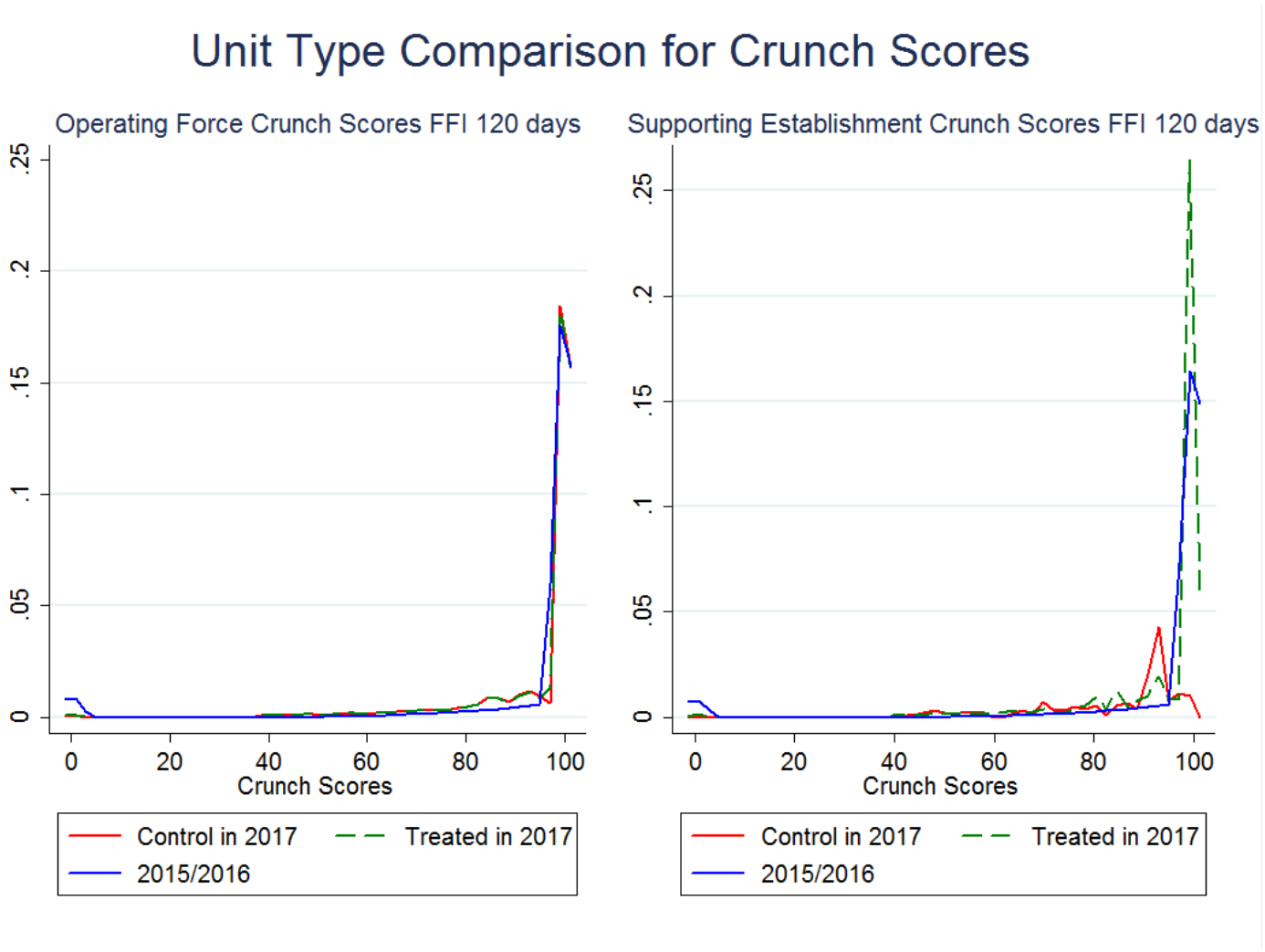

Figure 96. Operating Force and Supporting Establishment Comparison of Crunch Scores with FFI 120 Days or Greater

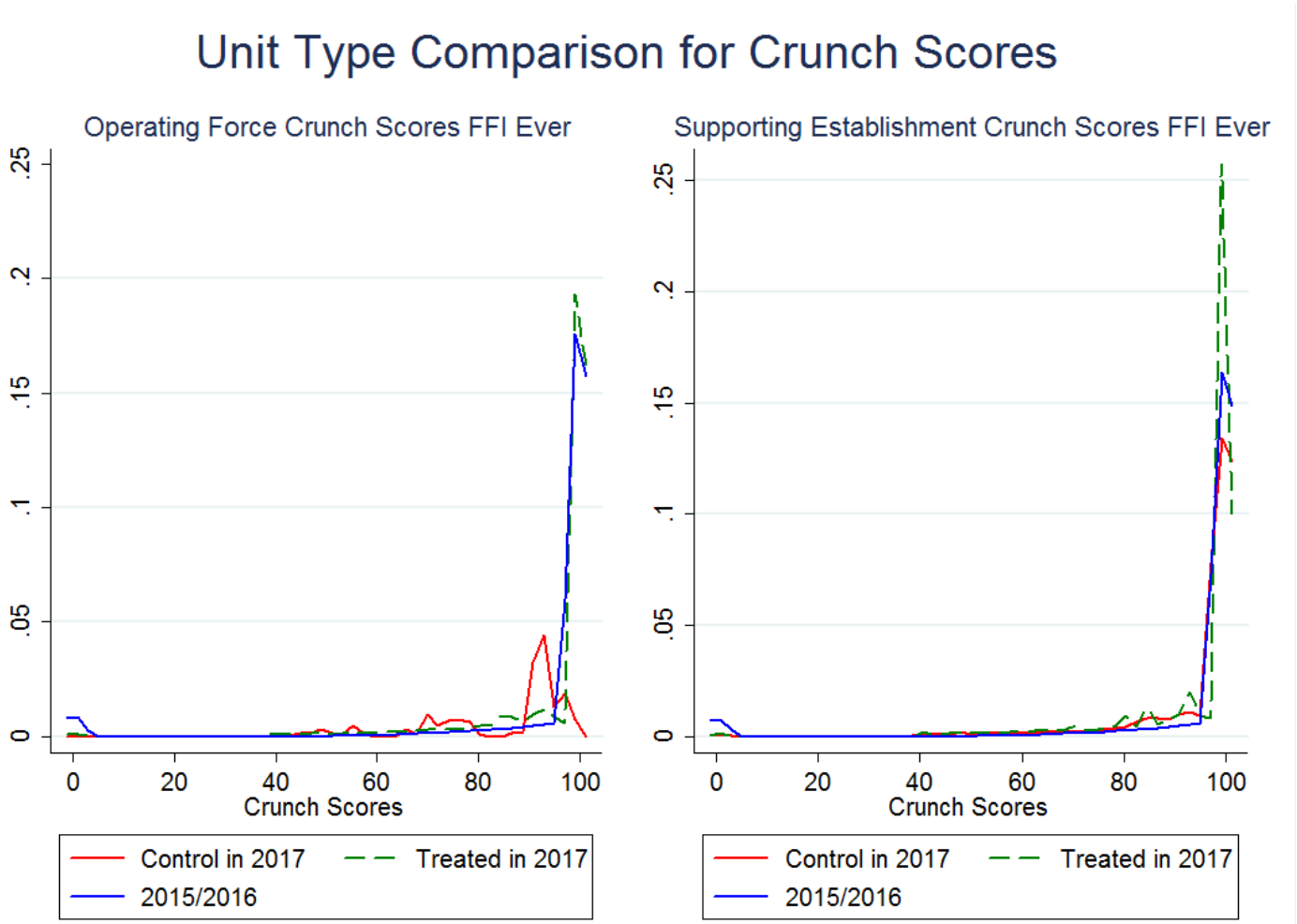

Figure 97. Operating Force and Supporting Establishment Comparison of Crunch Scores Ever Having an FFI

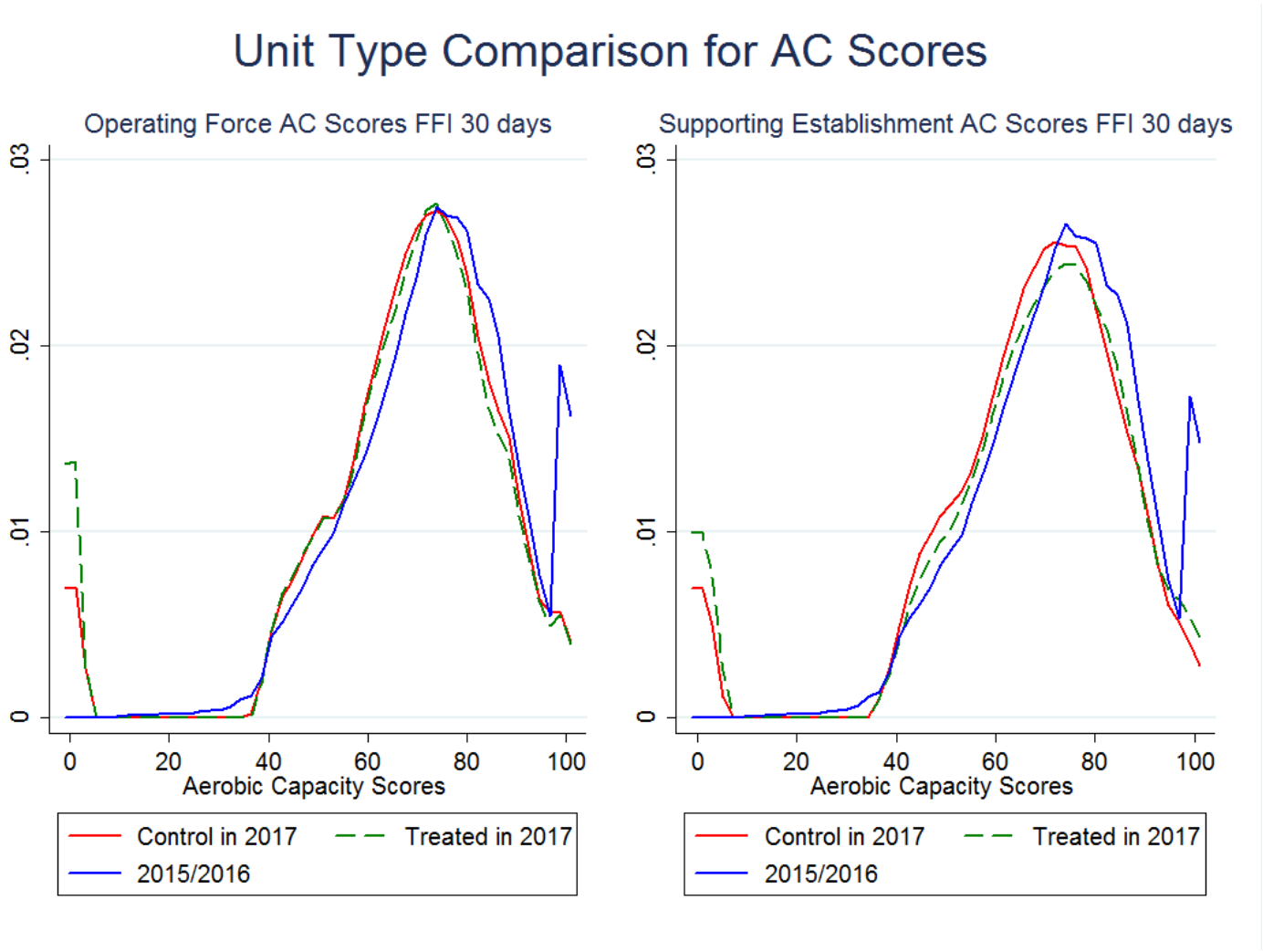

Figure 98. Operating Force and Supporting Establishment Comparison of Aerobic Capacity Scores with FFI 30 Days or Greater

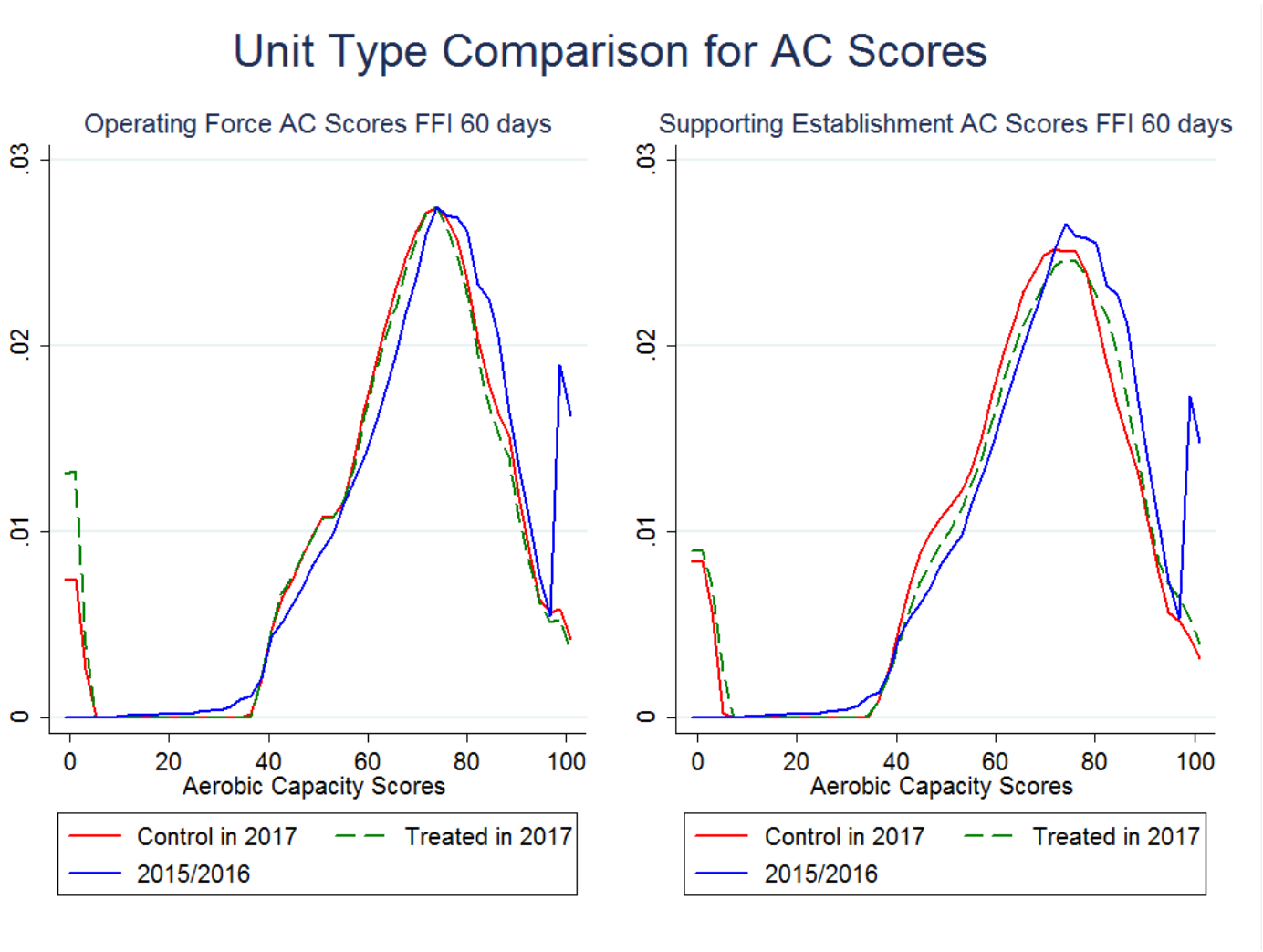

Figure 99. Operating Force and Supporting Establishment Comparison of Aerobic Capacity Scores with FFI 60 Days or Greater

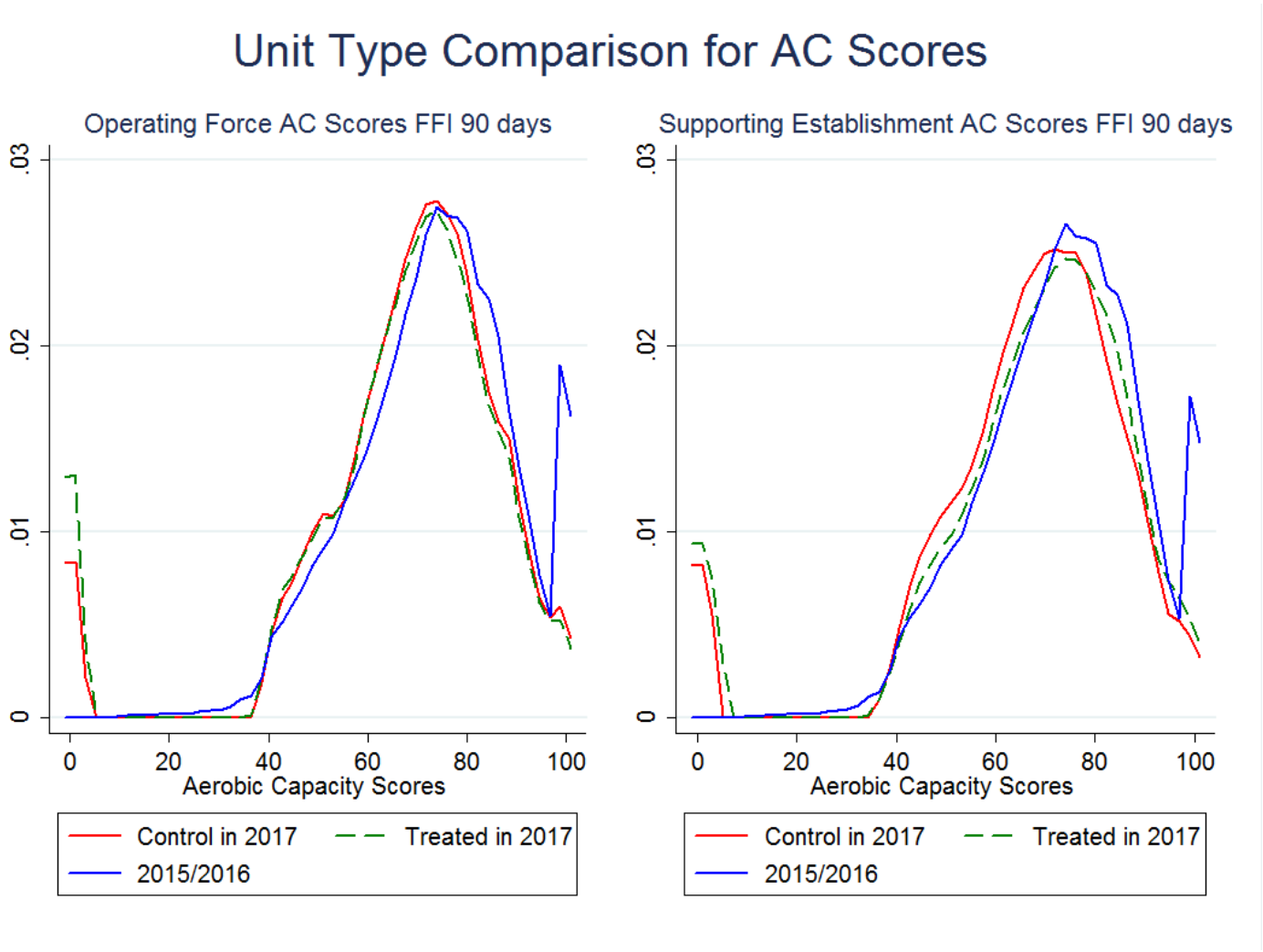

Figure 100. Operating Force and Supporting Establishment Comparison of Aerobic Capacity Scores with FFI 90 Days or Greater

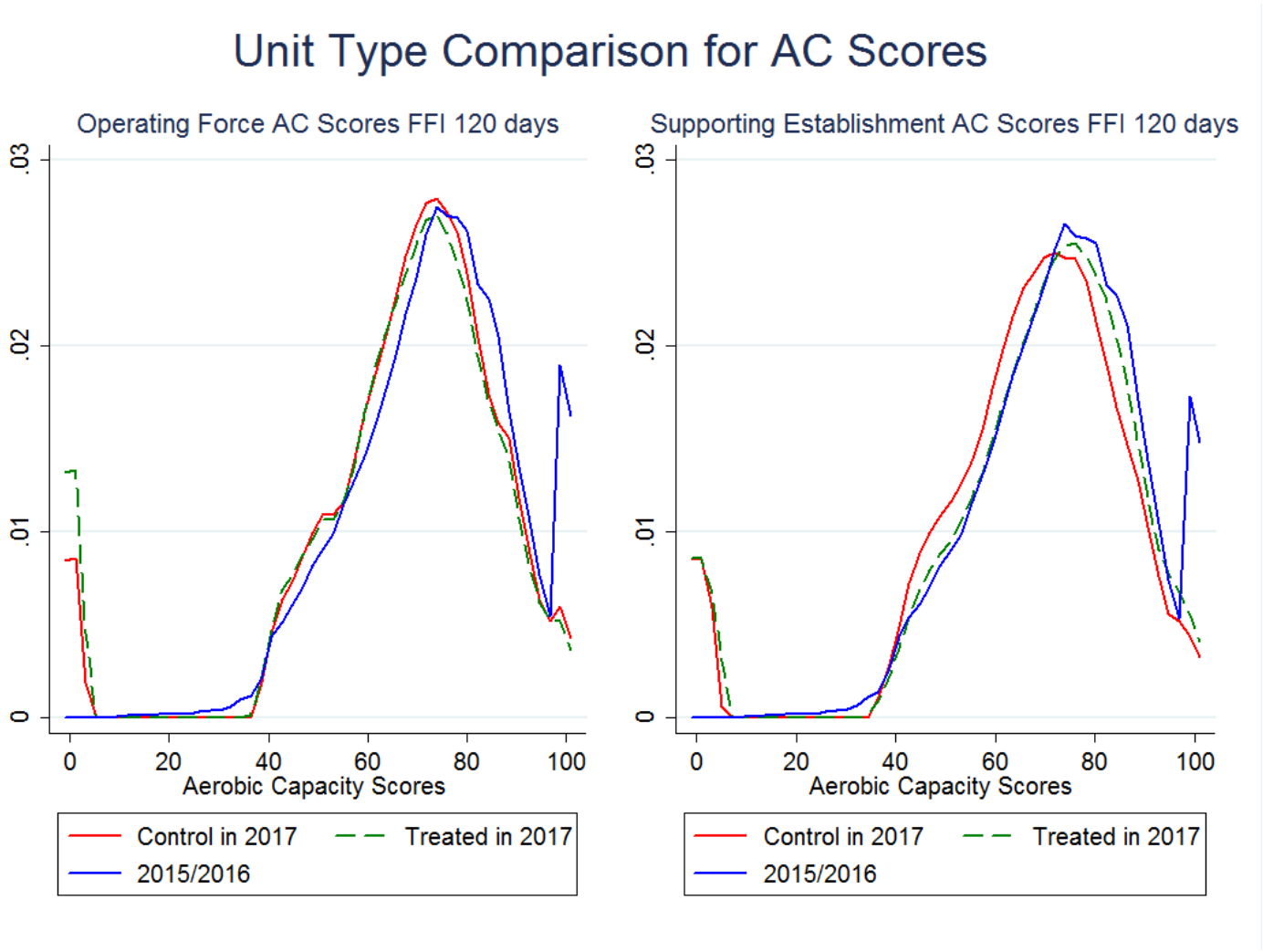

Figure 101. Operating Force and Supporting Establishment Comparison of Aerobic Capacity Scores with FFI 120 Days or Greater

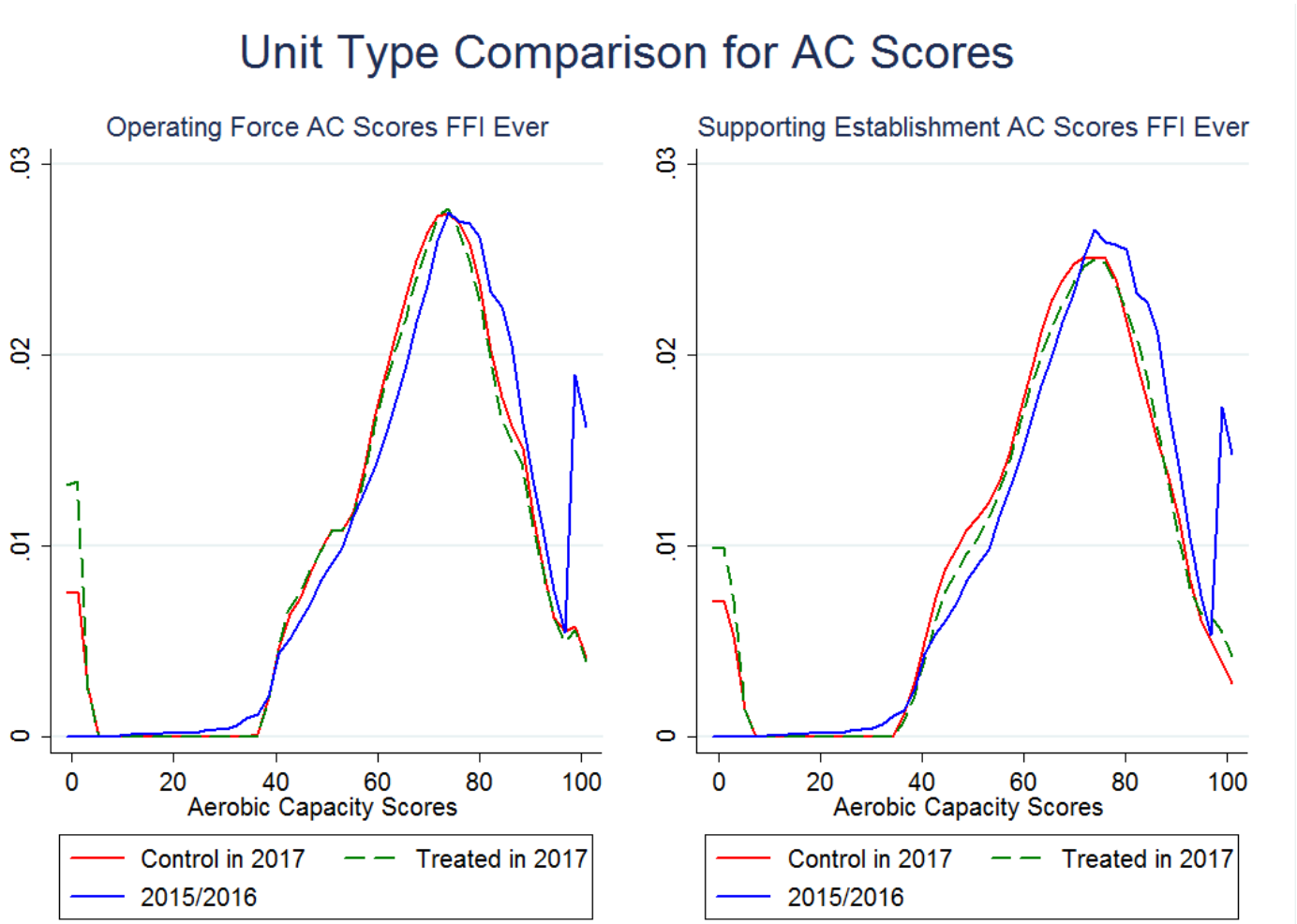

Figure 102. Operating Force and Supporting Establishment Comparison of Aerobic Capacity Scores Ever Having an FFI

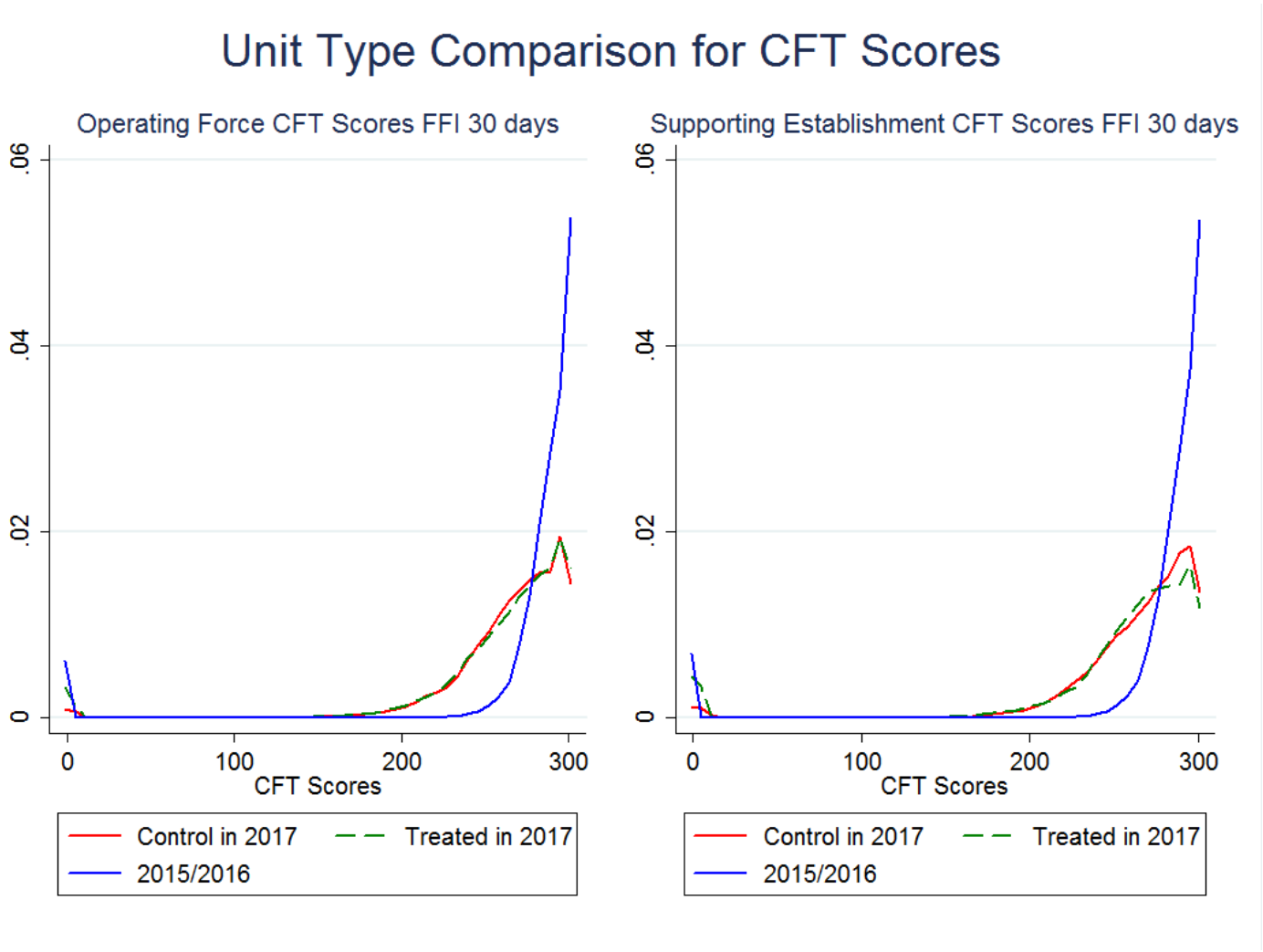

Figure 103. Operating Force and Supporting Establishment Comparison of Combat Fitness Test Scores with FFI 30 Days or Greater

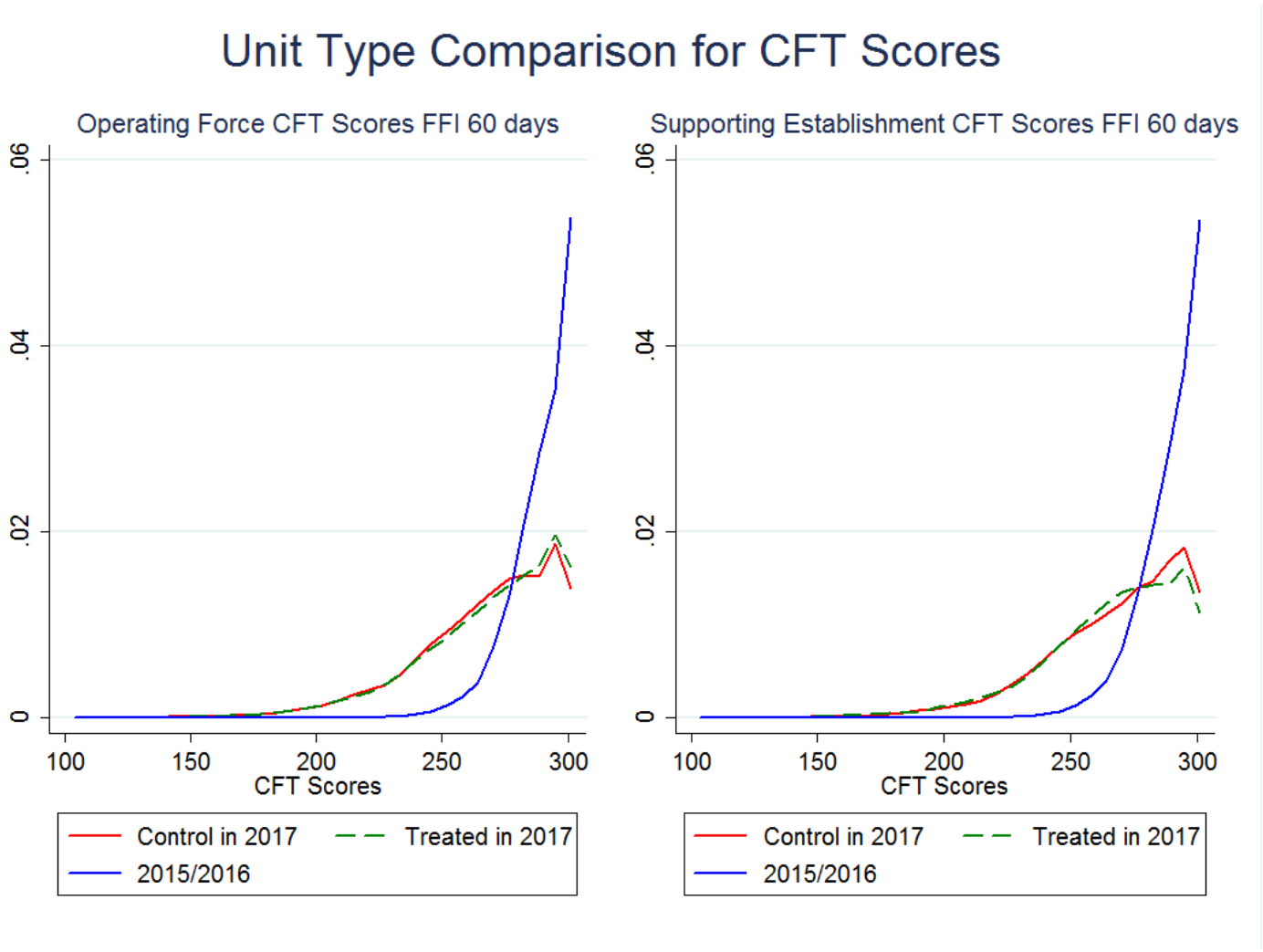

Figure 104. Operating Force and Supporting Establishment Comparison of Combat Fitness Test Scores with FFI 60 Days or Greater

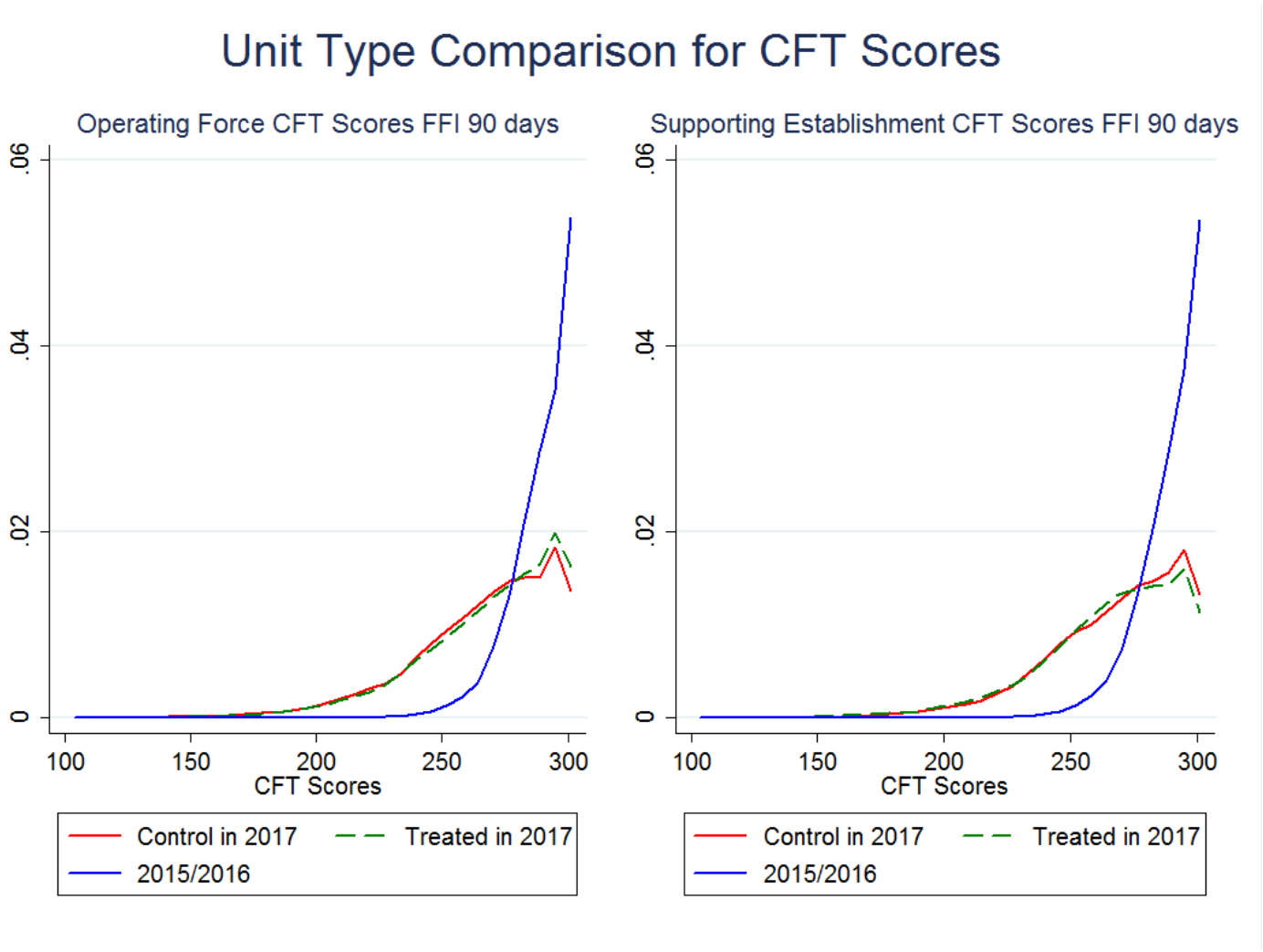

Figure 105. Operating Force and Supporting Establishment Comparison of Combat Fitness Test Scores with FFI 90 Days or Greater

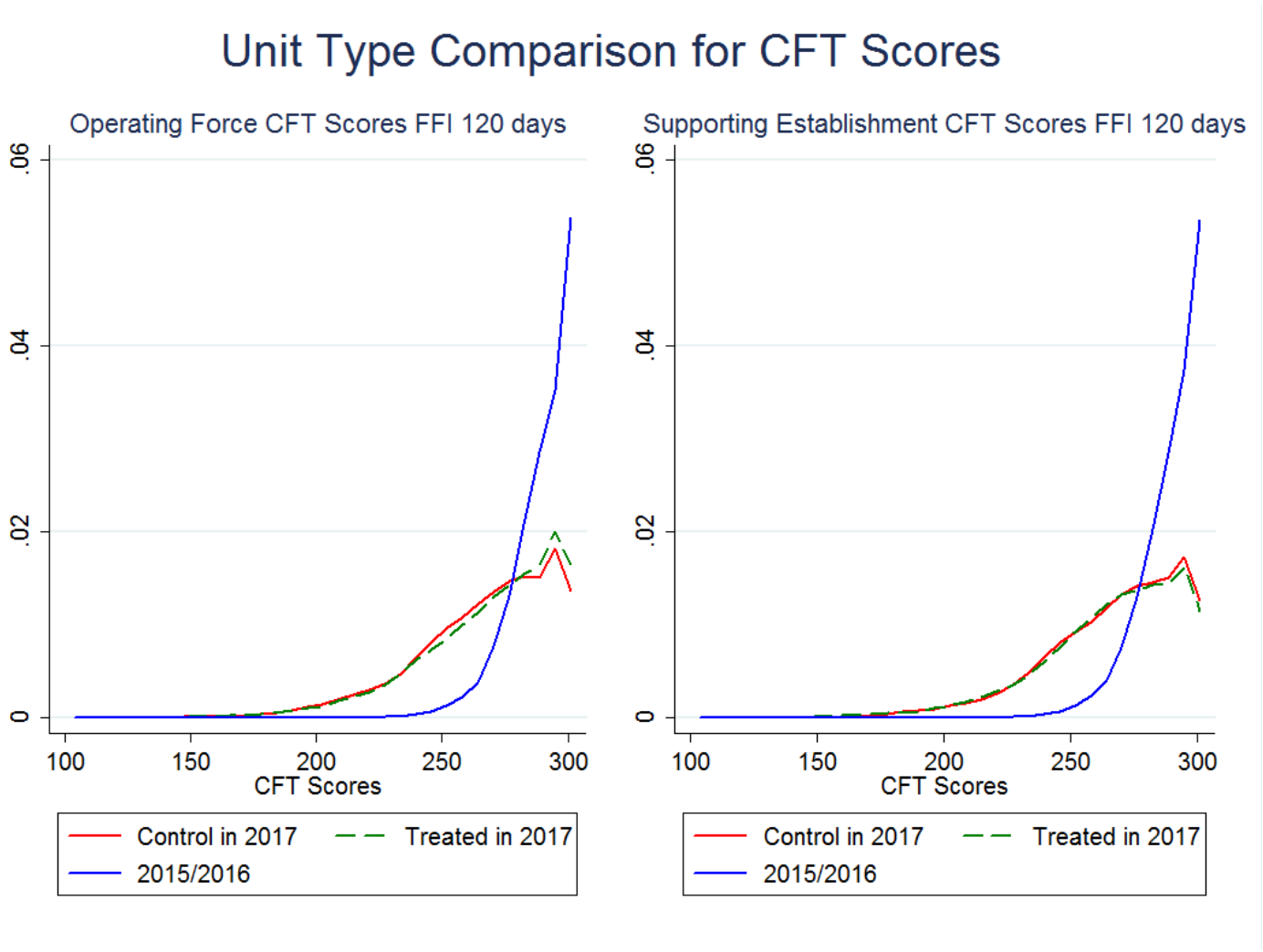

Figure 106. Operating Force and Supporting Establishment Comparison of Combat Fitness Test Scores with FFI 120 Days or Greater

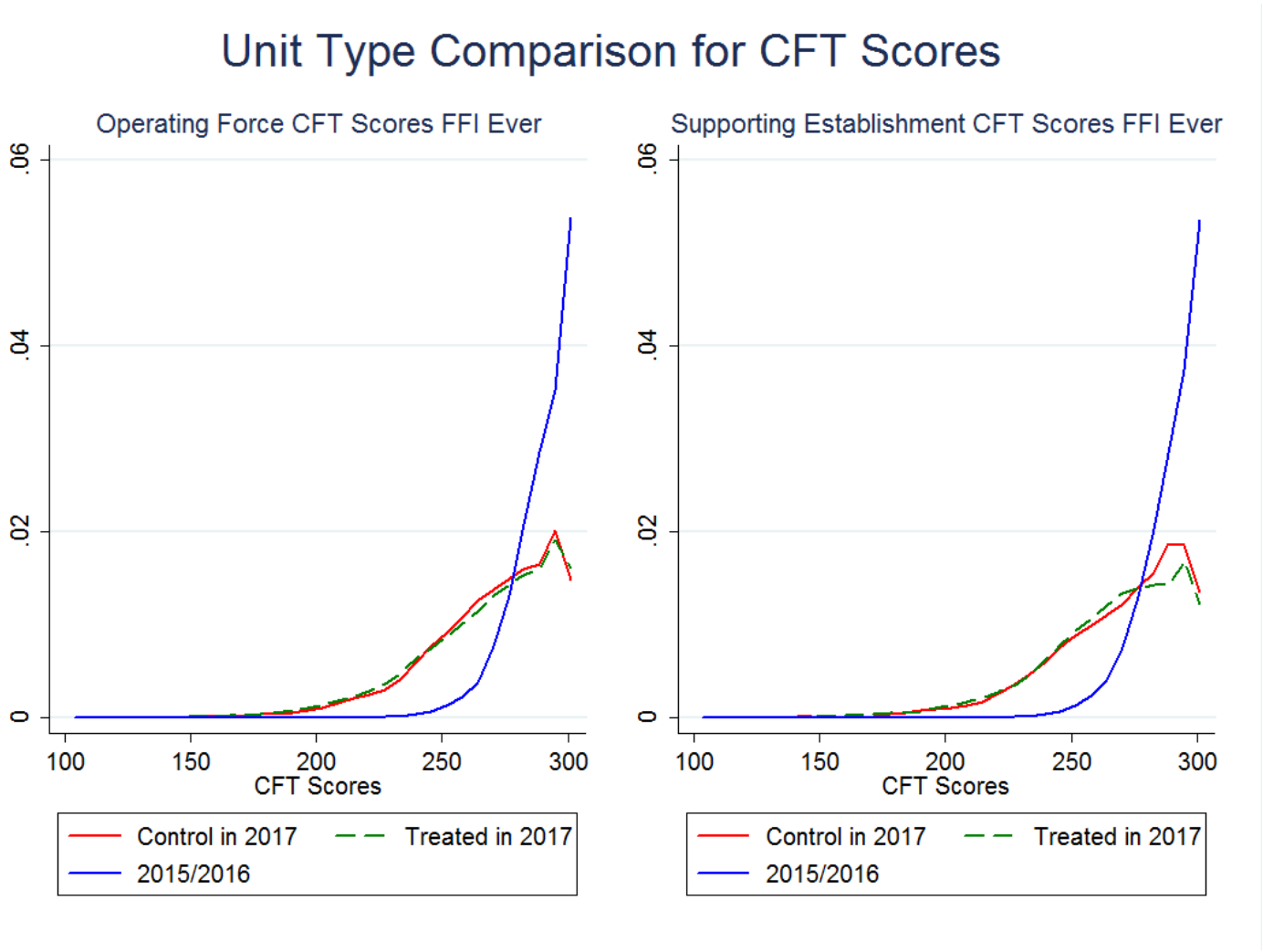

Figure 107. Operating Force and Supporting Establishment Comparison of Combat Fitness Test Scores Ever Having an FFI

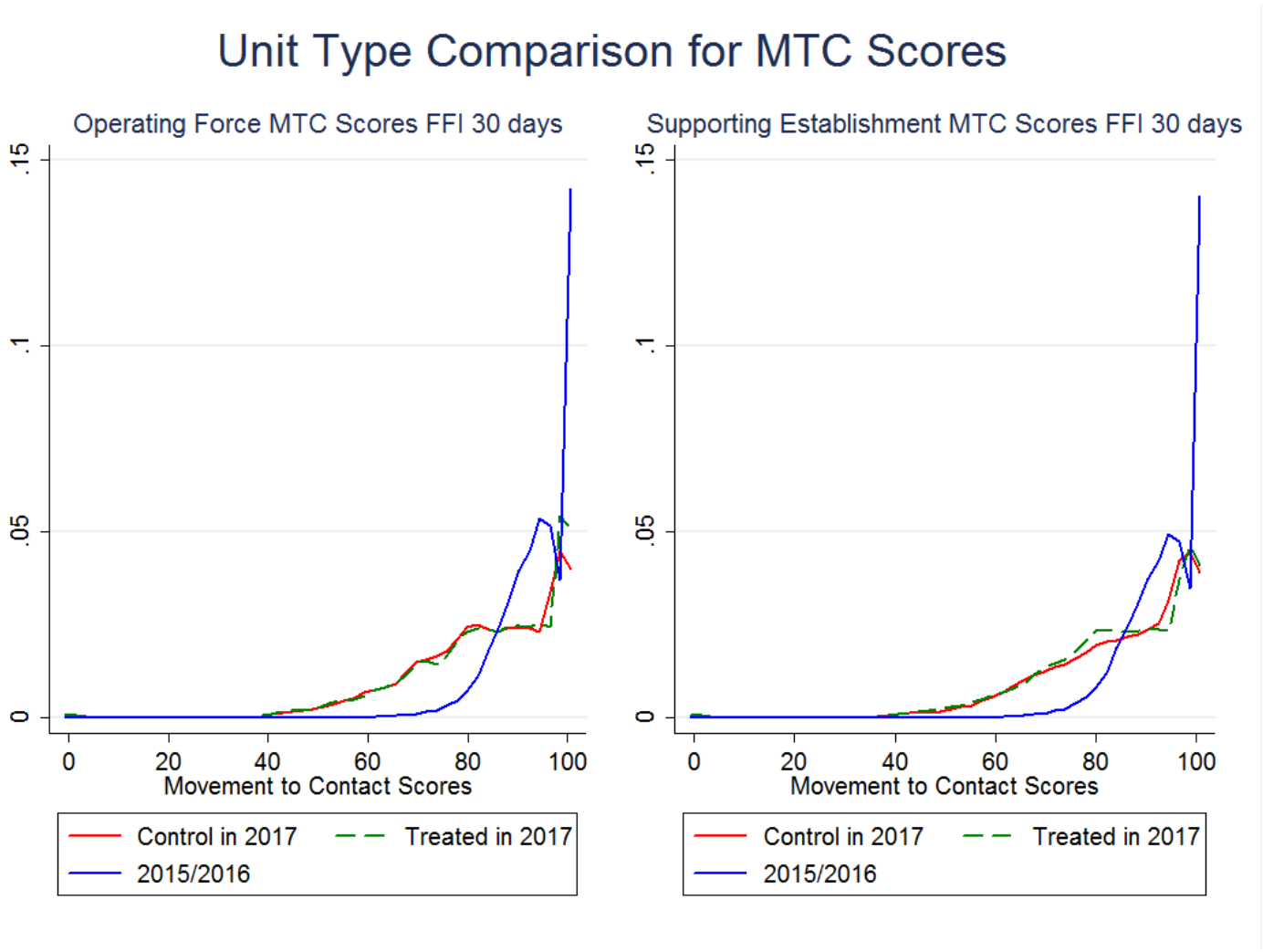

Figure 108. Operating Force and Supporting Establishment Comparison of Movement to Contact Scores with FFI 30 Days or Greater

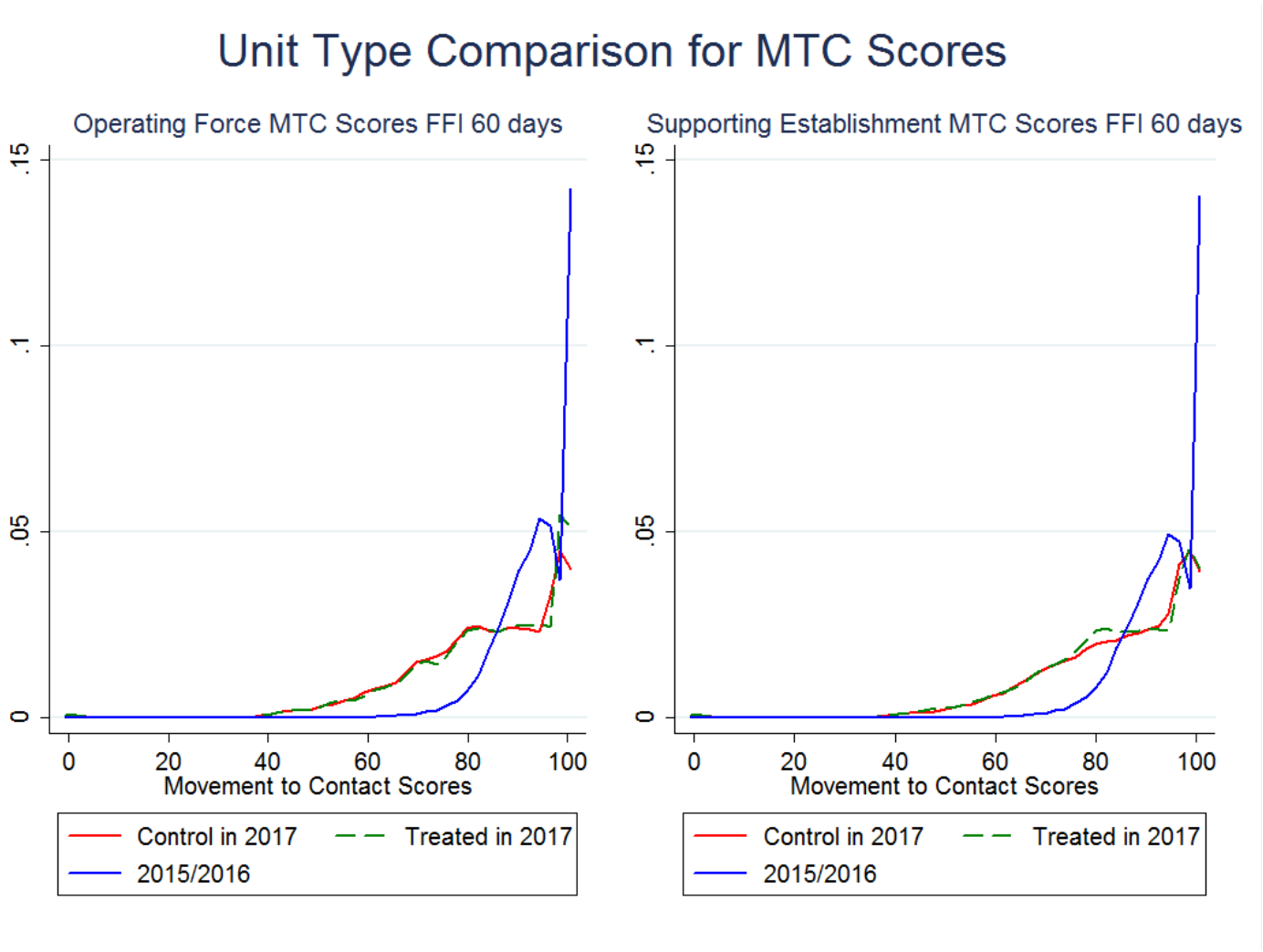

Figure 109. Operating Force and Supporting Establishment Comparison of Movement to Contact Scores with FFI 60 Days or Greater

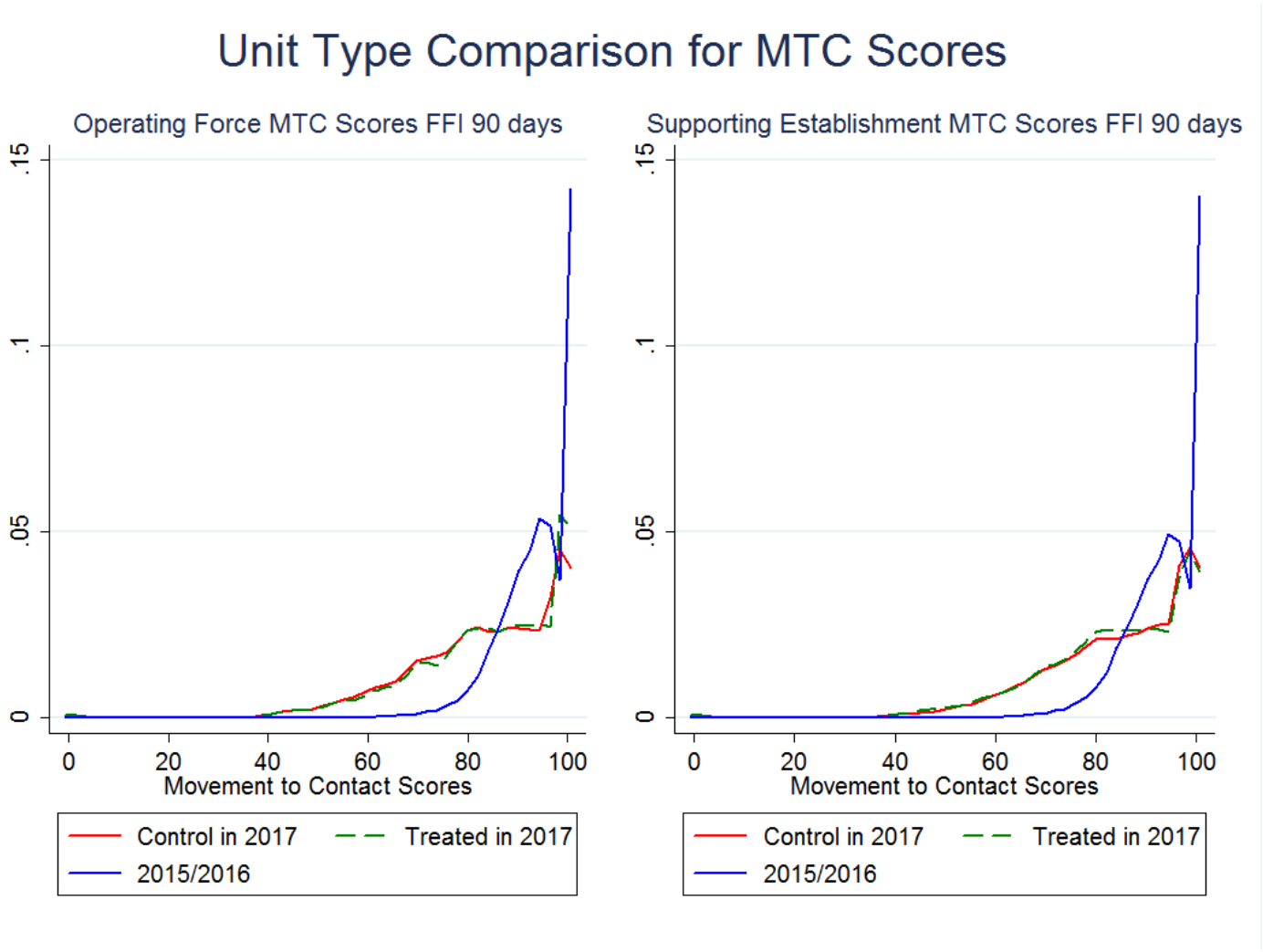

Figure 110. Operating Force and Supporting Establishment Comparison of Movement to Contact Scores with FFI 90 Days or Greater

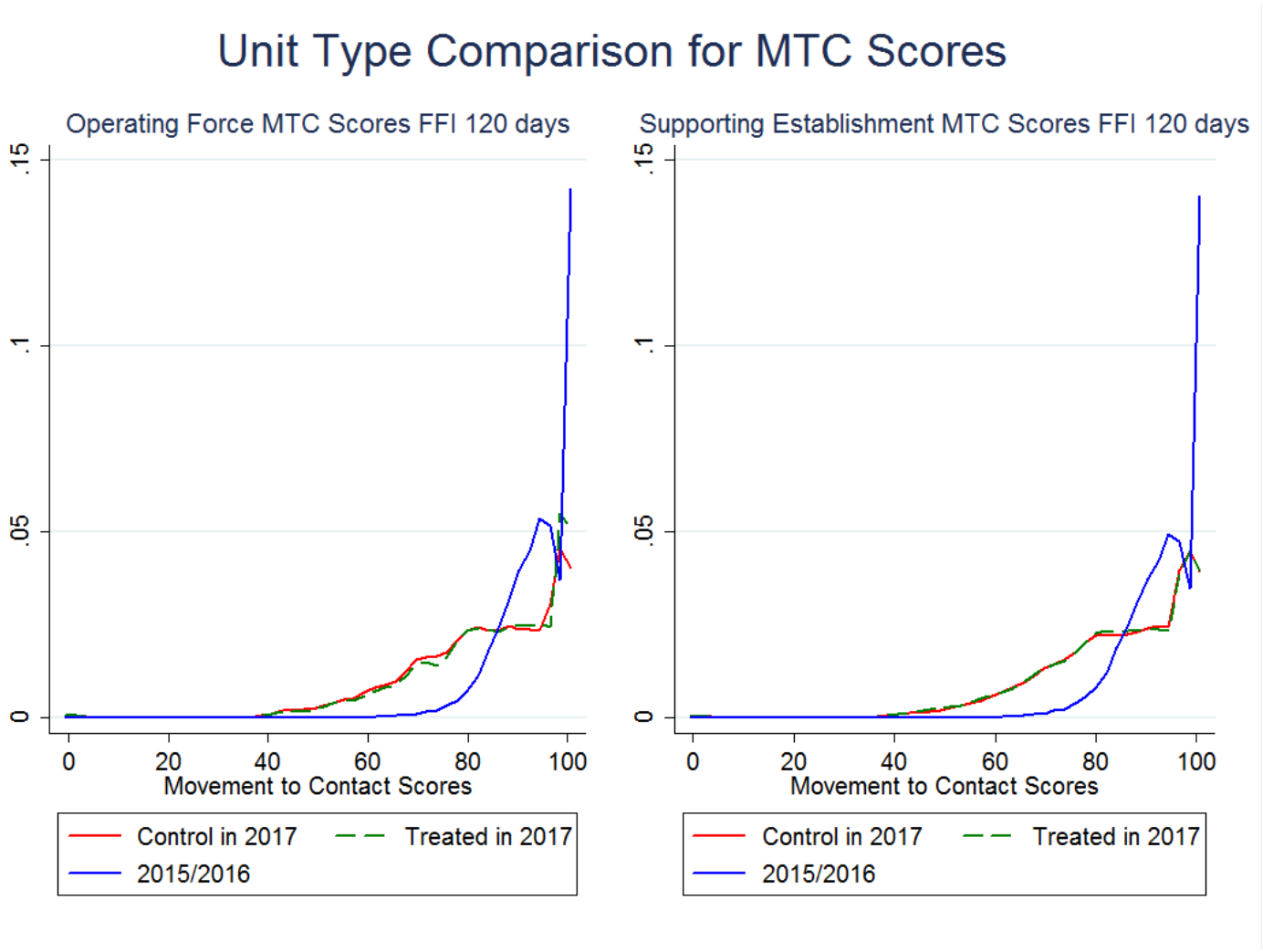

Figure 111. Operating Force and Supporting Establishment Comparison of Movement to Contact Scores with FFI 120 Days or Greater

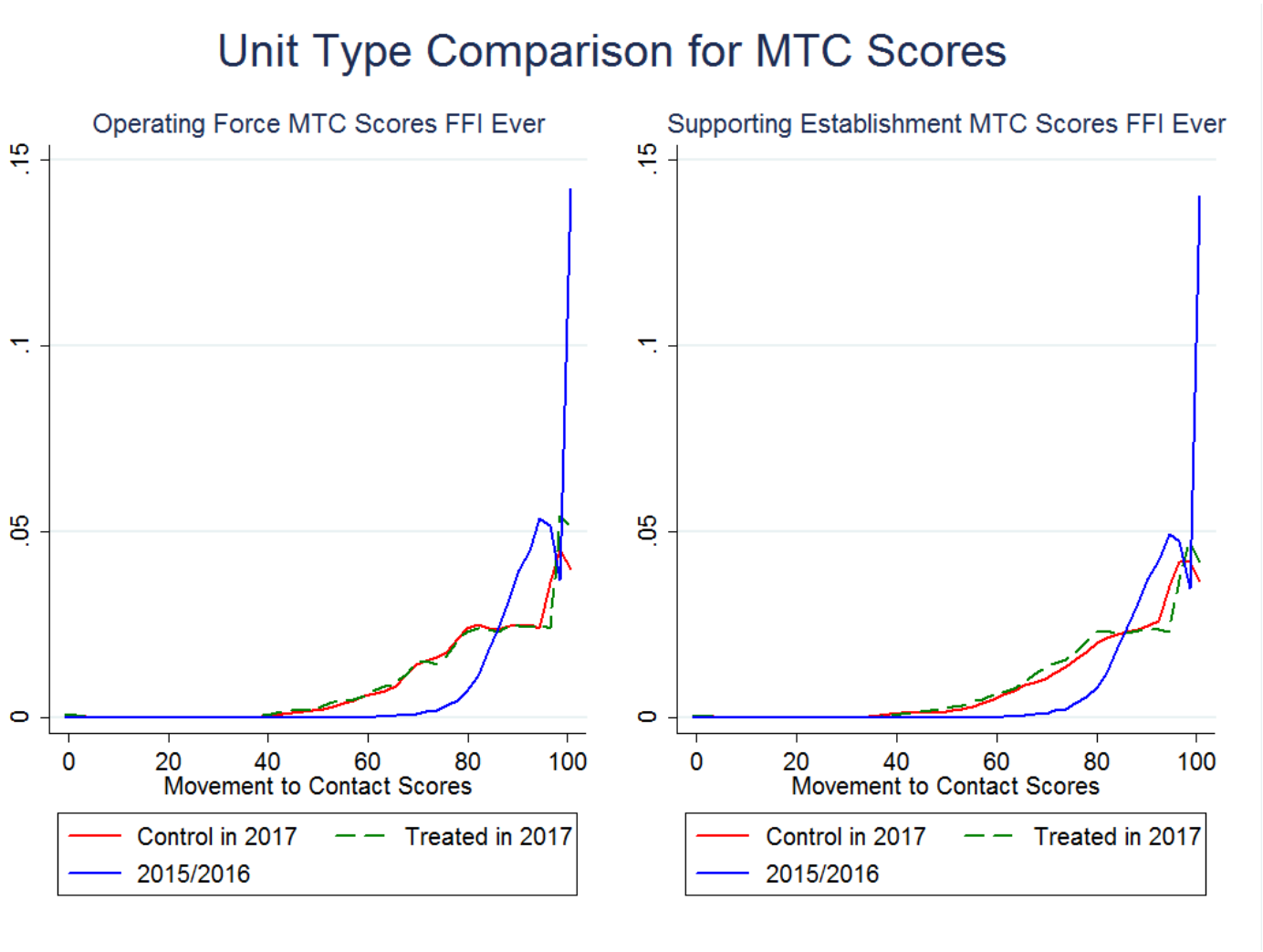

Figure 112. Operating Force and Supporting Establishment Comparison of Movement to Contact Scores Ever Having an FFI

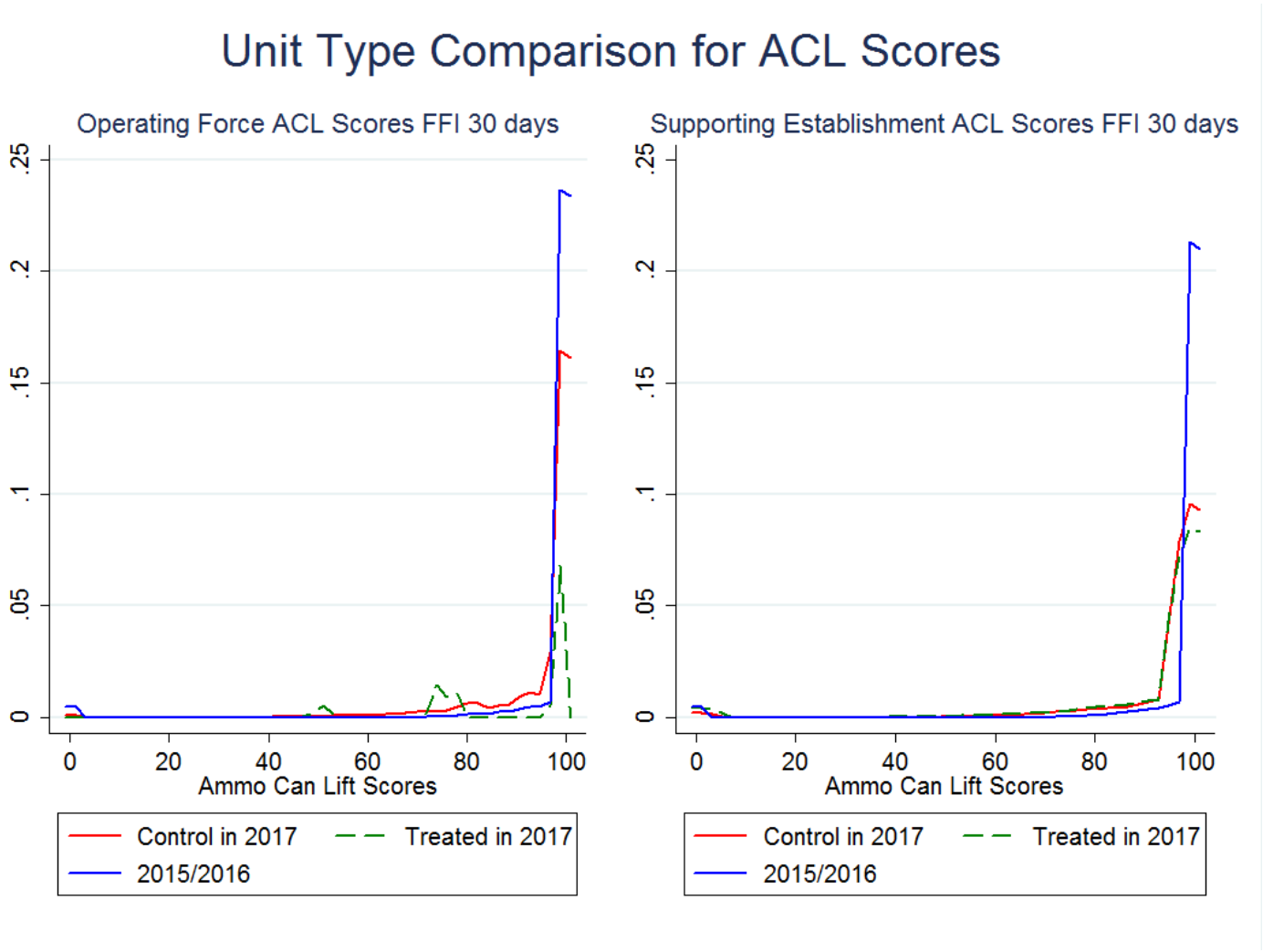

Figure 113. Operating Force and Supporting Establishment Comparison of Ammo Can Lift Scores with FFI 30 Days or Greater

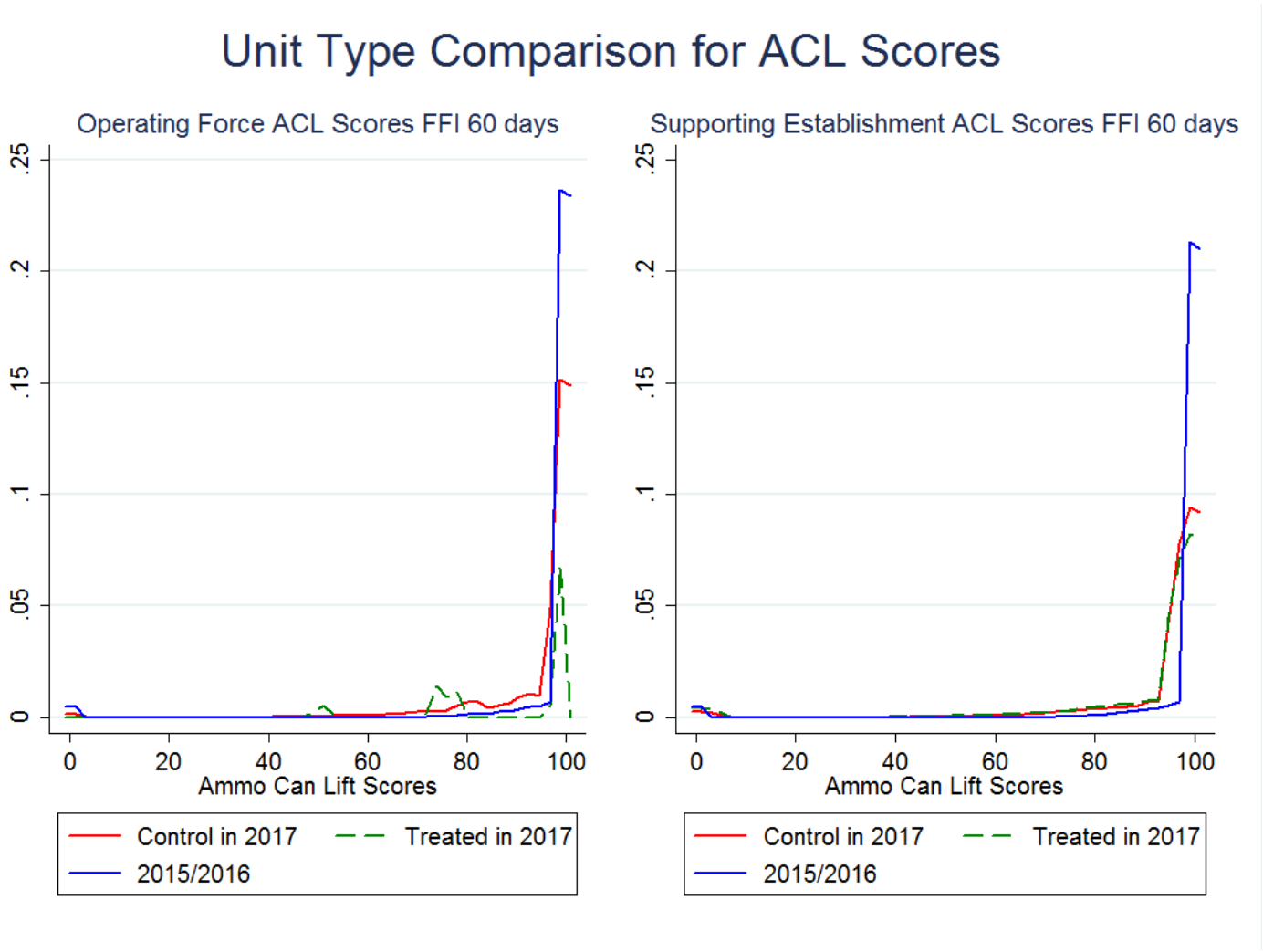

Figure 114. Operating Force and Supporting Establishment Comparison of Ammo Can Lift Scores with FFI 60 Days or Greater

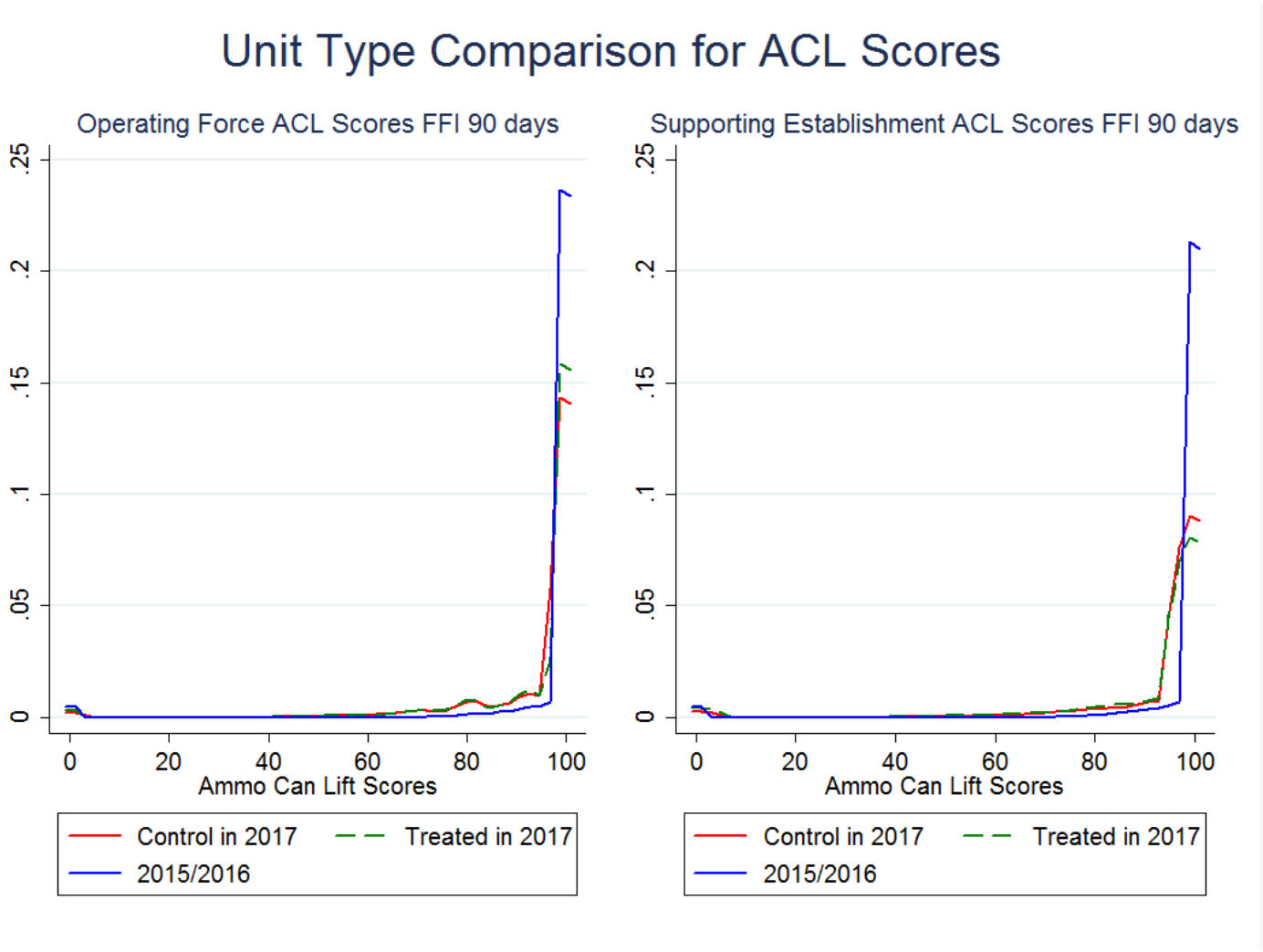

Figure 115. Operating Force and Supporting Establishment Comparison of Ammo Can Lift Scores with FFI 90 Days or Greater

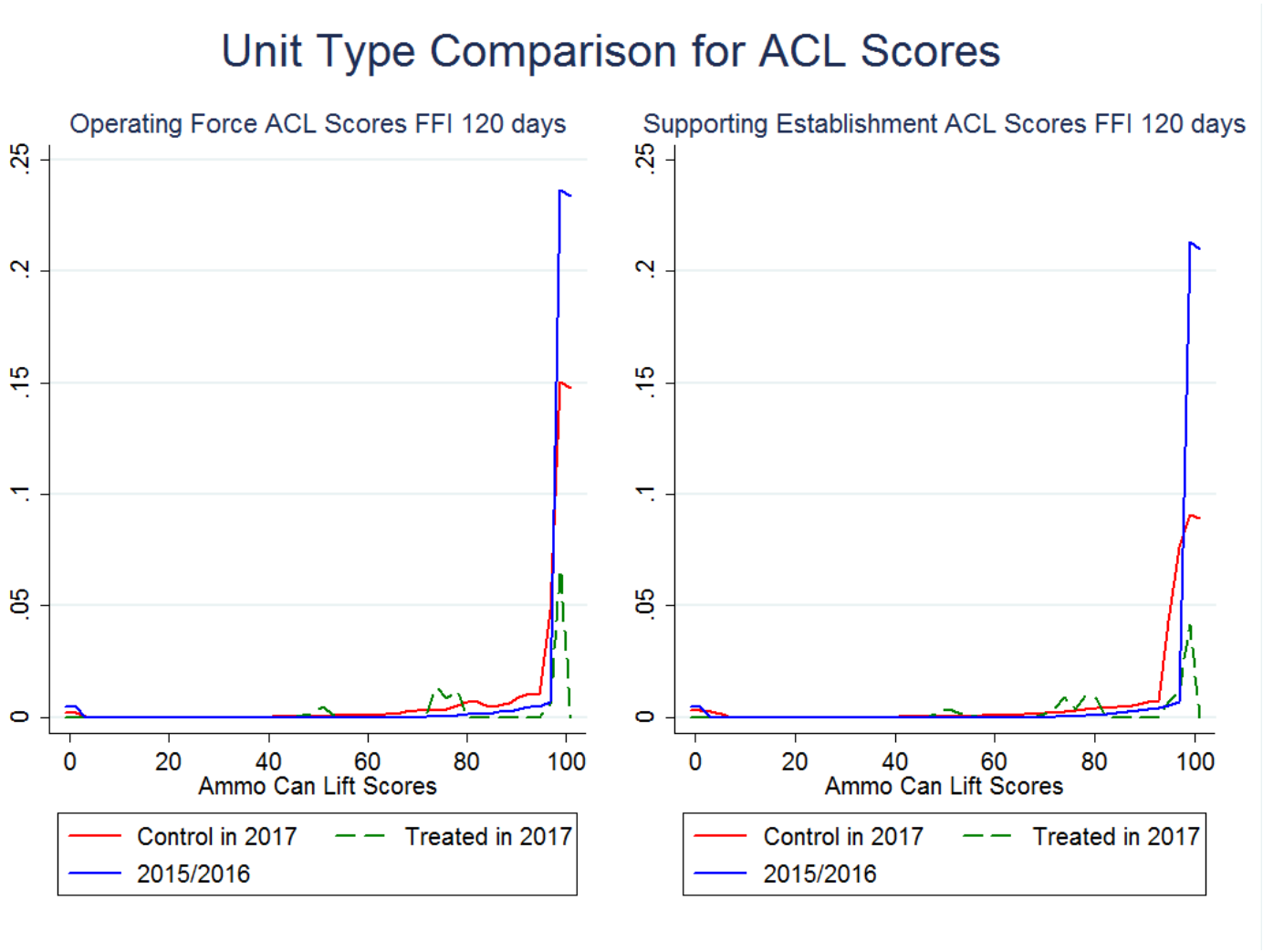

Figure 116. Operating Force and Supporting Establishment Comparison of Ammo Can Lift Scores with FFI 120 Days or Greater

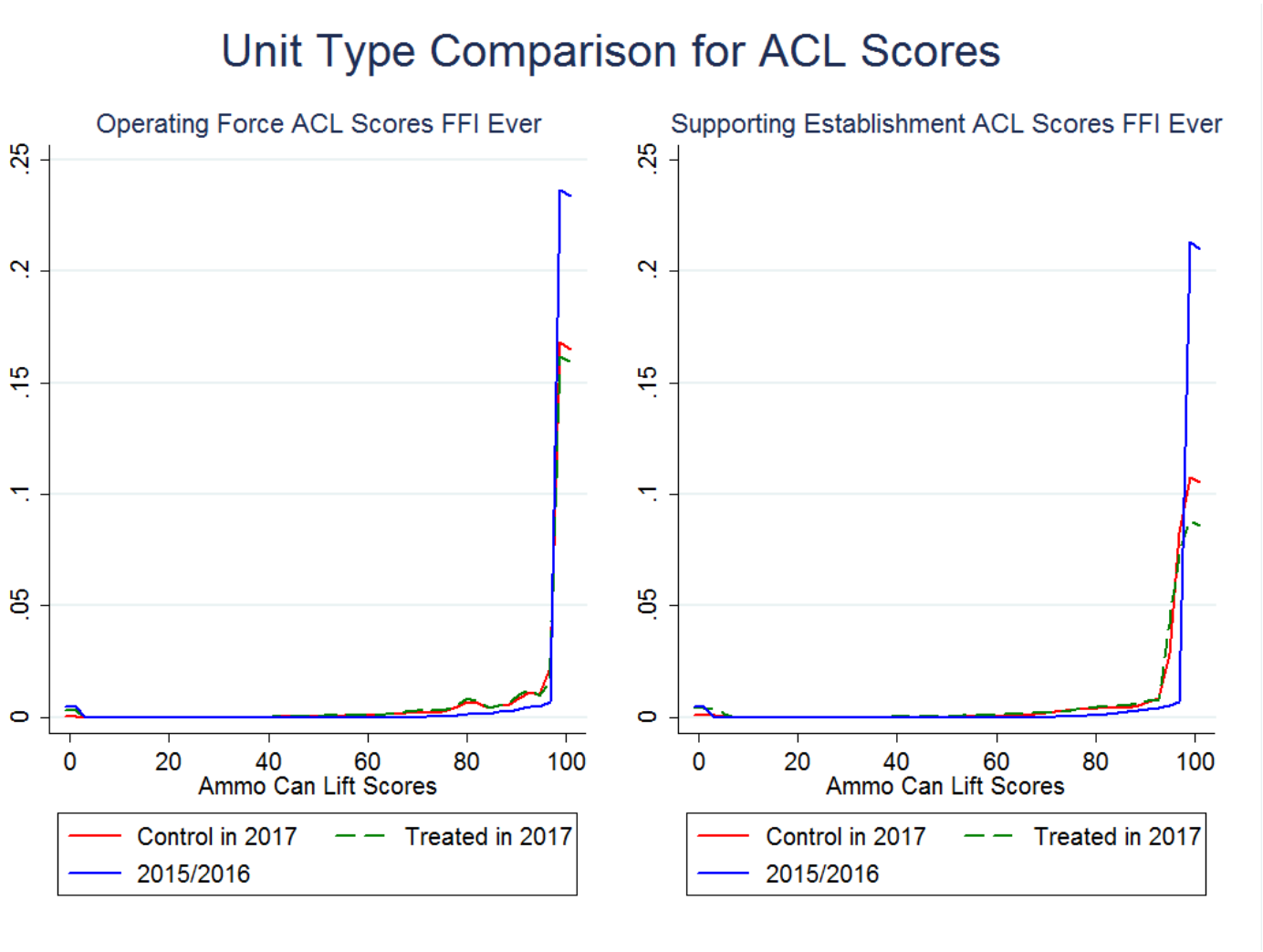

Figure 117. Operating Force and Supporting Establishment Comparison of Ammo Can Lift Scores Ever Having an FFI

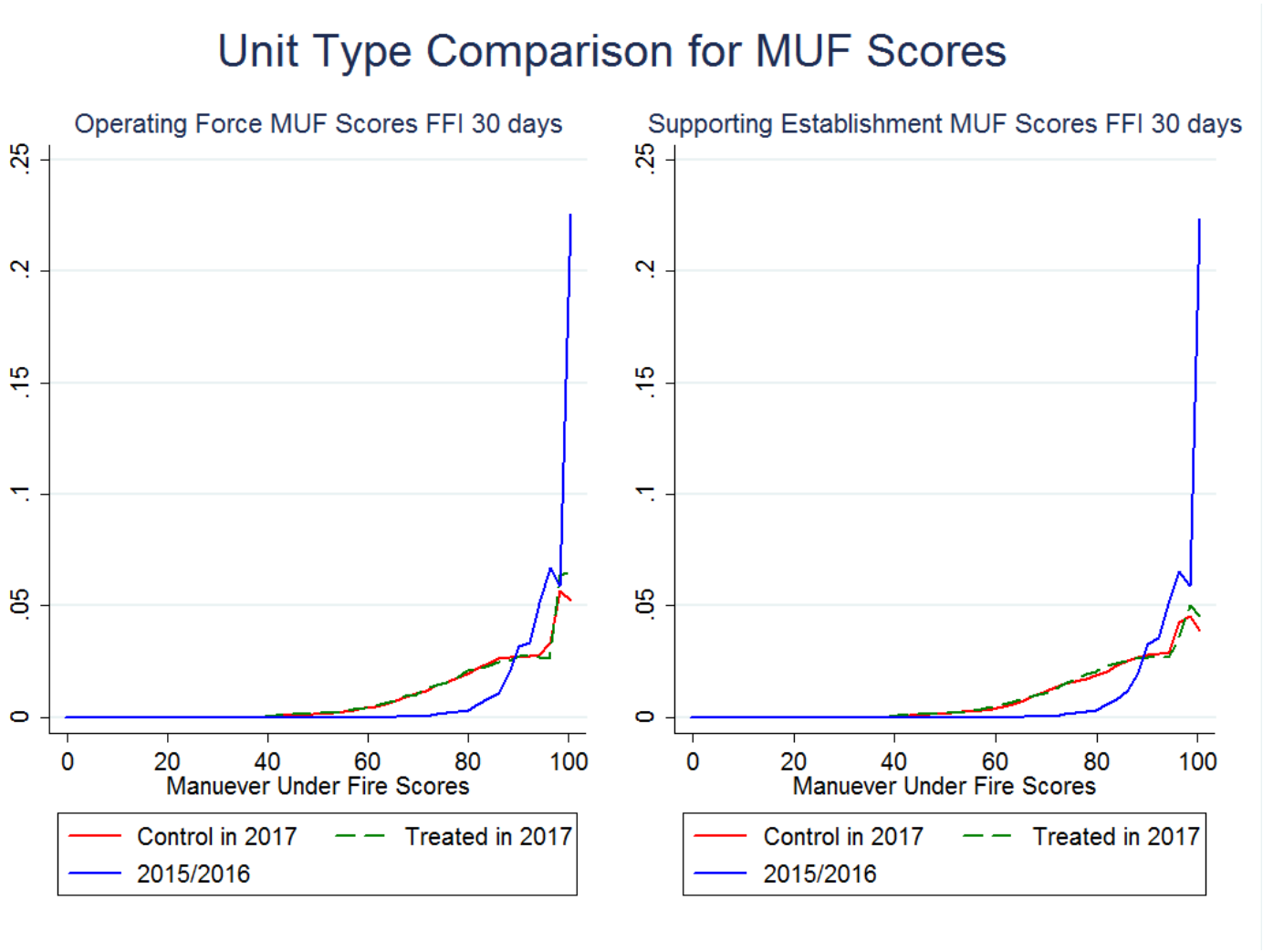

Figure 118. Operating Force and Supporting Establishment Comparison of Maneuver under Fire Scores with FFI 30 Days or Greater

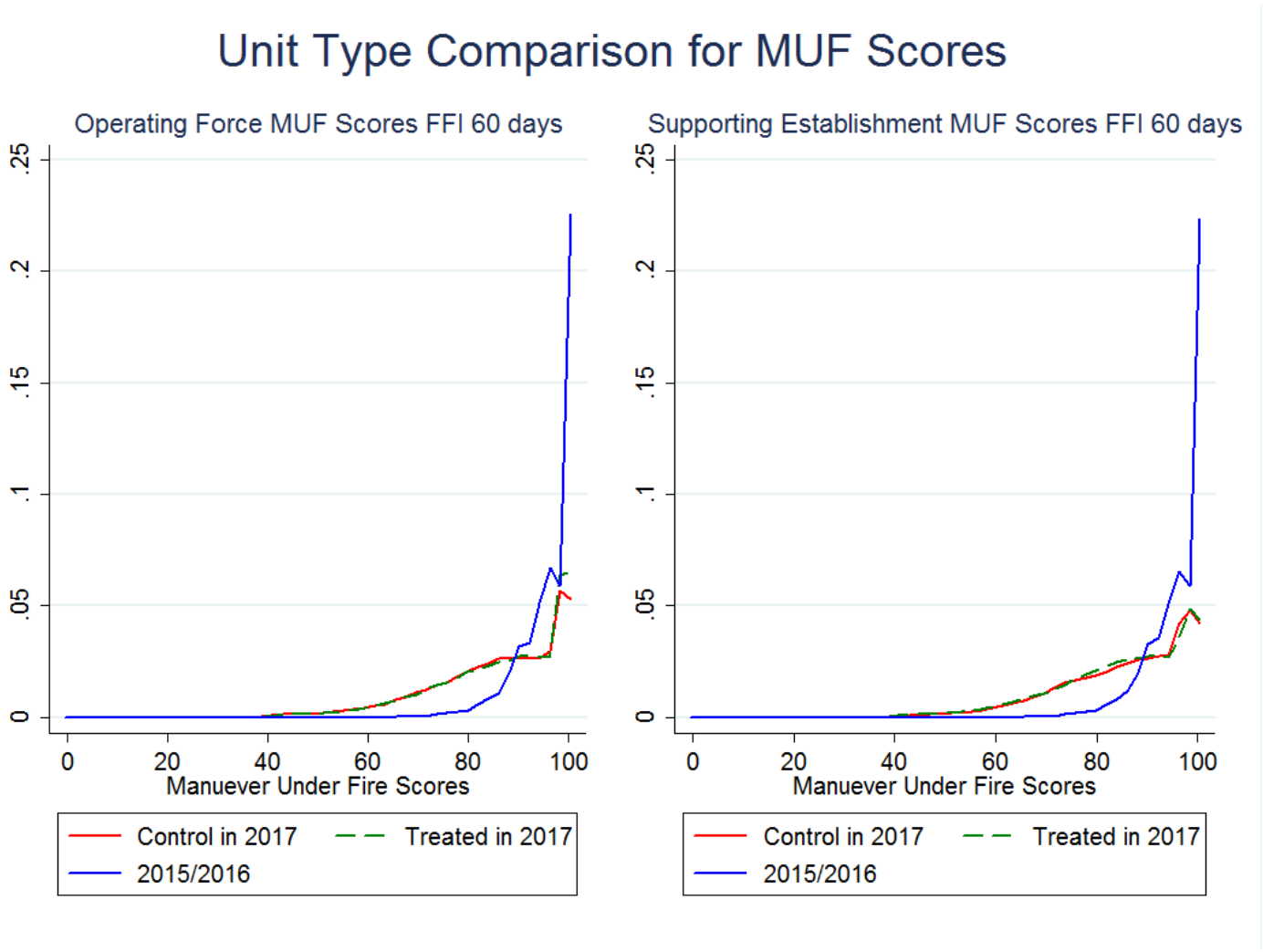

Figure 119. Operating Force and Supporting Establishment Comparison of Maneuver under Fire Scores with FFI 60 Days or Greater

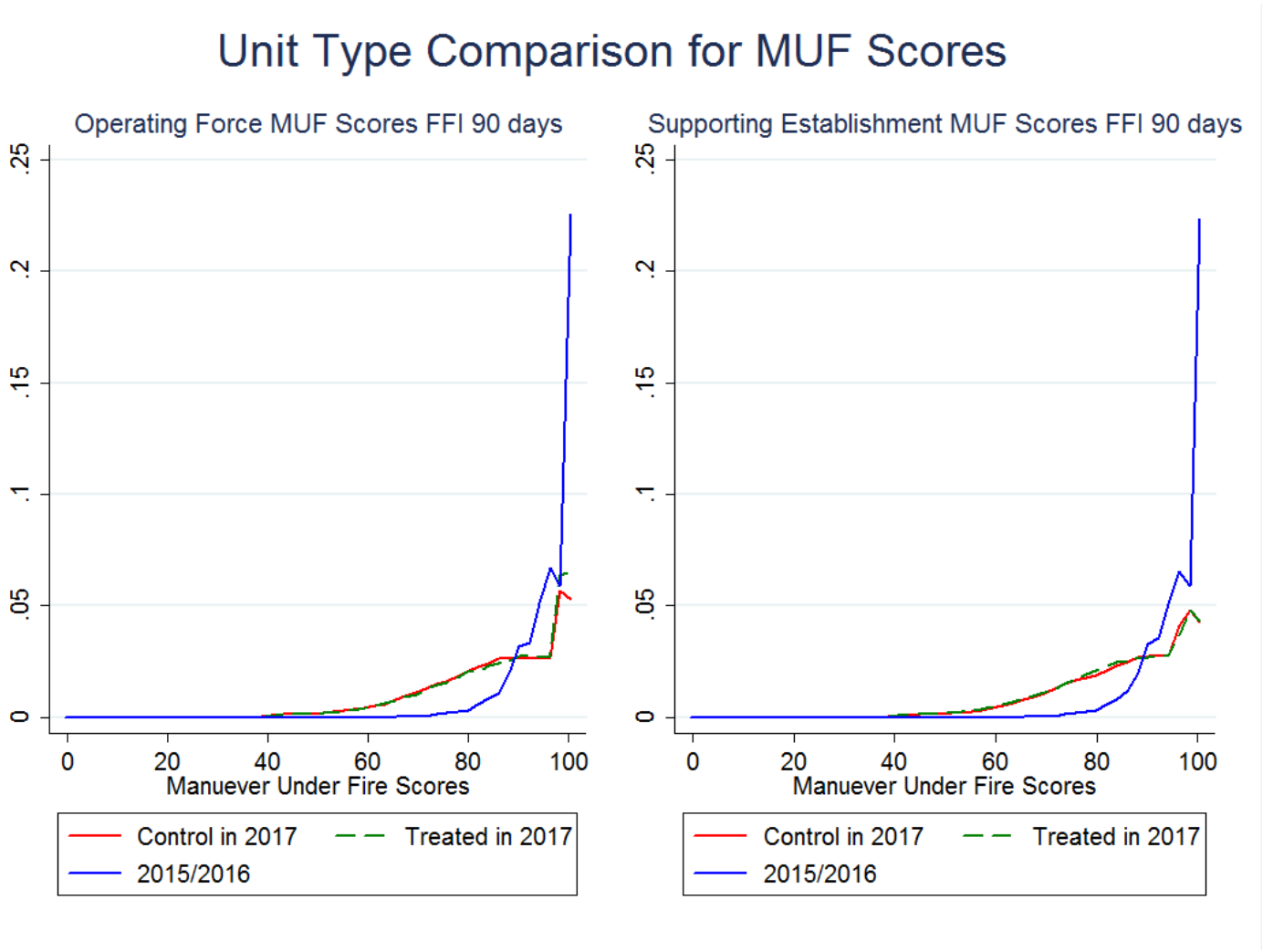

Figure 120. Operating Force and Supporting Establishment Comparison of Maneuver under Fire Scores with FFI 90 Days or Greater

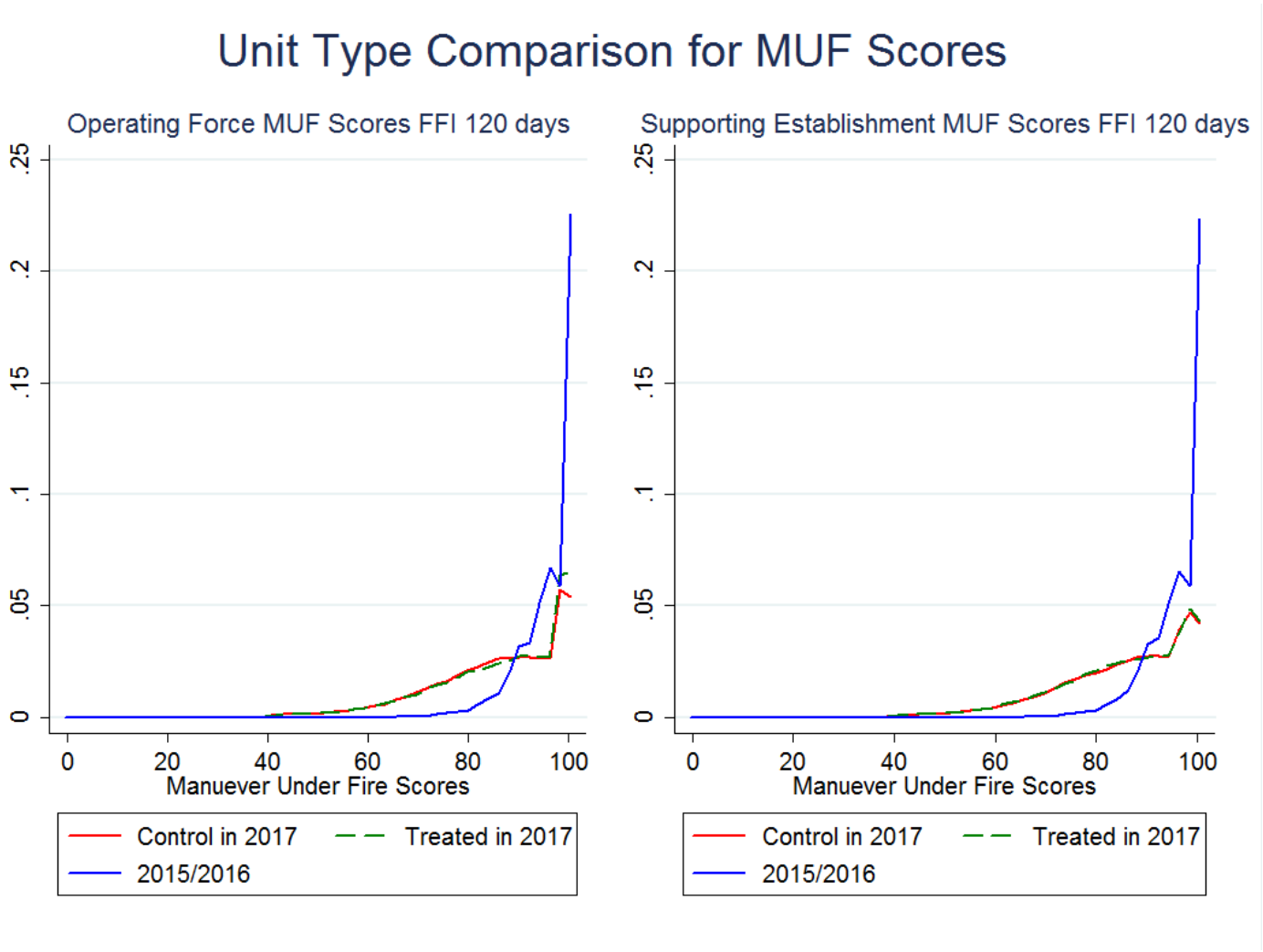

Figure 121. Operating Force and Supporting Establishment Comparison of Maneuver under Fire Scores with FFI 120 Days or Greater

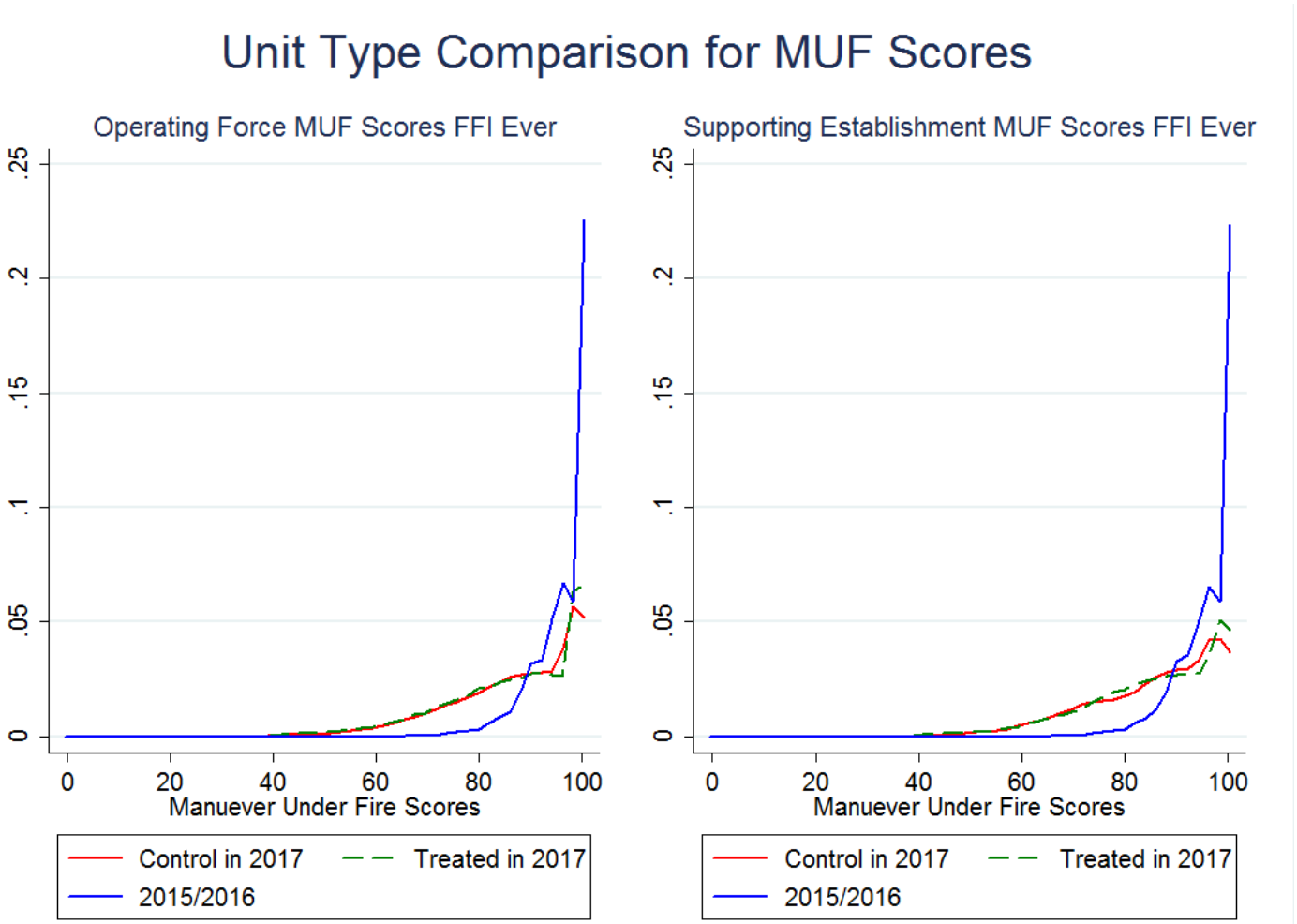

Figure 122. Operating Force and Supporting Establishment Comparison of Maneuver under Fire Scores Ever Having an FFI

APPENDIX D. GENDER TABLES

Table 40. Male Sample Population with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-3.983***	-4.605***	4.479***	4.721***	0.353***	0.000598	-4.999***	-5.229***								
	(0.315)	(0.310)	(0.138)	(0.137)	(0.104)	(0.104)	(0.0964)	(0.0954)								
PFT FFI 30 day	1.028***	0.866***	-0.933***	-0.919***	-1.347***	-1.498***	0.455***	0.481***								
	(0.235)	(0.235)	(0.102)	(0.103)	(0.0769)	(0.0782)	(0.0719)	(0.0723)								
Diff-in-diff	-1.707***	-2.224***	1.119***	1.123***	1.329***	1.512***	-2.620***	-2.896***	-5.020***	-3.907***	-0.267***	-0.192*	-1.586***	-1.311***	-0.465***	-0.652***
	(0.428)	(0.423)	(0.188)	(0.188)	(0.142)	(0.143)	(0.131)	(0.130)	(0.484)	(0.478)	(0.101)	(0.100)	(0.143)	(0.142)	(0.0874)	(0.0870)
Officer		29.22***		11.65***		3.192***		8.730***		14.31***		4.215***		2.489***		2.560***
		(0.363)		(0.160)		(0.122)		(0.112)		(0.322)		(0.0675)		(0.0958)		(0.0585)
Female FFI		-5.495***		-1.355***		-0.845***		-2.129***		-2.851***		-0.800***		-0.320***		-0.682***
		(0.384)		(0.169)		(0.129)		(0.118)		(0.341)		(0.0715)		(0.101)		(0.0620)
Age		2.092***		2.521***		0.0854**		-0.904***		1.219***		0.0284		0.310***		0.474***
		(0.123)		(0.0544)		(0.0414)		(0.0379)		(0.109)		(0.0228)		(0.0324)		(0.0198)
Age Squared		-0.0625***		-0.0449***		-0.00695***		0.00891***		-0.0436***		-0.00103***		-0.0112***		-0.00661***
		(0.00201)		(0.000890)		(0.000677)		(0.000619)		(0.00179)		(0.000374)		(0.000531)		(0.000325)
GCE		3.130***		-1.205***		-0.583***		0.984***		5.372***		0.588***		1.089***		1.191***
		(0.317)		(0.140)		(0.106)		(0.0978)		(0.281)		(0.0589)		(0.0835)		(0.0510)
LCE		-0.834**		-2.562***		0.267**		0.556***		1.685***		-1.011***		0.812***		-0.0235
		(0.369)		(0.162)		(0.124)		(0.114)		(0.326)		(0.0684)		(0.0971)		(0.0593)
ACE		-6.960***		-2.824***		-0.475***		-2.453***		-2.184***		-0.960***		-0.113		-0.972***
		(0.336)		(0.148)		(0.113)		(0.104)		(0.298)		(0.0624)		(0.0886)		(0.0541)
MIG		1.431***		-1.794***		-0.344**		0.506***		1.487***		-1.259***		0.695***		0.0931
		(0.435)		(0.192)		(0.146)		(0.134)		(0.385)		(0.0807)		(0.115)		(0.0700)
CFT Treated Year									-16.01***	-18.02***	-9.305***	-9.335***	-1.416***	-1.936***	-8.758***	-8.487***
									(0.424)	(0.418)	(0.0880)	(0.0876)	(0.125)	(0.124)	(0.0765)	(0.0760)
CFT FFI 30 day									-0.164	-0.420**	0.242***	0.176***	-0.0906	-0.141**	0.0495	0.106***
									(0.204)	(0.204)	(0.0423)	(0.0427)	(0.0602)	(0.0606)	(0.0367)	(0.0370)
Constant	244.2***	232.3***	78.58***	45.80***	94.83***	97.65***	73.34***	89.83***	282.2***	278.2***	93.86***	93.79***	97.68***	96.69***	95.66***	87.61***
	(0.139)	(1.830)	(0.0603)	(0.809)	(0.0455)	(0.616)	(0.0426)	(0.564)	(0.123)	(1.617)	(0.0257)	(0.339)	(0.0365)	(0.481)	(0.0223)	(0.294)
Observations	355,999	355,999	351,413	351,413	351,427	351,427	355,484	355,484	314,688	314,688	314,688	314,688	314,688	314,688	314,688	314,688
R-squared	0.002	0.044	0.008	0.032	0.001	0.011	0.030	0.060	0.037	0.073	0.160	0.176	0.009	0.034	0.192	0.210
Mean control t(0)	244.2	232.3	78.58	45.80	94.83	97.65	73.34	89.83	282.2	278.2	93.86	93.79	97.68	96.69	95.66	87.61
Mean treated t(0)	245.2	233.1	77.65	44.88	93.48	96.16	73.80	90.31	282	277.8	94.10	93.96	97.59	96.54	95.71	87.72
Diff t(0)	1.028	0.866	-0.933	-0.919	-1.347	-1.498	0.455	0.481	-0.164	-0.420	0.242	0.176	-0.0906	-0.141	0.0495	0.106
Mean control t(1)	240.2	227.7	83.06	50.52	95.18	97.65	68.34	84.60	266.2	260.2	84.55	84.45	96.26	94.75	86.90	79.12
Mean treated t(1)	239.6	226.3	83.25	50.72	95.16	97.67	66.18	82.19	261	255.8	84.53	84.44	94.58	93.30	86.48	78.58
Diff t(1)	-0.679	-1.358	0.186	0.203	-0.0179	0.0141	-2.165	-2.415	-5.184	-4.327	-0.0247	-0.0156	-1.676	-1.452	-0.416	-0.546
Standard errors in parentheses	Observations are only males from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.															
*** p<0.01, ** p<0.05, * p<0.1																

Table 41. Female Sample Population with FFI 30 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-15.16***	-16.38***	-7.495***	-7.409***	2.660***	2.250***	-7.585***	-7.318***								
	(1.436)	(1.429)	(0.434)	(0.436)	(0.468)	(0.471)	(0.386)	(0.384)								
PFT FFI 30 day	0.529	1.468	-0.0479	-0.0864	-1.043***	-0.953***	0.707**	1.039***								
	(1.114)	(1.135)	(0.333)	(0.344)	(0.353)	(0.365)	(0.300)	(0.305)								
Diff-in-diff	-4.762**	-6.075***	0.357	0.563	0.969	0.838	-2.601***	-3.118***	-11.05***	-11.96***	-1.393***	-1.537***	-3.192***	-3.563***	-0.816***	-1.074***
	(1.978)	(1.996)	(0.599)	(0.611)	(0.644)	(0.657)	(0.532)	(0.536)	(2.743)	(2.719)	(0.385)	(0.385)	(0.887)	(0.885)	(0.301)	(0.302)
Officer		33.25***		7.785***		6.019***		12.02***		21.29***		4.639***		4.651***		2.916***
		(1.677)		(0.516)		(0.546)		(0.451)		(1.677)		(0.238)		(0.546)		(0.186)
Female FFI		-4.971***		-0.297		0.0734		-2.449***		-1.350		-0.629***		-0.0636		-0.345**
		(1.318)		(0.399)		(0.427)		(0.354)		(1.306)		(0.185)		(0.425)		(0.145)
Age		-1.055		1.277***		-0.165		0.740***		-2.576***		0.690***		-0.894***		0.783***
		(0.644)		(0.202)		(0.211)		(0.173)		(0.639)		(0.0904)		(0.208)		(0.0709)
Age Squared		-0.0246**		-0.0221***		-0.00594*		-0.0147***		-0.00571		-0.0105***		0.00189		-0.0123***
		(0.0110)		(0.00346)		(0.00360)		(0.00295)		(0.0109)		(0.00155)		(0.00356)		(0.00121)
GCE		6.321***		0.116		0.504		2.511***		6.453***		0.647**		1.766***		0.480**
		(1.904)		(0.579)		(0.619)		(0.512)		(1.870)		(0.265)		(0.609)		(0.208)
LCE		4.518***		-0.623		0.0487		1.776***		6.275***		-0.0715		1.935***		0.387***
		(1.269)		(0.386)		(0.412)		(0.341)		(1.260)		(0.178)		(0.410)		(0.140)
ACE		-3.429***		-0.601		-0.168		-1.113***		0.568		-0.451***		0.156		-0.226*
		(1.204)		(0.368)		(0.392)		(0.324)		(1.194)		(0.169)		(0.389)		(0.133)
MIG		6.063***		-1.278***		0.331		2.858***		5.634***		-0.293		1.811***		0.418**
		(1.550)		(0.472)		(0.503)		(0.417)		(1.528)		(0.216)		(0.498)		(0.170)
CFT Treated Year									-9.036***	-11.65***	-8.782***	-8.412***	0.361	-0.332	-7.429***	-7.017***
									(2.450)	(2.414)	(0.344)	(0.342)	(0.793)	(0.786)	(0.269)	(0.268)
CFT FFI 30 day									-1.612	-0.547	0.132	0.104	-0.529	-0.153	-0.0226	0.00750
									(1.081)	(1.091)	(0.152)	(0.154)	(0.350)	(0.355)	(0.119)	(0.121)
Constant	239.7***	278.1***	87.16***	69.58***	88.96***	96.30***	73.58***	63.25***	272.2***	335.0***	94.23***	83.73***	93.44***	113.1***	96.25***	84.43***
	(0.621)	(9.122)	(0.185)	(2.842)	(0.197)	(2.984)	(0.167)	(2.452)	(0.621)	(9.040)	(0.0872)	(1.280)	(0.201)	(2.944)	(0.0682)	(1.004)
Observations	28,297	28,297	26,649	26,649	27,631	27,631	28,250	28,250	24,932	24,932	24,932	24,932	24,932	24,932	24,932	24,932
R-squared	0.013	0.046	0.024	0.036	0.004	0.015	0.043	0.076	0.018	0.061	0.181	0.204	0.004	0.035	0.196	0.214
Mean control t(0)	239.7	278.1	87.16	69.58	88.96	96.30	73.58	63.25	272.2	335	94.23	83.73	93.44	113.1	96.25	84.43
Mean treated t(0)	240.2	279.6	87.12	69.50	87.92	95.35	74.29	64.29	270.6	334.5	94.36	83.84	92.91	112.9	96.23	84.44
Diff t(0)	0.529	1.468	-0.0479	-0.0864	-1.043	-0.953	0.707	1.039	-1.612	-0.547	0.132	0.104	-0.529	-0.153	-0.0226	0.00750
Mean control t(1)	224.6	261.8	79.67	62.17	91.62	98.55	66	55.93	263.2	323.4	85.44	75.32	93.80	112.7	88.82	77.41
Mean treated t(1)	220.3	257.2	79.98	62.65	91.55	98.44	64.10	53.85	250.5	310.9	84.18	73.89	90.08	109	87.99	76.34
Diff t(1)	-4.233	-4.608	0.309	0.476	-0.0743	-0.115	-1.894	-2.079	-12.66	-12.51	-1.262	-1.433	-3.721	-3.716	-0.838	-1.067
Standard errors in parentheses	Observations are only females from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.															
*** p<0.01, ** p<0.05, * p<0.1																

Table 42. Male Sample Population with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.915***	-5.531***	4.383***	4.604***	0.299***	-0.0388	-5.152***	-5.384***								
	(0.303)	(0.299)	(0.133)	(0.132)	(0.100)	(0.101)	(0.0929)	(0.0920)								
PFT FFI 60 day	0.972***	0.848***	-0.922***	-0.918***	-1.379***	-1.524***	0.415***	0.453***								
	(0.235)	(0.235)	(0.102)	(0.103)	(0.0769)	(0.0783)	(0.0720)	(0.0724)								
Diff-in-diff	-0.134	-0.716*	1.296***	1.341***	1.437***	1.596***	-2.475***	-2.769***	-2.964***	-2.244***	0.164*	0.208**	-1.325***	-1.137***	0.0239	-0.203**
	(0.424)	(0.419)	(0.186)	(0.186)	(0.141)	(0.141)	(0.130)	(0.129)	(0.442)	(0.437)	(0.0918)	(0.0917)	(0.131)	(0.130)	(0.0798)	(0.0795)
Officer		29.21***		11.65***		3.190***		8.731***		14.27***		4.212***		2.481***		2.556***
		(0.363)		(0.160)		(0.122)		(0.112)		(0.322)		(0.0675)		(0.0958)		(0.0585)
Female FFI		-5.496***		-1.356***		-0.854***		-2.134***		-2.590***		-0.786***		-0.255**		-0.672***
		(0.384)		(0.169)		(0.129)		(0.118)		(0.341)		(0.0716)		(0.102)		(0.0620)
Age		2.094***		2.523***		0.0876**		-0.905***		1.217***		0.0273		0.310***		0.473***
		(0.123)		(0.0544)		(0.0414)		(0.0379)		(0.109)		(0.0228)		(0.0324)		(0.0198)
Age Squared		-0.0626***		-0.0449***		-0.00698***		0.00891***		-0.0436***		-0.00102***		-0.0112***		-0.00660***
		(0.00201)		(0.000890)		(0.000677)		(0.000619)		(0.00179)		(0.000374)		(0.000531)		(0.000325)
GCE		3.048***		-1.219***		-0.586***		0.994***		5.314***		0.581***		1.081***		1.188***
		(0.317)		(0.140)		(0.106)		(0.0979)		(0.281)		(0.0588)		(0.0835)		(0.0510)
LCE		-0.884**		-2.575***		0.263**		0.578***		1.607***		-1.020***		0.798***		-0.0297
		(0.369)		(0.162)		(0.124)		(0.114)		(0.326)		(0.0684)		(0.0971)		(0.0593)
ACE		-7.008***		-2.833***		-0.473***		-2.436***		-2.340***		-0.970***		-0.149*		-0.978***
		(0.336)		(0.148)		(0.113)		(0.104)		(0.298)		(0.0624)		(0.0886)		(0.0541)
MIG		1.311***		-1.810***		-0.348**		0.492***		1.372***		-1.285***		0.687***		0.0733
		(0.435)		(0.192)		(0.146)		(0.134)		(0.385)		(0.0808)		(0.115)		(0.0700)
CFT Treated Year									-18.37***	-20.02***	-9.659***	-9.676***	-1.831***	-2.265***	-9.164***	-8.888***
									(0.370)	(0.365)	(0.0769)	(0.0766)	(0.109)	(0.109)	(0.0667)	(0.0664)
CFT FFI 60 day									0.859***	0.599***	0.254***	0.216***	0.182***	0.120*	0.0350	0.134***
									(0.206)	(0.207)	(0.0428)	(0.0433)	(0.0609)	(0.0615)	(0.0372)	(0.0375)
Constant	244.2***	232.3***	78.58***	45.78***	94.84***	97.63***	73.36***	89.84***	281.8***	277.9***	93.86***	93.80***	97.58***	96.60***	95.66***	87.63***
	(0.139)	(1.830)	(0.0602)	(0.809)	(0.0455)	(0.616)	(0.0426)	(0.564)	(0.122)	(1.616)	(0.0253)	(0.339)	(0.0360)	(0.481)	(0.0220)	(0.294)
Observations	355,999	355,999	351,413	351,413	351,427	351,427	355,484	355,484	314,688	314,688	314,688	314,688	314,688	314,688	314,688	314,688
R-squared	0.002	0.044	0.008	0.032	0.001	0.011	0.030	0.059	0.037	0.073	0.160	0.177	0.009	0.034	0.191	0.210
Mean control t(0)	244.2	232.3	78.58	45.78	94.84	97.63	73.36	89.84	281.9	277.9	93.86	93.80	97.58	96.60	95.66	87.63
Mean treated t(0)	245.2	233.2	77.66	44.87	93.46	96.11	73.77	90.29	282.7	278.5	94.11	94.02	97.76	96.72	95.70	87.76
Diff t(0)	0.972	0.848	-0.922	-0.918	-1.379	-1.524	0.415	0.453	0.859	0.599	0.254	0.216	0.182	0.120	0.0350	0.134
Mean control t(1)	239.3	226.8	82.96	50.39	95.14	97.59	68.21	84.46	263.5	257.9	84.20	84.13	95.75	94.34	86.50	78.74
Mean treated t(1)	240.2	226.9	83.33	50.81	95.19	97.66	66.15	82.14	261.4	256.3	84.62	84.55	94.61	93.32	86.56	78.67
Diff t(1)	0.838	0.132	0.374	0.423	0.0580	0.0724	-2.061	-2.316	-2.106	-1.645	0.417	0.424	-1.143	-1.017	0.0589	-0.0691
Standard errors in parentheses	Observations are only males from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.															
*** p<0.01, ** p<0.05, * p<0.1																

Table 43. Female Sample Population with FFI 60 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-17.64***	-18.92***	-7.442***	-7.340***	2.481***	2.062***	-8.280***	-8.061***								
	(1.359)	(1.353)	(0.412)	(0.415)	(0.444)	(0.447)	(0.365)	(0.364)								
PFT FFI 60 day	0.140	1.207	-0.148	-0.224	-1.133***	-1.016***	0.689**	1.000***								
	(1.118)	(1.144)	(0.335)	(0.346)	(0.355)	(0.367)	(0.301)	(0.308)								
Diff-in-diff	-0.657	-1.972	0.338	0.550	1.326**	1.196*	-1.565***	-2.009***	-9.934***	-11.83***	-1.252***	-1.372***	-2.976***	-3.656***	-0.657**	-0.897***
	(1.950)	(1.972)	(0.591)	(0.604)	(0.635)	(0.649)	(0.524)	(0.530)	(2.394)	(2.392)	(0.336)	(0.339)	(0.774)	(0.779)	(0.263)	(0.266)
Officer		33.30***		7.781***		6.021***		12.04***		21.31***		4.640***		4.659***		2.917***
		(1.677)		(0.516)		(0.546)		(0.451)		(1.677)		(0.238)		(0.546)		(0.186)
Female FFI		-5.123***		-0.324		0.0396		-2.471***		-0.588		-0.611***		0.186		-0.326**
		(1.321)		(0.400)		(0.428)		(0.355)		(1.310)		(0.186)		(0.427)		(0.146)
Age		-1.058		1.279***		-0.159		0.737***		-2.652***		0.686***		-0.918***		0.779***
		(0.644)		(0.202)		(0.211)		(0.173)		(0.639)		(0.0905)		(0.208)		(0.0709)
Age Squared		-0.0246**		-0.0221***		-0.00602*		-0.0147***		-0.00453		-0.0105***		0.00227		-0.0123***
		(0.0110)		(0.00346)		(0.00360)		(0.00295)		(0.0109)		(0.00155)		(0.00356)		(0.00121)
GCE		5.951***		0.108		0.460		2.421***		6.926***		0.669**		1.924***		0.494**
		(1.905)		(0.579)		(0.619)		(0.512)		(1.874)		(0.265)		(0.610)		(0.208)
LCE		4.435***		-0.625		0.0377		1.759***		6.273***		-0.0692		1.936***		0.387***
		(1.269)		(0.387)		(0.412)		(0.341)		(1.260)		(0.178)		(0.410)		(0.140)
ACE		-3.513***		-0.586		-0.173		-1.132***		0.228		-0.456***		0.0453		-0.233*
		(1.204)		(0.368)		(0.392)		(0.324)		(1.194)		(0.169)		(0.389)		(0.133)
MIG		5.727***		-1.272***		0.301		2.765***		5.808***		-0.275		1.870***		0.426**
		(1.550)		(0.472)		(0.503)		(0.417)		(1.530)		(0.217)		(0.498)		(0.170)
CFT Treated Year									-12.40***	-14.38***	-8.991***	-8.669***	-0.586	-1.091*	-7.636***	-7.271***
									(2.025)	(2.000)	(0.284)	(0.283)	(0.655)	(0.651)	(0.222)	(0.222)
CFT FFI 60 day									1.734	3.078***	0.159	0.167	0.557	1.034***	0.0283	0.0908
									(1.101)	(1.120)	(0.155)	(0.159)	(0.356)	(0.365)	(0.121)	(0.124)
Constant	239.8***	278.4***	87.19***	69.60***	88.98***	96.26***	73.59***	63.35***	271.2***	335.0***	94.22***	83.76***	93.10***	113.0***	96.24***	84.45***
	(0.619)	(9.122)	(0.185)	(2.841)	(0.197)	(2.984)	(0.167)	(2.452)	(0.612)	(9.039)	(0.0859)	(1.280)	(0.198)	(2.943)	(0.0672)	(1.004)
Observations	28,297	28,297	26,649	26,649	27,631	27,631	28,250	28,250	24,932	24,932	24,932	24,932	24,932	24,932	24,932	24,932
R-squared	0.013	0.046	0.024	0.036	0.004	0.015	0.043	0.075	0.017	0.061	0.181	0.204	0.004	0.035	0.196	0.214
Mean control t(0)	239.8	278.4	87.19	69.60	88.98	96.26	73.59	63.35	271.2	335	94.22	83.76	93.10	113	96.24	84.45
Mean treated t(0)	240	279.6	87.05	69.37	87.85	95.24	74.28	64.35	272.9	338	94.38	83.93	93.65	114.1	96.26	84.54
Diff t(0)	0.140	1.207	-0.148	-0.224	-1.134	-1.016	0.689	1	1.734	3.078	0.159	0.167	0.557	1.034	0.0283	0.0908
Mean control t(1)	222.2	259.5	79.75	62.26	91.47	98.32	65.31	55.29	258.8	320.6	85.23	75.09	92.51	111.9	88.60	77.18
Mean treated t(1)	221.7	258.8	79.94	62.58	91.66	98.50	64.44	54.28	250.6	311.8	84.14	73.89	90.09	109.3	87.97	76.37
Diff t(1)	-0.518	-0.765	0.190	0.326	0.192	0.180	-0.876	-1.009	-8.200	-8.750	-1.092	-1.204	-2.419	-2.622	-0.628	-0.806

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Observations are only females from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 60 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.

Table 44. Male Sample Population with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.452***	-5.148***	4.473***	4.692***	0.337***	0.00875	-5.347***	-5.601***								
	(0.295)	(0.290)	(0.129)	(0.129)	(0.0977)	(0.0978)	(0.0903)	(0.0894)								
PFT FFI 90 day	0.972***	0.847***	-0.922***	-0.918***	-1.379***	-1.524***	0.415***	0.449***								
	(0.235)	(0.235)	(0.102)	(0.103)	(0.0769)	(0.0783)	(0.0720)	(0.0725)								
Diff-in-diff	-0.923**	-1.403***	1.152***	1.204***	1.370***	1.513***	-2.240***	-2.506***	-0.812*	-0.593	0.348***	0.377***	-0.749***	-0.680***	0.220***	-0.0180
	(0.421)	(0.416)	(0.185)	(0.184)	(0.140)	(0.140)	(0.129)	(0.128)	(0.420)	(0.416)	(0.0873)	(0.0873)	(0.124)	(0.124)	(0.0758)	(0.0757)
Officer		29.22***		11.65***		3.191***		8.729***		14.26***		4.211***		2.476***		2.555***
		(0.363)		(0.160)		(0.122)		(0.112)		(0.322)		(0.0675)		(0.0958)		(0.0585)
Female FFI		-5.503***		-1.353***		-0.855***		-2.159***		-2.583***		-0.786***		-0.252**		-0.671***
		(0.384)		(0.169)		(0.129)		(0.118)		(0.341)		(0.0716)		(0.102)		(0.0620)
Age		2.093***		2.522***		0.0874**		-0.904***		1.215***		0.0271		0.310***		0.473***
		(0.123)		(0.0544)		(0.0414)		(0.0379)		(0.109)		(0.0228)		(0.0324)		(0.0198)
Age Squared		-0.0625***		-0.0449***		-0.00698***		0.00890***		-0.0436***		-0.00102***		-0.0112***		-0.00660***
		(0.00201)		(0.000890)		(0.000677)		(0.000619)		(0.00179)		(0.000374)		(0.000531)		(0.000325)
GCE		3.090***		-1.211***		-0.581***		0.976***		5.288***		0.570***		1.082***		1.184***
		(0.317)		(0.140)		(0.106)		(0.0979)		(0.281)		(0.0589)		(0.0836)		(0.0510)
LCE		-0.850**		-2.570***		0.266**		0.579***		1.576***		-1.027***		0.793***		-0.0340
		(0.369)		(0.163)		(0.124)		(0.114)		(0.326)		(0.0684)		(0.0971)		(0.0593)
ACE		-6.978***		-2.829***		-0.470***		-2.439***		-2.356***		-0.976***		-0.150*		-0.981***
		(0.336)		(0.148)		(0.113)		(0.104)		(0.298)		(0.0624)		(0.0886)		(0.0541)
MIG		1.362***		-1.798***		-0.342**		0.462***		1.268***		-1.305***		0.667***		0.0599
		(0.435)		(0.191)		(0.146)		(0.134)		(0.385)		(0.0808)		(0.115)		(0.0701)
CFT Treated Year									-20.09***	-21.34***	-9.782***	-9.786***	-2.314***	-2.653***	-9.311***	-9.031***
									(0.341)	(0.337)	(0.0709)	(0.0706)	(0.101)	(0.100)	(0.0616)	(0.0613)
CFT FFI 90 day									0.859***	0.596***	0.254***	0.215***	0.182***	0.119*	0.0350	0.133***
									(0.206)	(0.207)	(0.0428)	(0.0433)	(0.0609)	(0.0615)	(0.0372)	(0.0375)
Constant	244.2***	232.3***	78.58***	45.78***	94.84***	97.63***	73.36***	89.85***	281.8***	278.0***	93.86***	93.82***	97.58***	96.62***	95.66***	87.63***
	(0.139)	(1.830)	(0.0602)	(0.809)	(0.0455)	(0.616)	(0.0426)	(0.564)	(0.122)	(1.616)	(0.0253)	(0.339)	(0.0360)	(0.481)	(0.0220)	(0.294)
Observations	355,999	355,999	351,413	351,413	351,427	351,427	355,484	355,484	314,688	314,688	314,688	314,688	314,688	314,688	314,688	314,688
R-squared	0.002	0.044	0.008	0.032	0.001	0.011	0.030	0.059	0.037	0.073	0.160	0.177	0.008	0.033	0.192	0.210
Mean control t(0)	244.2	232.3	78.58	45.78	94.84	97.63	73.36	89.85	281.9	278	93.86	93.82	97.58	96.62	95.66	87.63
Mean treated t(0)	245.2	233.1	77.66	44.86	93.46	96.10	73.77	90.30	282.7	278.6	94.11	94.03	97.76	96.74	95.70	87.77
Diff t(0)	0.972	0.847	-0.922	-0.918	-1.379	-1.524	0.415	0.449	0.859	0.596	0.254	0.215	0.182	0.119	0.0350	0.133
Mean control t(1)	239.8	227.1	83.05	50.47	95.17	97.64	68.01	84.25	261.8	256.7	84.08	84.03	95.27	93.97	86.35	78.60
Mean treated t(1)	239.8	226.6	83.28	50.76	95.17	97.63	66.19	82.19	261.8	256.7	84.68	84.62	94.70	93.41	86.61	78.72
Diff t(1)	0.0490	-0.556	0.231	0.286	-0.00836	-0.0106	-1.825	-2.057	0.0469	0.00380	0.602	0.592	-0.567	-0.561	0.255	0.115
Standard errors in parentheses	Observations are only males from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.															
*** p<0.01, ** p<0.05, * p<0.1																

Table 45. Female Sample Population with FFI 90 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-16.54***	-17.88***	-7.376***	-7.255***	2.578***	2.152***	-7.942***	-7.733***								
	(1.324)	(1.316)	(0.401)	(0.403)	(0.432)	(0.434)	(0.356)	(0.354)								
PFT FFI 90 day	0.140	1.225	-0.148	-0.221	-1.133***	-1.013***	0.689**	1.003***								
	(1.118)	(1.143)	(0.335)	(0.346)	(0.355)	(0.367)	(0.301)	(0.308)								
Diff-in-diff	-2.697	-3.922**	0.228	0.410	1.157*	1.038	-2.232***	-2.667***	-8.495***	-10.34***	-0.991***	-1.041***	-2.550***	-3.226***	-0.642***	-0.838***
	(1.941)	(1.955)	(0.589)	(0.599)	(0.632)	(0.643)	(0.522)	(0.525)	(2.237)	(2.241)	(0.314)	(0.317)	(0.724)	(0.730)	(0.246)	(0.249)
Officer		33.29***		7.779***		6.019***		12.04***		21.26***		4.634***		4.644***		2.911***
		(1.677)		(0.516)		(0.546)		(0.451)		(1.677)		(0.238)		(0.546)		(0.186)
Female FFI		-5.069***		-0.315		0.0470		-2.461***		-0.562		-0.609***		0.194		-0.323**
		(1.320)		(0.400)		(0.428)		(0.355)		(1.310)		(0.186)		(0.427)		(0.146)
Age		-1.055		1.279***		-0.159		0.738***		-2.651***		0.686***		-0.918***		0.780***
		(0.644)		(0.202)		(0.211)		(0.173)		(0.639)		(0.0905)		(0.208)		(0.0709)
Age Squared		-0.0246**		-0.0221***		-0.00602*		-0.0147***		-0.00454		-0.0105***		0.00226		-0.0123***
		(0.0110)		(0.00346)		(0.00360)		(0.00295)		(0.0109)		(0.00155)		(0.00356)		(0.00121)
GCE		6.113***		0.123		0.474		2.469***		6.944***		0.664**		1.930***		0.500**
		(1.904)		(0.579)		(0.619)		(0.512)		(1.875)		(0.266)		(0.611)		(0.208)
LCE		4.506***		-0.623		0.0418		1.789***		6.286***		-0.0709		1.941***		0.390***
		(1.269)		(0.387)		(0.412)		(0.341)		(1.260)		(0.178)		(0.410)		(0.140)
ACE		-3.427***		-0.582		-0.167		-1.099***		0.285		-0.449***		0.0624		-0.227*
		(1.205)		(0.368)		(0.392)		(0.324)		(1.194)		(0.169)		(0.389)		(0.133)
MIG		5.854***		-1.259***		0.314		2.800***		5.820***		-0.283		1.875***		0.433**
		(1.548)		(0.471)		(0.503)		(0.416)		(1.532)		(0.217)		(0.499)		(0.170)
CFT Treated Year									-13.90***	-15.94***	-9.244***	-8.981***	-1.029*	-1.546***	-7.676***	-7.354***
									(1.824)	(1.804)	(0.256)	(0.255)	(0.590)	(0.587)	(0.200)	(0.200)
CFT FFI 90 day									1.734	3.073***	0.159	0.165	0.557	1.033***	0.0283	0.0913
									(1.101)	(1.121)	(0.155)	(0.159)	(0.356)	(0.365)	(0.121)	(0.124)
Constant	239.8***	278.3***	87.19***	69.59***	88.98***	96.25***	73.59***	63.30***	271.2***	334.9***	94.22***	83.76***	93.10***	113.0***	96.24***	84.44***
	(0.619)	(9.122)	(0.185)	(2.841)	(0.197)	(2.983)	(0.167)	(2.452)	(0.612)	(9.040)	(0.0859)	(1.280)	(0.198)	(2.944)	(0.0672)	(1.004)
Observations	28,297	28,297	26,649	26,649	27,631	27,631	28,250	28,250	24,932	24,932	24,932	24,932	24,932	24,932	24,932	24,932
R-squared	0.013	0.046	0.024	0.036	0.004	0.015	0.043	0.076	0.017	0.061	0.181	0.203	0.004	0.035	0.196	0.214
Mean control t(0)	239.8	278.3	87.19	69.59	88.98	96.25	73.59	63.30	271.2	334.9	94.22	83.76	93.10	113	96.24	84.44
Mean treated t(0)	240	279.5	87.05	69.37	87.85	95.24	74.28	64.30	272.9	338	94.38	83.93	93.65	114	96.26	84.53
Diff t(0)	0.140	1.225	-0.148	-0.221	-1.134	-1.013	0.689	1.003	1.734	3.073	0.159	0.165	0.557	1.033	0.0283	0.0913
Mean control t(1)	223.3	260.4	79.82	62.33	91.56	98.40	65.65	55.56	257.3	319	84.98	74.78	92.07	111.5	88.56	77.08
Mean treated t(1)	220.7	257.7	79.90	62.52	91.59	98.43	64.11	53.90	250.5	311.7	84.14	73.91	90.07	109.3	87.95	76.34
Diff t(1)	-2.557	-2.698	0.0799	0.189	0.0235	0.0247	-1.543	-1.664	-6.761	-7.263	-0.832	-0.875	-1.993	-2.193	-0.614	-0.747
Standard errors in parentheses	Observations are only females from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 90 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.															
*** p<0.01, ** p<0.05, * p<0.1																

Table 46. Male Sample Population with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.156***	-5.010***	4.533***	4.720***	0.396***	0.0808	-5.400***	-5.698***								
	(0.283)	(0.278)	(0.124)	(0.123)	(0.0936)	(0.0936)	(0.0865)	(0.0856)								
PFT FFI 120 day	0.972***	0.844***	-0.922***	-0.917***	-1.379***	-1.524***	0.415***	0.444***								
	(0.235)	(0.235)	(0.102)	(0.103)	(0.0769)	(0.0783)	(0.0720)	(0.0725)								
Diff-in-diff	-1.510***	-1.738***	1.054***	1.178***	1.250***	1.366***	-2.326***	-2.530***	-0.738*	-0.796**	0.587***	0.566***	-0.894***	-0.877***	0.291***	0.0176
	(0.420)	(0.413)	(0.185)	(0.184)	(0.140)	(0.140)	(0.129)	(0.127)	(0.403)	(0.400)	(0.0838)	(0.0838)	(0.119)	(0.119)	(0.0728)	(0.0727)
Officer		29.22***		11.65***		3.192***		8.729***		14.26***		4.208***		2.479***		2.554***
		(0.363)		(0.160)		(0.122)		(0.112)		(0.322)		(0.0675)		(0.0958)		(0.0585)
Female FFI		-5.517***		-1.351***		-0.858***		-2.182***		-2.583***		-0.787***		-0.252**		-0.671***
		(0.384)		(0.169)		(0.129)		(0.118)		(0.341)		(0.0716)		(0.102)		(0.0620)
Age		2.091***		2.523***		0.0868**		-0.907***		1.215***		0.0270		0.310***		0.473***
		(0.123)		(0.0544)		(0.0414)		(0.0379)		(0.109)		(0.0228)		(0.0324)		(0.0198)
Age Squared		-0.0625***		-0.0449***		-0.00697***		0.00894***		-0.0436***		-0.00102***		-0.0112***		-0.00660***
		(0.00201)		(0.000890)		(0.000677)		(0.000619)		(0.00179)		(0.000374)		(0.000531)		(0.000325)
GCE		3.104***		-1.208***		-0.574***		0.964***		5.296***		0.557***		1.094***		1.181***
		(0.317)		(0.140)		(0.106)		(0.0978)		(0.281)		(0.0589)		(0.0836)		(0.0511)
LCE		-0.828**		-2.571***		0.274**		0.593***		1.580***		-1.028***		0.794***		-0.0341
		(0.369)		(0.163)		(0.124)		(0.114)		(0.326)		(0.0684)		(0.0971)		(0.0593)
ACE		-6.958***		-2.829***		-0.463***		-2.425***		-2.352***		-0.981***		-0.145		-0.982***
		(0.336)		(0.148)		(0.113)		(0.104)		(0.298)		(0.0624)		(0.0886)		(0.0541)
MIG		1.374***		-1.792***		-0.334**		0.433***		1.287***		-1.328***		0.690***		0.0556
		(0.435)		(0.191)		(0.146)		(0.134)		(0.386)		(0.0808)		(0.115)		(0.0701)
CFT Treated Year									-20.14***	-21.19***	-9.924***	-9.894***	-2.238***	-2.539***	-9.349***	-9.051***
									(0.316)	(0.313)	(0.0658)	(0.0656)	(0.0936)	(0.0931)	(0.0571)	(0.0569)
CFT FFI 120 day									0.859***	0.597***	0.254***	0.215***	0.182***	0.120*	0.0350	0.133***
									(0.206)	(0.207)	(0.0428)	(0.0433)	(0.0609)	(0.0615)	(0.0372)	(0.0375)
Constant	244.2***	232.3***	78.58***	45.77***	94.84***	97.63***	73.36***	89.90***	281.8***	278.0***	93.86***	93.83***	97.58***	96.61***	95.66***	87.64***
	(0.139)	(1.830)	(0.0602)	(0.809)	(0.0455)	(0.616)	(0.0426)	(0.564)	(0.122)	(1.616)	(0.0253)	(0.339)	(0.0360)	(0.481)	(0.0220)	(0.294)
Observations	355,999	355,999	351,413	351,413	351,427	351,427	355,484	355,484	314,688	314,688	314,688	314,688	314,688	314,688	314,688	314,688
R-squared	0.002	0.044	0.008	0.032	0.001	0.011	0.030	0.059	0.037	0.073	0.160	0.177	0.008	0.033	0.192	0.210
Mean control t(0)	244.2	232.3	78.58	45.77	94.84	97.63	73.36	89.90	281.9	278	93.86	93.83	97.58	96.61	95.66	87.64
Mean treated t(0)	245.2	233.2	77.66	44.86	93.46	96.11	73.77	90.34	282.7	278.6	94.11	94.04	97.76	96.73	95.70	87.77
Diff t(0)	0.972	0.844	-0.922	-0.917	-1.379	-1.524	0.415	0.444	0.859	0.597	0.254	0.215	0.182	0.120	0.0350	0.133
Mean control t(1)	240.1	227.3	83.11	50.49	95.23	97.71	67.96	84.20	261.7	256.8	83.93	83.93	95.34	94.07	86.31	78.59
Mean treated t(1)	239.5	226.4	83.24	50.75	95.10	97.55	66.05	82.12	261.8	256.6	84.77	84.72	94.63	93.31	86.64	78.74
Diff t(1)	-0.538	-0.893	0.133	0.260	-0.129	-0.158	-1.911	-2.085	0.121	-0.199	0.841	0.781	-0.711	-0.757	0.326	0.151

Standard errors in parentheses	Observations are only males from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.
*** p<0.01, ** p<0.05, * p<0.1	

Table 47. Female Sample Population with FFI 120 Days or Greater

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-16.82***	-18.19***	-7.482***	-7.365***	2.679***	2.253***	-7.957***	-7.803***								
	(1.277)	(1.266)	(0.386)	(0.387)	(0.416)	(0.418)	(0.343)	(0.340)								
PFT FFI 120 day	0.140	1.208	-0.148	-0.222	-1.133***	-1.012***	0.689**	0.994***								
	(1.118)	(1.143)	(0.335)	(0.346)	(0.355)	(0.367)	(0.301)	(0.308)								
Diff-in-diff	-2.372	-3.537*	0.449	0.650	0.955	0.834	-2.342***	-2.673***	-8.428***	-9.961***	-0.280	-0.295	-2.910***	-3.513***	-0.283	-0.440*
	(1.936)	(1.941)	(0.587)	(0.595)	(0.631)	(0.639)	(0.520)	(0.522)	(2.113)	(2.124)	(0.297)	(0.301)	(0.684)	(0.691)	(0.232)	(0.236)
Officer		33.28***		7.783***		6.016***		12.03***		21.26***		4.640***		4.639***		2.914***
		(1.677)		(0.516)		(0.546)		(0.451)		(1.677)		(0.238)		(0.546)		(0.186)
Female FFI		-5.116***		-0.317		0.0513		-2.486***		-0.478		-0.616***		0.229		-0.323**
		(1.319)		(0.400)		(0.428)		(0.355)		(1.311)		(0.186)		(0.427)		(0.146)
Age		-1.055		1.279***		-0.159		0.738***		-2.662***		0.683***		-0.921***		0.778***
		(0.644)		(0.202)		(0.211)		(0.173)		(0.639)		(0.0905)		(0.208)		(0.0710)
Age Squared		-0.0246**		-0.0221***		-0.00602*		-0.0147***		-0.00434		-0.0104***		0.00232		-0.0123***
		(0.0110)		(0.00346)		(0.00360)		(0.00295)		(0.0109)		(0.00155)		(0.00356)		(0.00121)
GCE		6.069***		0.106		0.490		2.462***		6.984***		0.621**		1.970***		0.480**
		(1.904)		(0.578)		(0.619)		(0.512)		(1.876)		(0.266)		(0.611)		(0.208)
LCE		4.515***		-0.635		0.0503		1.804***		6.202***		-0.0936		1.922***		0.375***
		(1.270)		(0.387)		(0.413)		(0.341)		(1.259)		(0.178)		(0.410)		(0.140)
ACE		-3.426***		-0.595		-0.157		-1.086***		0.291		-0.455***		0.0685		-0.230*
		(1.205)		(0.368)		(0.392)		(0.324)		(1.194)		(0.169)		(0.389)		(0.133)
MIG		5.791***		-1.267***		0.324		2.774***		5.839***		-0.339		1.913***		0.405**
		(1.546)		(0.471)		(0.502)		(0.416)		(1.532)		(0.217)		(0.499)		(0.170)
CFT Treated Year									-14.33***	-16.63***	-9.805***	-9.566***	-0.882*	-1.468***	-7.970***	-7.682***
									(1.650)	(1.634)	(0.232)	(0.232)	(0.534)	(0.532)	(0.181)	(0.182)
CFT FFI 120 day									1.734	3.087***	0.159	0.157	0.557	1.043***	0.0283	0.0874
									(1.101)	(1.121)	(0.155)	(0.159)	(0.356)	(0.365)	(0.121)	(0.124)
Constant	239.8***	278.3***	87.19***	69.60***	88.98***	96.24***	73.59***	63.30***	271.2***	335.1***	94.22***	83.83***	93.10***	113.0***	96.24***	84.48***
	(0.619)	(9.122)	(0.185)	(2.841)	(0.197)	(2.983)	(0.167)	(2.452)	(0.612)	(9.039)	(0.0859)	(1.280)	(0.198)	(2.943)	(0.0672)	(1.004)
Observations	28,297	28,297	26,649	26,649	27,631	27,631	28,250	28,250	24,932	24,932	24,932	24,932	24,932	24,932	24,932	24,932
R-squared	0.013	0.046	0.024	0.036	0.004	0.015	0.043	0.076	0.017	0.061	0.181	0.203	0.004	0.035	0.195	0.214
Mean control t(0)	239.8	278.3	87.19	69.60	88.98	96.24	73.59	63.30	271.2	335.1	94.22	83.83	93.10	113	96.24	84.48
Mean treated t(0)	240	279.5	87.05	69.38	87.85	95.23	74.28	64.30	272.9	338.2	94.38	83.99	93.65	114.1	96.26	84.57
Diff t(0)	0.140	1.208	-0.148	-0.222	-1.134	-1.012	0.689	0.994	1.734	3.087	0.159	0.157	0.557	1.043	0.0283	0.0874
Mean control t(1)	223	260.1	79.71	62.23	91.66	98.49	65.64	55.50	256.8	318.4	84.41	74.27	92.21	111.6	88.27	76.80
Mean treated t(1)	220.8	257.8	80.01	62.66	91.49	98.31	63.98	53.82	250.1	311.6	84.29	74.13	89.86	109.1	88.01	76.44
Diff t(1)	-2.233	-2.329	0.301	0.428	-0.178	-0.178	-1.653	-1.678	-6.694	-6.875	-0.120	-0.138	-2.353	-2.469	-0.255	-0.353
Standard errors in parentheses	Observations are only females from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 120 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.															
*** p<0.01, ** p<0.05, * p<0.1																

Table 48. Male Sample Population Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-4.591***	-5.216***	4.312***	4.594***	0.289***	-0.0804	-5.178***	-5.416***								
	(0.328)	(0.323)	(0.144)	(0.143)	(0.109)	(0.109)	(0.100)	(0.0995)								
PFT FFI Ever	1.081***	0.895***	-0.947***	-0.918***	-1.327***	-1.484***	0.498***	0.514***								
	(0.234)	(0.234)	(0.102)	(0.103)	(0.0768)	(0.0781)	(0.0719)	(0.0723)								
Diff-in-diff	-0.765*	-1.228***	1.369***	1.303***	1.416***	1.625***	-2.246***	-2.489***	-7.833***	-6.092***	-1.000***	-0.850***	-1.926***	-1.524***	-0.989***	-1.082***
	(0.435)	(0.430)	(0.191)	(0.190)	(0.144)	(0.145)	(0.133)	(0.132)	(0.577)	(0.568)	(0.120)	(0.119)	(0.171)	(0.169)	(0.104)	(0.103)
Officer		29.22***		11.65***		3.191***		8.729***		14.30***		4.218***		2.482***		2.560***
		(0.363)		(0.160)		(0.122)		(0.112)		(0.322)		(0.0675)		(0.0958)		(0.0585)
Female FFI		-5.489***		-1.352***		-0.837***		-2.121***		-2.846***		-0.815***		-0.310***		-0.694***
		(0.384)		(0.169)		(0.128)		(0.118)		(0.340)		(0.0713)		(0.101)		(0.0618)
Age		2.096***		2.520***		0.0834**		-0.900***		1.222***		0.0294		0.311***		0.475***
		(0.123)		(0.0544)		(0.0414)		(0.0379)		(0.109)		(0.0228)		(0.0324)		(0.0198)
Age Squared		-0.0626***		-0.0449***		-0.00692***		0.00885***		-0.0437***		-0.00104***		-0.0112***		-0.00662***
		(0.00201)		(0.000890)		(0.000677)		(0.000619)		(0.00179)		(0.000374)		(0.000531)		(0.000325)
GCE		3.069***		-1.212***		-0.589***		0.943***		5.314***		0.586***		1.070***		1.184***
		(0.317)		(0.140)		(0.106)		(0.0978)		(0.281)		(0.0589)		(0.0835)		(0.0510)
LCE		-0.874**		-2.563***		0.265**		0.521***		1.682***		-1.005***		0.804***		-0.0212
		(0.369)		(0.162)		(0.124)		(0.114)		(0.326)		(0.0685)		(0.0971)		(0.0593)
ACE		-7.000***		-2.827***		-0.481***		-2.484***		-2.221***		-0.954***		-0.129		-0.970***
		(0.336)		(0.148)		(0.113)		(0.104)		(0.297)		(0.0624)		(0.0885)		(0.0541)
MIG		1.347***		-1.808***		-0.353**		0.472***		1.452***		-1.244***		0.668***		0.0922
		(0.435)		(0.192)		(0.146)		(0.134)		(0.385)		(0.0807)		(0.114)		(0.0699)
CFT Treated Year									-13.27***	-15.90***	-8.621***	-8.721***	-1.056***	-1.706***	-8.263***	-8.057***
									(0.529)	(0.522)	(0.110)	(0.109)	(0.157)	(0.155)	(0.0956)	(0.0948)
CFT FFI Ever									0.0490	-0.213	0.218***	0.153***	-0.00804	-0.0584	0.0580	0.0953***
									(0.202)	(0.201)	(0.0419)	(0.0421)	(0.0596)	(0.0598)	(0.0364)	(0.0365)
Constant	244.2***	232.2***	78.59***	45.83***	94.82***	97.69***	73.33***	89.80***	282.1***	278.1***	93.86***	93.77***	97.65***	96.67***	95.65***	87.60***
	(0.139)	(1.830)	(0.0604)	(0.809)	(0.0456)	(0.616)	(0.0427)	(0.564)	(0.125)	(1.617)	(0.0260)	(0.339)	(0.0371)	(0.481)	(0.0226)	(0.294)
Observations	355,999	355,999	351,413	351,413	351,427	351,427	355,484	355,484	314,688	314,688	314,688	314,688	314,688	314,688	314,688	314,688
R-squared	0.002	0.044	0.008	0.032	0.001	0.011	0.030	0.059	0.038	0.073	0.160	0.177	0.009	0.034	0.192	0.211
Mean control t(0)	244.2	232.2	78.59	45.83	94.82	97.69	73.33	89.80	282.1	278.1	93.86	93.77	97.65	96.67	95.65	87.60
Mean treated t(0)	245.3	233.1	77.64	44.91	93.50	96.20	73.83	90.31	282.2	277.9	94.08	93.93	97.64	96.61	95.71	87.70
Diff t(0)	1.081	0.895	-0.947	-0.918	-1.327	-1.484	0.498	0.514	0.0490	-0.213	0.218	0.153	-0.00804	-0.0584	0.0580	0.0953
Mean control t(1)	239.6	227	82.90	50.42	95.11	97.61	68.15	84.38	268.9	262.2	85.24	85.05	96.59	94.96	87.39	79.55
Mean treated t(1)	239.9	226.7	83.32	50.81	95.20	97.75	66.40	82.41	261.1	255.9	84.46	84.35	94.66	93.38	86.46	78.56
Diff t(1)	0.316	-0.333	0.422	0.385	0.0892	0.142	-1.747	-1.975	-7.784	-6.305	-0.783	-0.697	-1.934	-1.582	-0.931	-0.987

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Observations are only males from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 1 day or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.

Table 49. Female Sample Population Ever Having an FFI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	PFT Score	PFT Score	UBE Score	UBE Score	Crunch Score	Crunch Score	AC Score	AC Score	CFT Score	CFT Score	MTC Score	MTC Score	ACL Score	ACL Score	MUF Score	MUF Score
PFT Treated Year	-15.31***	-16.62***	-7.426***	-7.340***	2.860***	2.419***	-7.591***	-7.302***								
	(1.499)	(1.491)	(0.453)	(0.456)	(0.489)	(0.492)	(0.403)	(0.401)								
PFT FFI Ever	0.837	1.630	0.0638	0.0622	-0.995***	-0.925**	0.729**	1.066***								
	(1.111)	(1.130)	(0.332)	(0.342)	(0.352)	(0.363)	(0.299)	(0.304)								
Diff-in-diff	-4.452**	-5.537***	0.175	0.352	0.640	0.568	-2.496***	-3.035***	-16.02***	-15.99***	-2.088***	-2.337***	-4.488***	-4.558***	-0.346	-0.668*
	(2.008)	(2.024)	(0.608)	(0.619)	(0.654)	(0.666)	(0.540)	(0.544)	(3.562)	(3.501)	(0.500)	(0.496)	(1.152)	(1.140)	(0.391)	(0.389)
Officer		33.25***		7.786***		6.016***		12.02***		21.33***		4.644***		4.663***		2.918***
		(1.677)		(0.516)		(0.546)		(0.451)		(1.677)		(0.238)		(0.546)		(0.186)
Female FFI		-4.994***		-0.264		0.0916		-2.466***		-1.389		-0.654***		-0.0508		-0.346**
		(1.316)		(0.399)		(0.427)		(0.354)		(1.303)		(0.185)		(0.424)		(0.145)
Age		-1.047		1.275***		-0.168		0.745***		-2.580***		0.692***		-0.898***		0.780***
		(0.643)		(0.202)		(0.211)		(0.173)		(0.639)		(0.0904)		(0.208)		(0.0709)
Age Squared		-0.0247**		-0.0221***		-0.00588		-0.0148***		-0.00565		-0.0106***		0.00194		-0.0123***
		(0.0110)		(0.00346)		(0.00360)		(0.00295)		(0.0109)		(0.00155)		(0.00356)		(0.00121)
GCE		6.239***		0.145		0.530		2.483***		6.351***		0.630**		1.735***		0.455**
		(1.903)		(0.578)		(0.619)		(0.511)		(1.866)		(0.264)		(0.608)		(0.207)
LCE		4.487***		-0.618		0.0542		1.765***		6.246***		-0.0707		1.920***		0.375***
		(1.268)		(0.386)		(0.412)		(0.341)		(1.260)		(0.178)		(0.410)		(0.140)
ACE		-3.500***		-0.607*		-0.166		-1.137***		0.551		-0.443***		0.138		-0.228*
		(1.203)		(0.368)		(0.391)		(0.323)		(1.194)		(0.169)		(0.389)		(0.133)
MIG		5.996***		-1.265***		0.355		2.842***		5.527***		-0.300		1.770***		0.388**
		(1.550)		(0.472)		(0.503)		(0.417)		(1.526)		(0.216)		(0.497)		(0.170)
CFT Treated Year									-4.172	-7.439**	-8.044***	-7.557***	1.559	0.654	-7.853***	-7.357***
									(3.357)	(3.296)	(0.471)	(0.467)	(1.086)	(1.073)	(0.369)	(0.366)
CFT FFI Ever									-0.799	-0.0897	0.110	0.0716	-0.161	0.109	0.0259	0.0375
									(1.063)	(1.063)	(0.149)	(0.150)	(0.344)	(0.346)	(0.117)	(0.118)
Constant	239.6***	278.0***	87.13***	69.56***	88.95***	96.34***	73.57***	63.18***	272.0***	335.0***	94.23***	83.71***	93.33***	113.0***	96.24***	84.47***
	(0.623)	(9.124)	(0.186)	(2.842)	(0.198)	(2.985)	(0.168)	(2.452)	(0.633)	(9.041)	(0.0889)	(1.280)	(0.205)	(2.944)	(0.0695)	(1.004)
Observations	28,297	28,297	26,649	26,649	27,631	27,631	28,250	28,250	24,932	24,932	24,932	24,932	24,932	24,932	24,932	24,932
R-squared	0.013	0.046	0.024	0.036	0.004	0.015	0.043	0.076	0.018	0.061	0.181	0.204	0.004	0.035	0.195	0.214
Mean control t(0)	239.6	278	87.13	69.56	88.95	96.34	73.57	63.18	272	335	94.23	83.71	93.33	113	96.24	84.47
Mean treated t(0)	240.5	279.7	87.19	69.62	87.95	95.41	74.30	64.24	271.2	334.9	94.34	83.78	93.16	113.1	96.26	84.50
Diff t(0)	0.837	1.630	0.0638	0.0622	-0.995	-0.925	0.729	1.066	-0.799	-0.0897	0.110	0.0716	-0.161	0.109	0.0259	0.0375
Mean control t(1)	224.3	261.4	79.70	62.22	91.81	98.76	65.98	55.87	267.8	327.5	86.19	76.15	94.88	113.7	88.38	77.11
Mean treated t(1)	220.7	257.5	79.94	62.63	91.45	98.40	64.22	53.90	251	311.4	84.21	73.89	90.24	109.2	88.06	76.48
Diff t(1)	-3.615	-3.906	0.239	0.415	-0.356	-0.357	-1.767	-1.970	-16.82	-16.08	-1.977	-2.266	-4.649	-4.449	-0.320	-0.631

Standard errors in parentheses	Observations are only females from total sample population. Results are individual points. Dependent variables are individual Marine scores for Physical Fitness Test (PFT), Upper Body Endurance (UBE) (a composite of pull-ups, push-ups, or flex arm hang), Crunches, Aerobic Capacity (AC) (a composite of 3-mile timed run or 5,000m timed row), Combat Fitness Test (CFT), Movement to Contact (MTC), Ammo Can Lift (ACL), and Manuever Under Fire (MUF). Treatment variables are at the individual Marine level for Treated Year (2017) and having an FFI for 30 days or greater prior to running a PFT or CFT. Control variables are at the individual Marine level for demographics, Unit Type, and having a Female FFI.
*** p<0.01, ** p<0.05, * p<0.1	

APPENDIX E. GENDER KERNEL DENSITIES

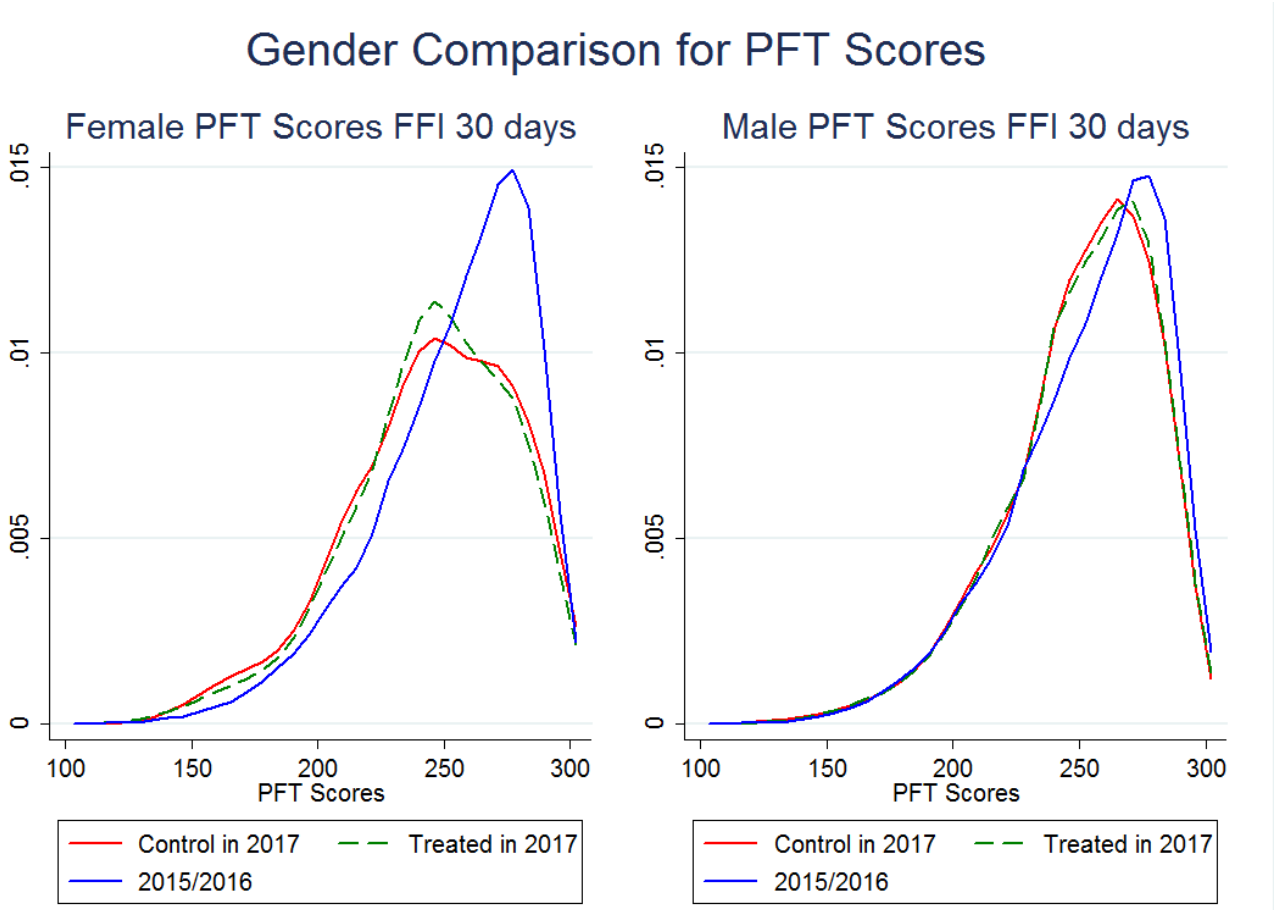

Figure 123. Gender Comparison of Physical Fitness Scores for FFI 30 Days or Greater

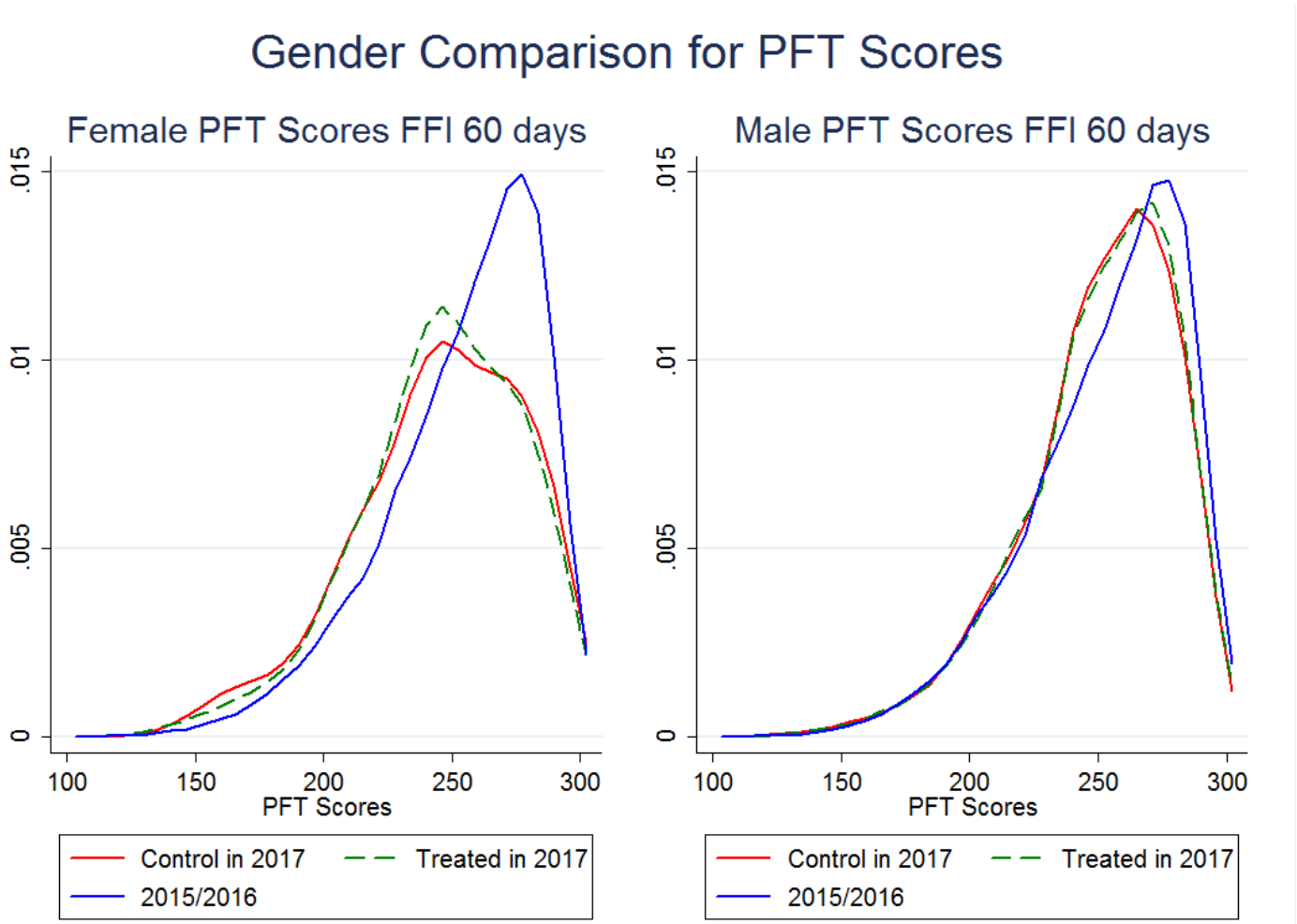

Figure 124. Gender Comparison of Physical Fitness Scores for FFI 60 Days or Greater

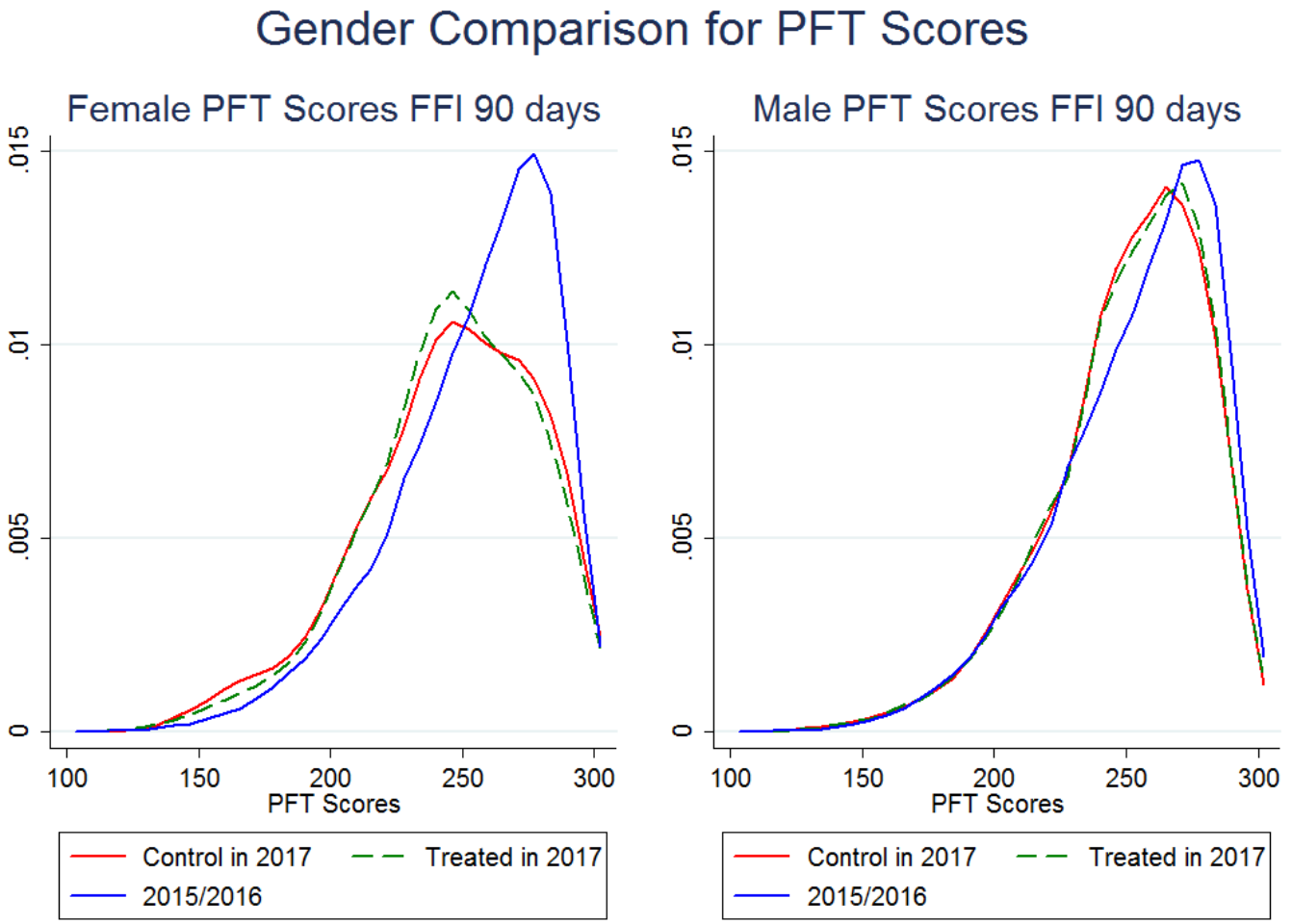

Figure 125. Gender Comparison of Physical Fitness Scores for FFI 90 Days or Greater

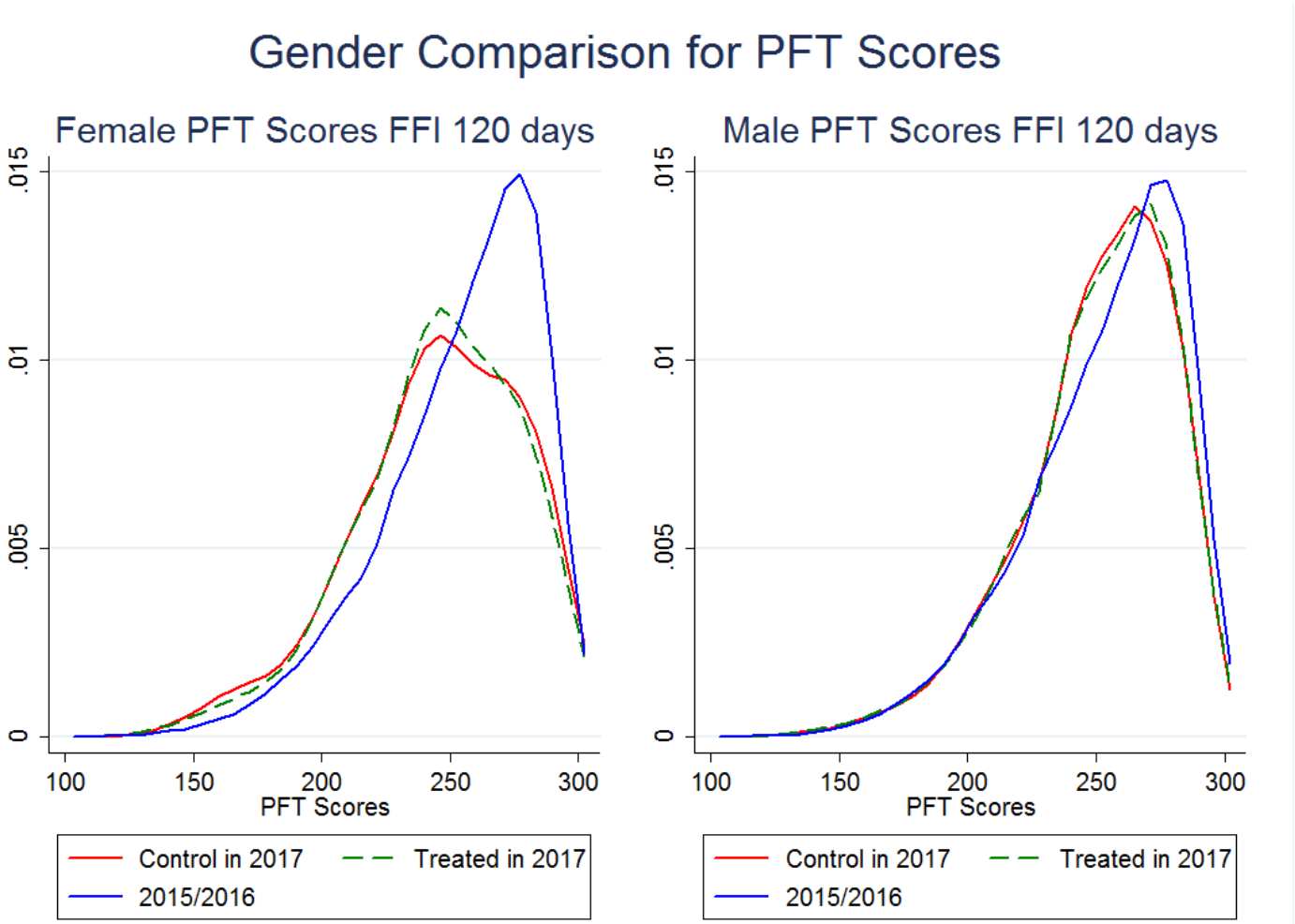

Figure 126. Gender Comparison of Physical Fitness Scores for FFI 120 Days or Greater

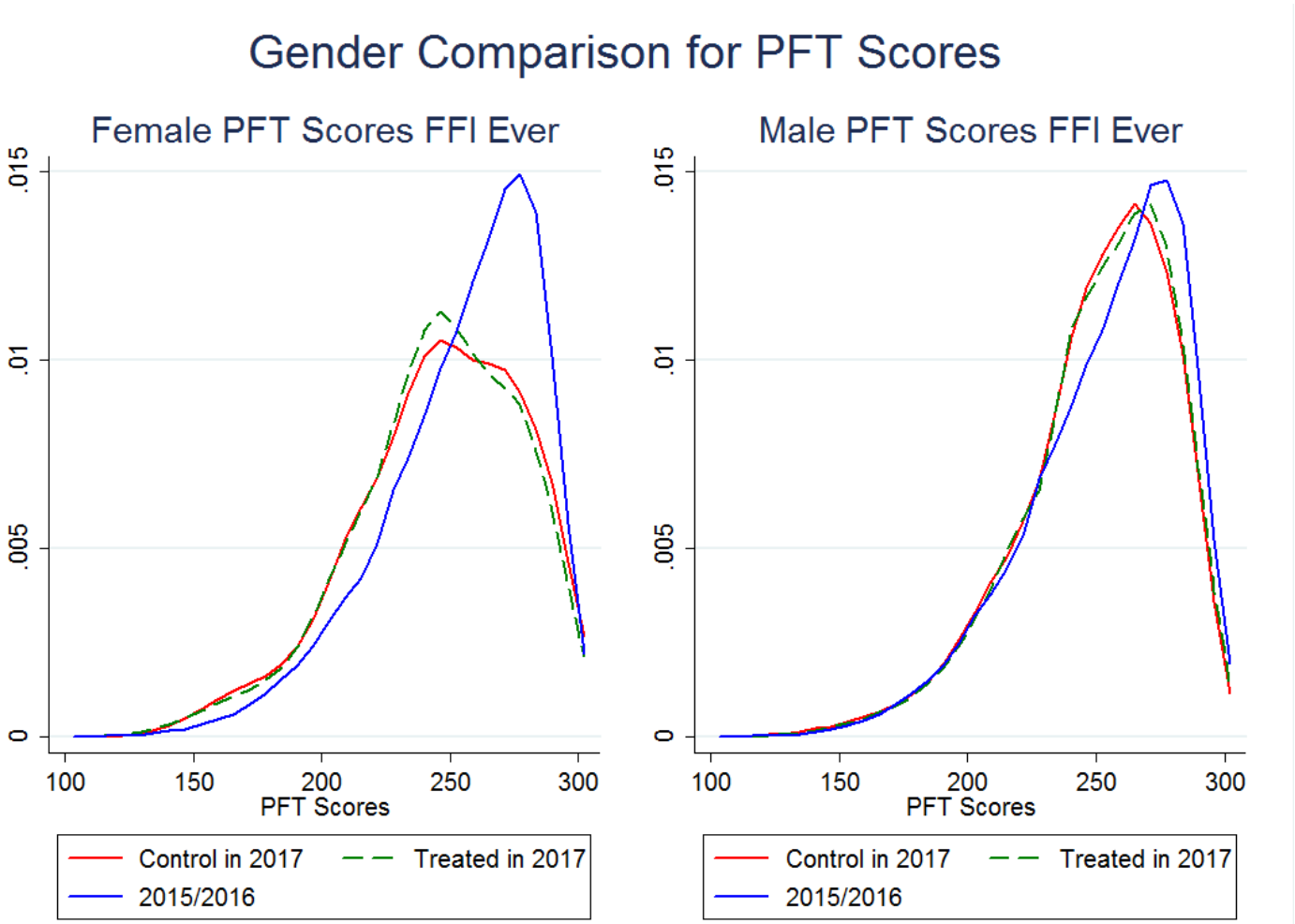

Figure 127. Gender Comparison of Physical Fitness Scores Ever Having an FFI

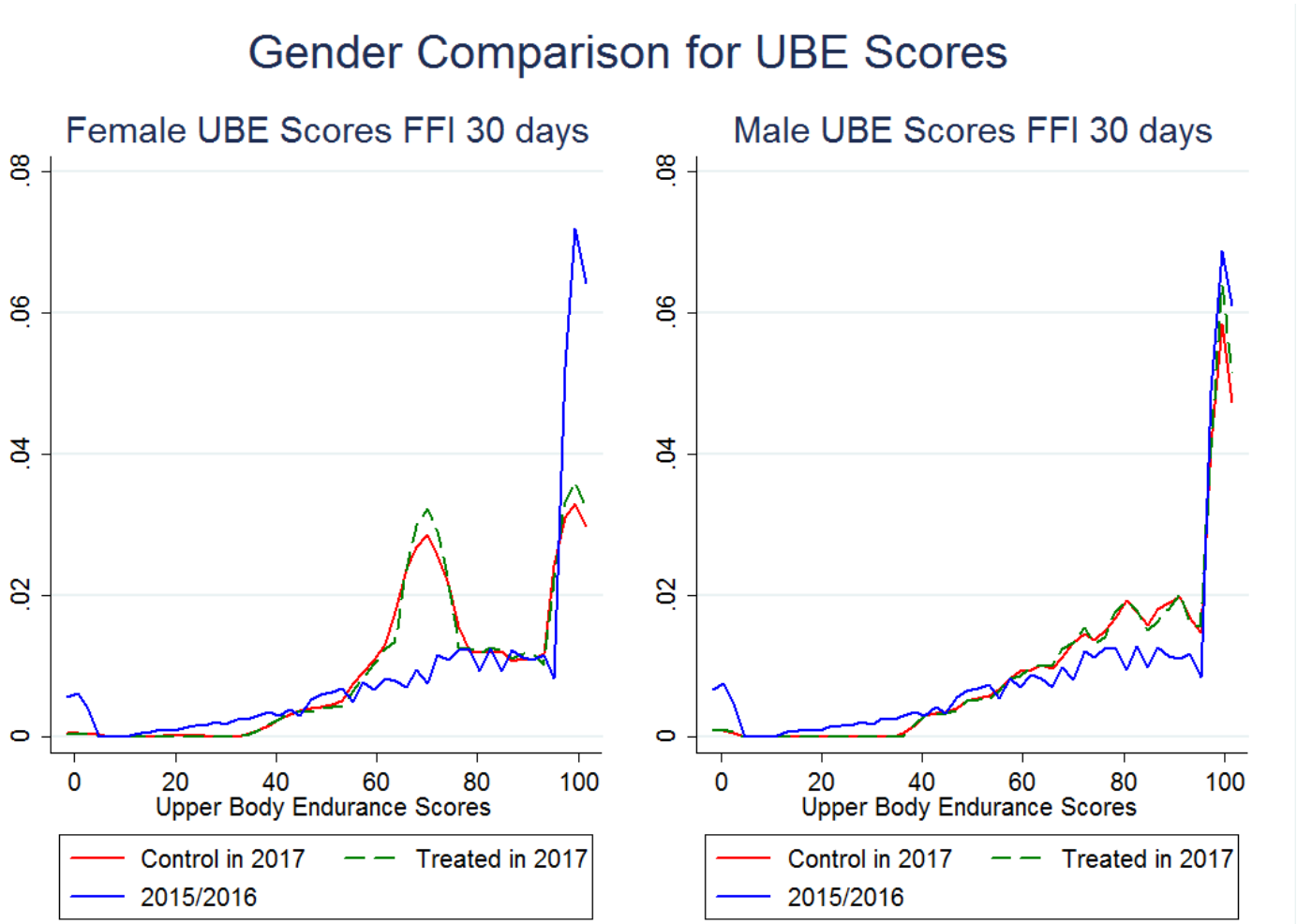

Figure 128. Gender Comparison of Upper Body Endurance Scores for FFI 30 Days or Greater

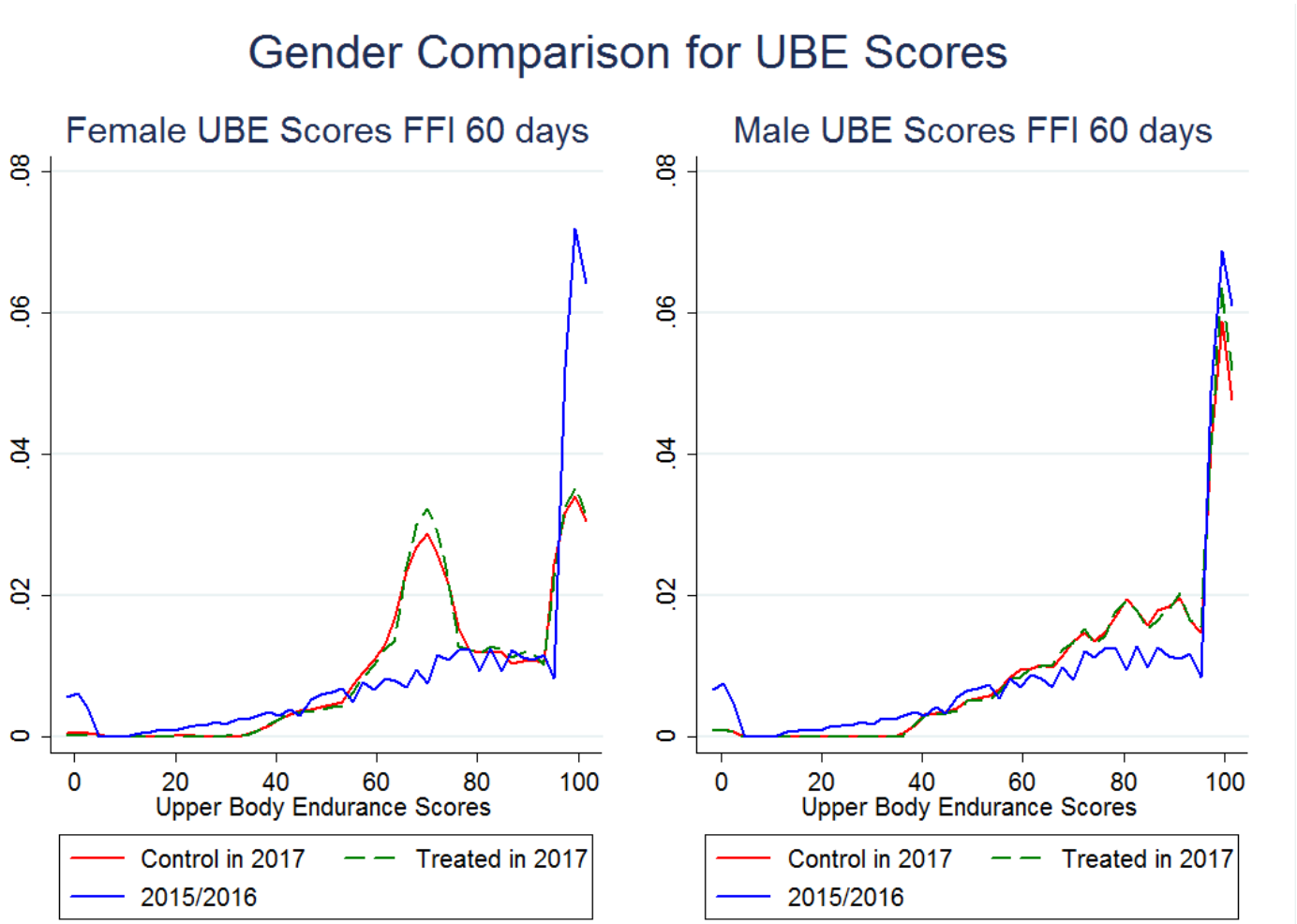

Figure 129. Gender Comparison of Upper Body Endurance Scores for FFI 60 Days or Greater

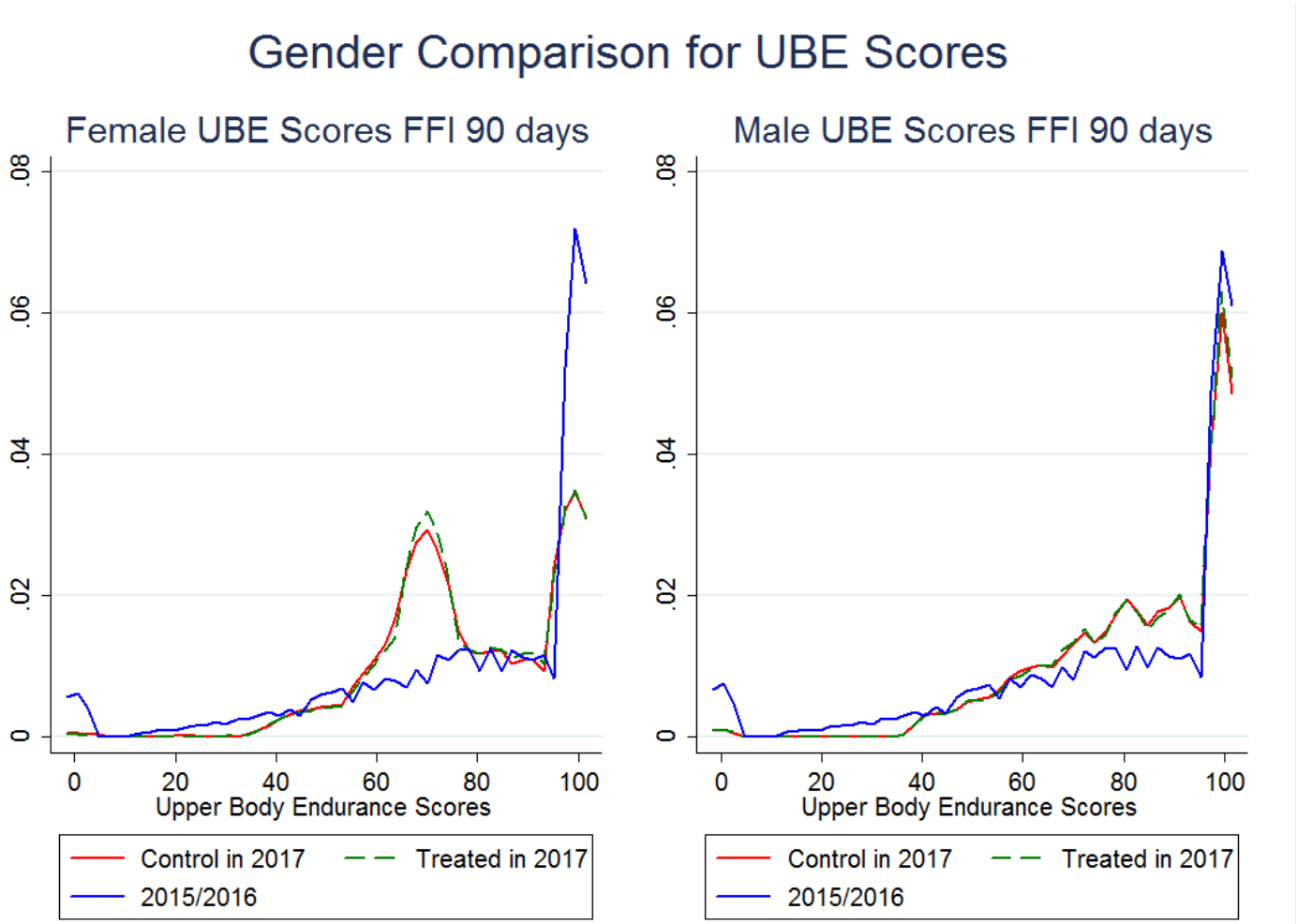

Figure 130. Gender Comparison of Upper Body Endurance Scores for FFI 90 Days or Greater

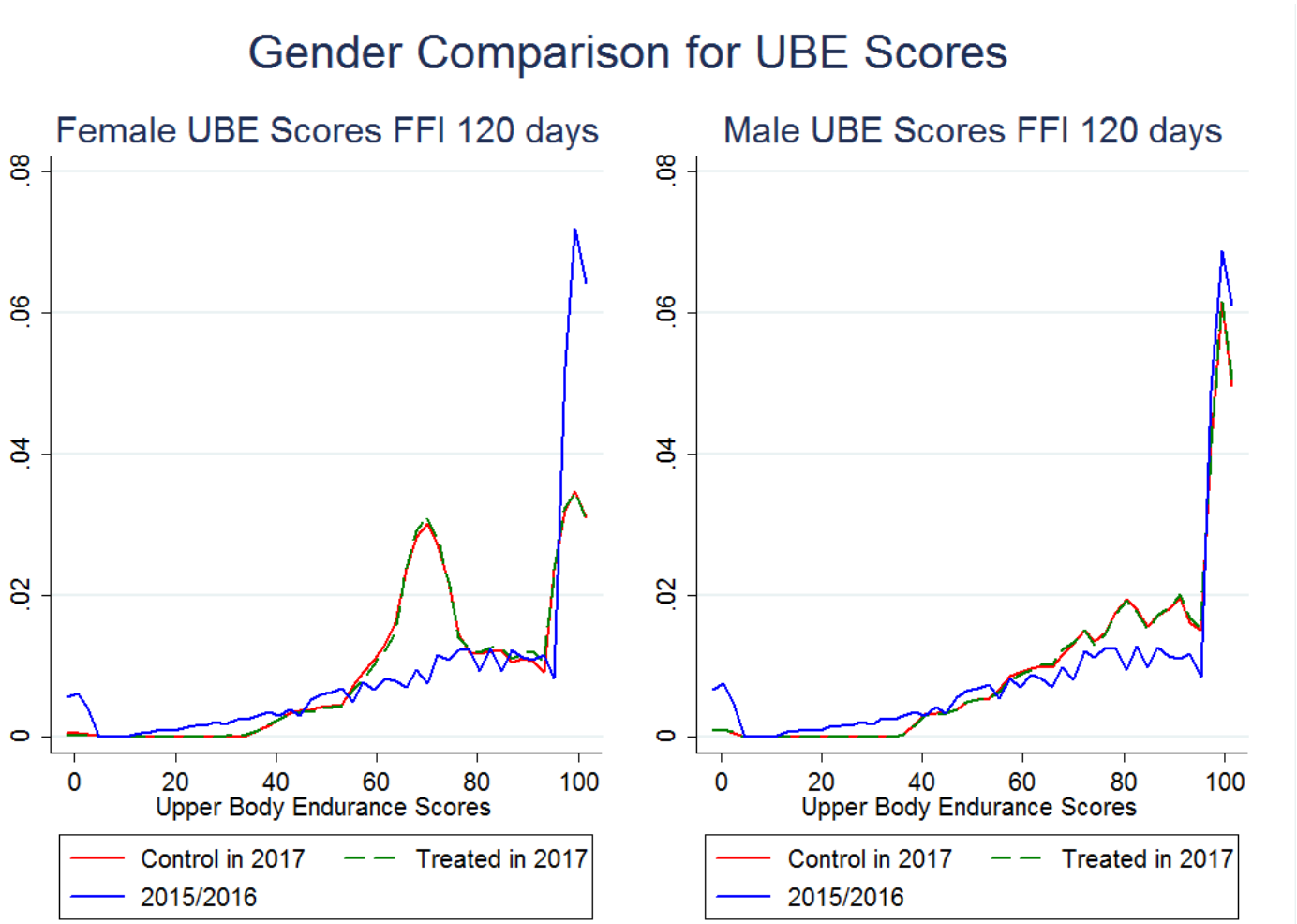

Figure 131. Gender Comparison of Upper Body Endurance Scores for FFI 120 Days or Greater

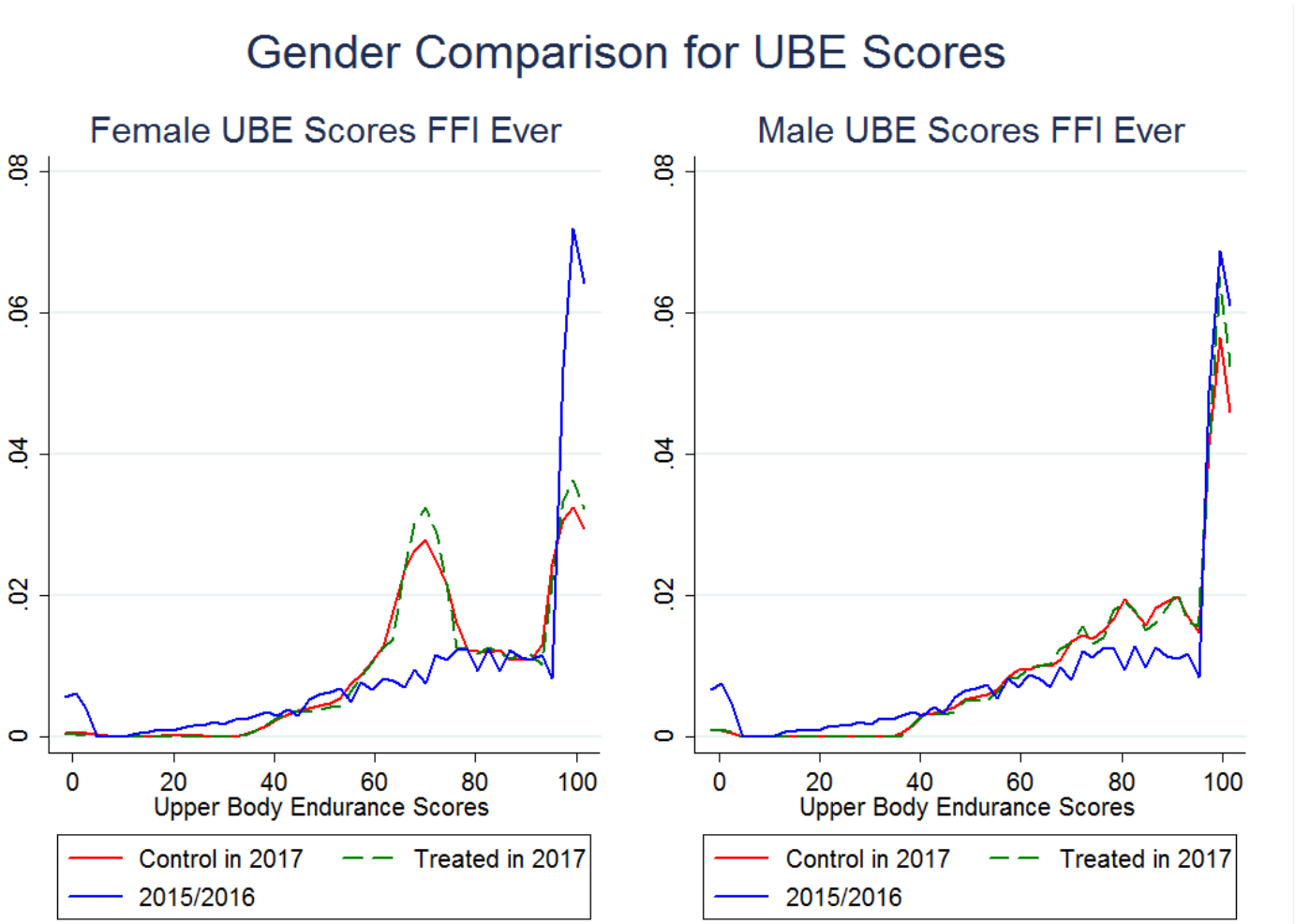

Figure 132. Gender Comparison of Upper Body Endurance Scores Ever Having an FFI

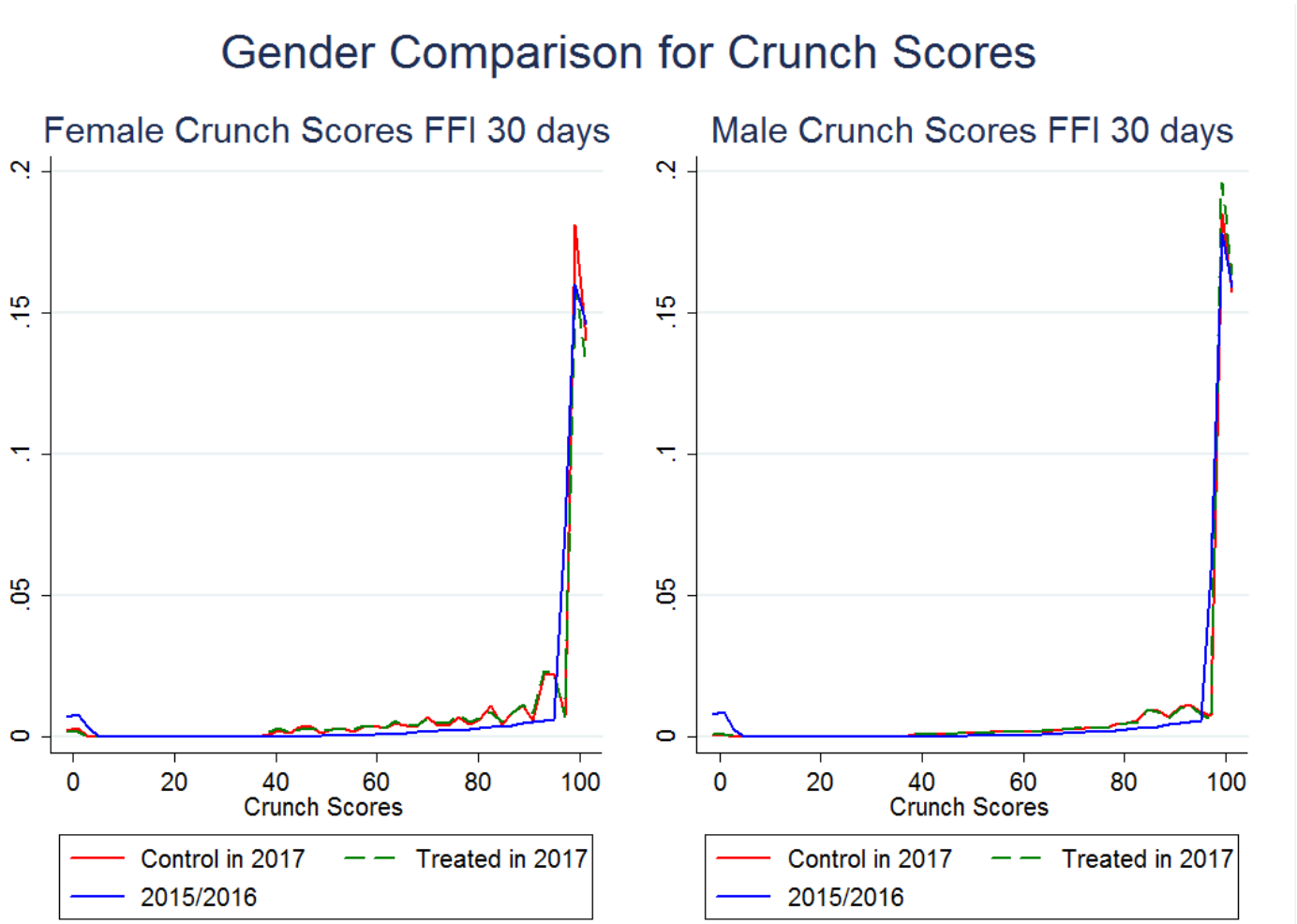

Figure 133. Gender Comparison of Crunch Scores for FFI 30 Days or Greater

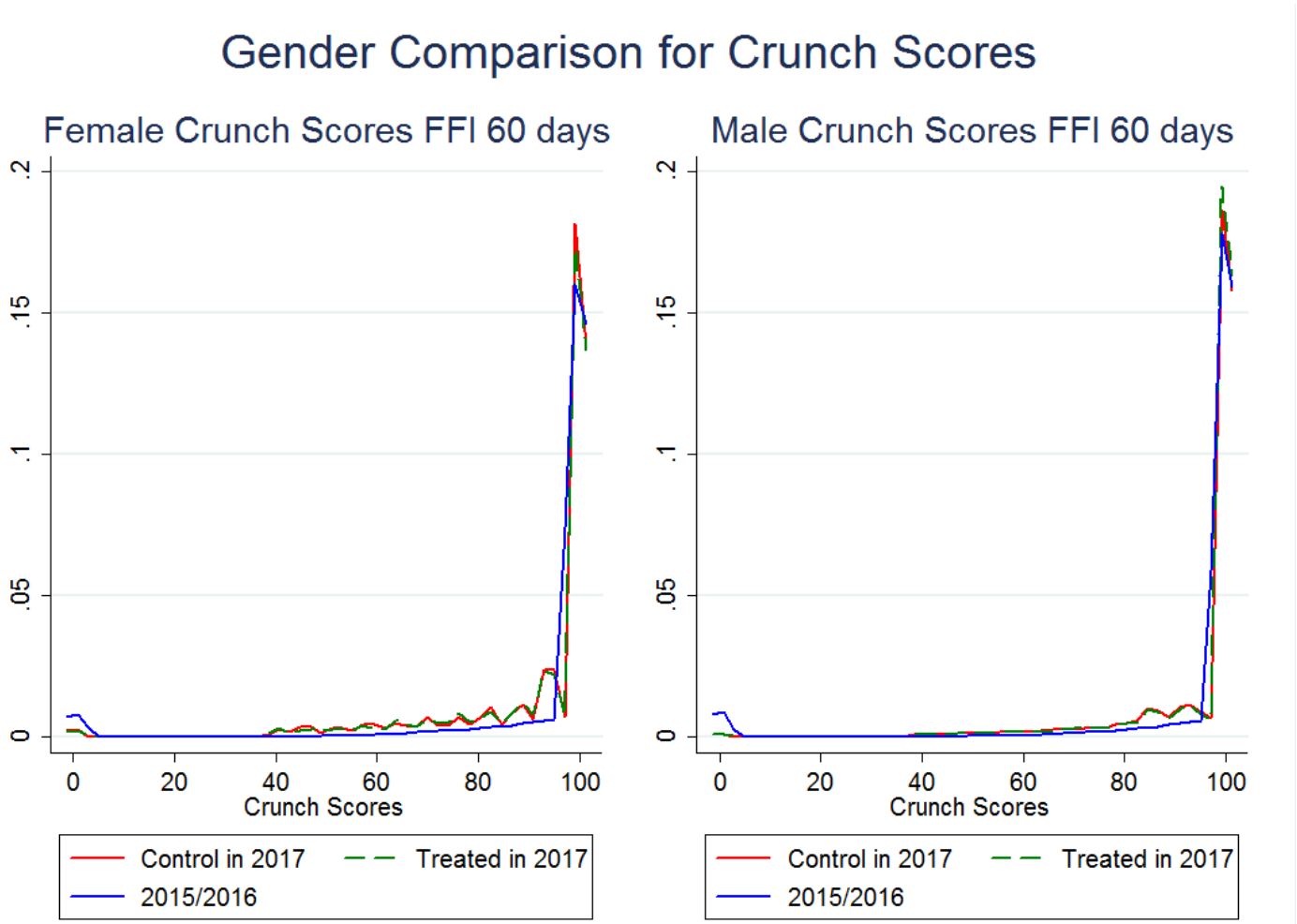

Figure 134. Gender Comparison of Crunch Scores for FFI 60 Days or Greater

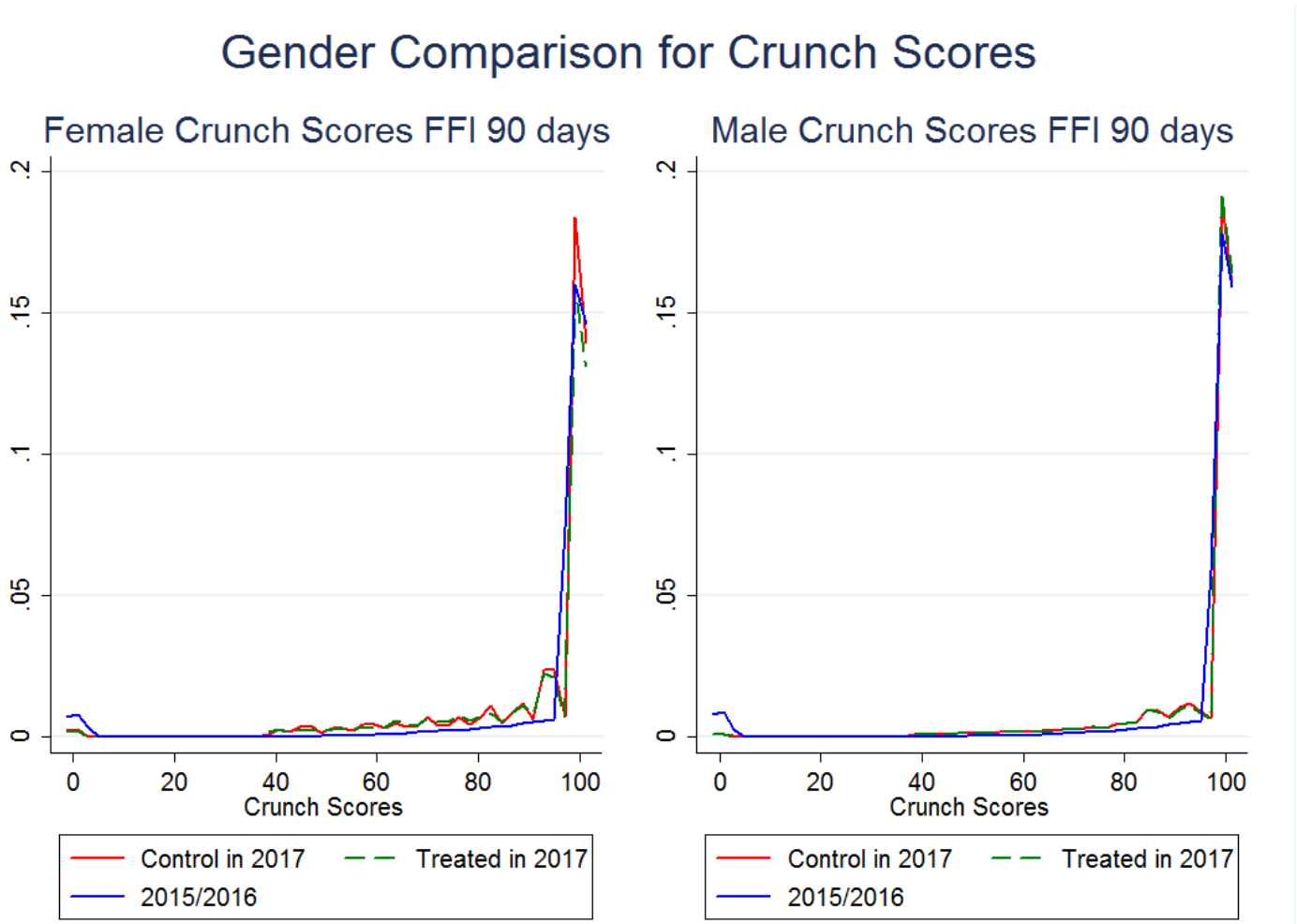

Figure 135. Gender Comparison of Crunch Scores for FFI 90 Days or Greater

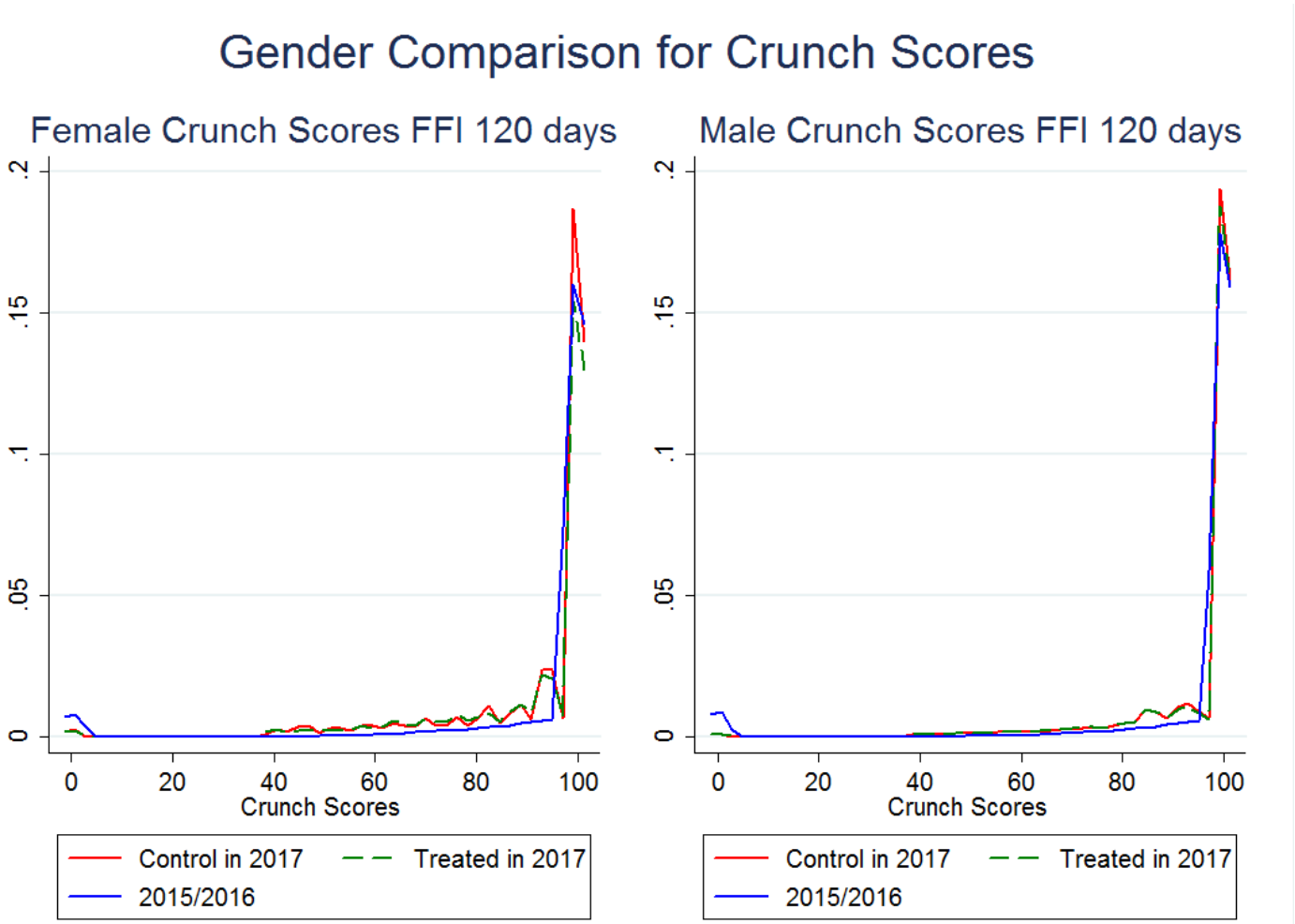

Figure 136. Gender Comparison of Crunch Scores for FFI 120 Days or Greater

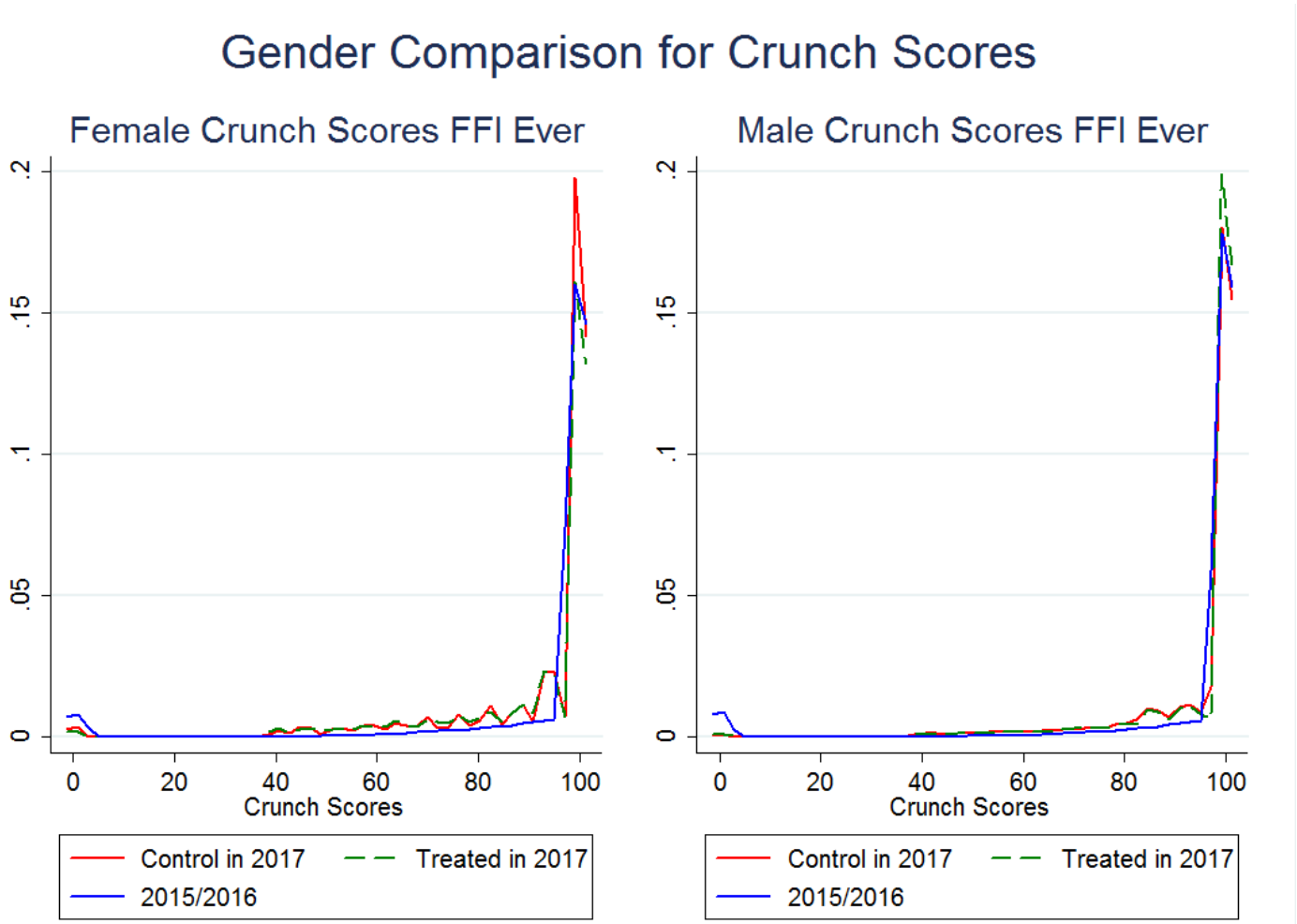

Figure 137. Gender Comparison of Crunch Scores Ever Having an FFI

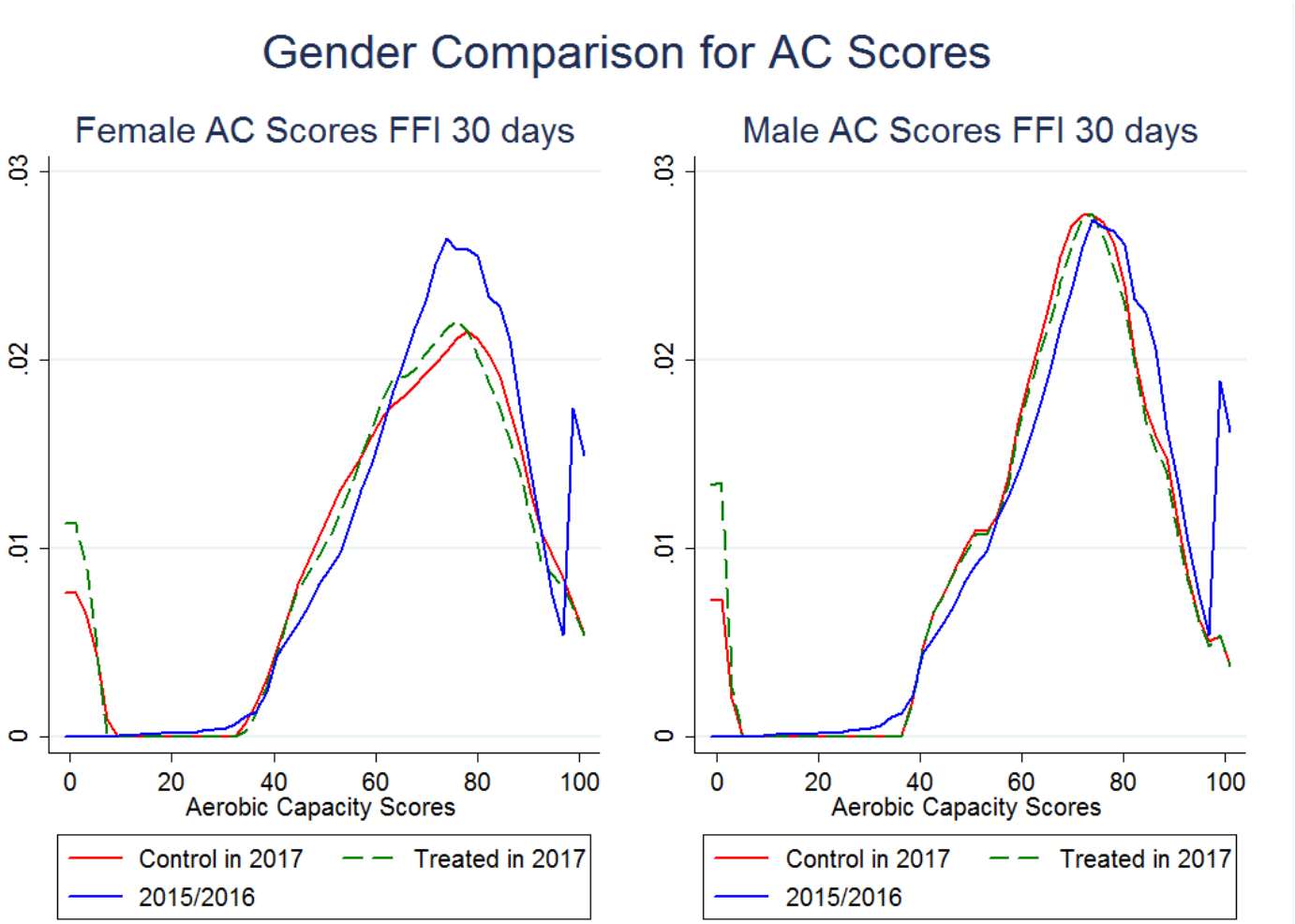

Figure 138. Gender Comparison of Aerobic Capacity Scores for FFI 30 Days or Greater

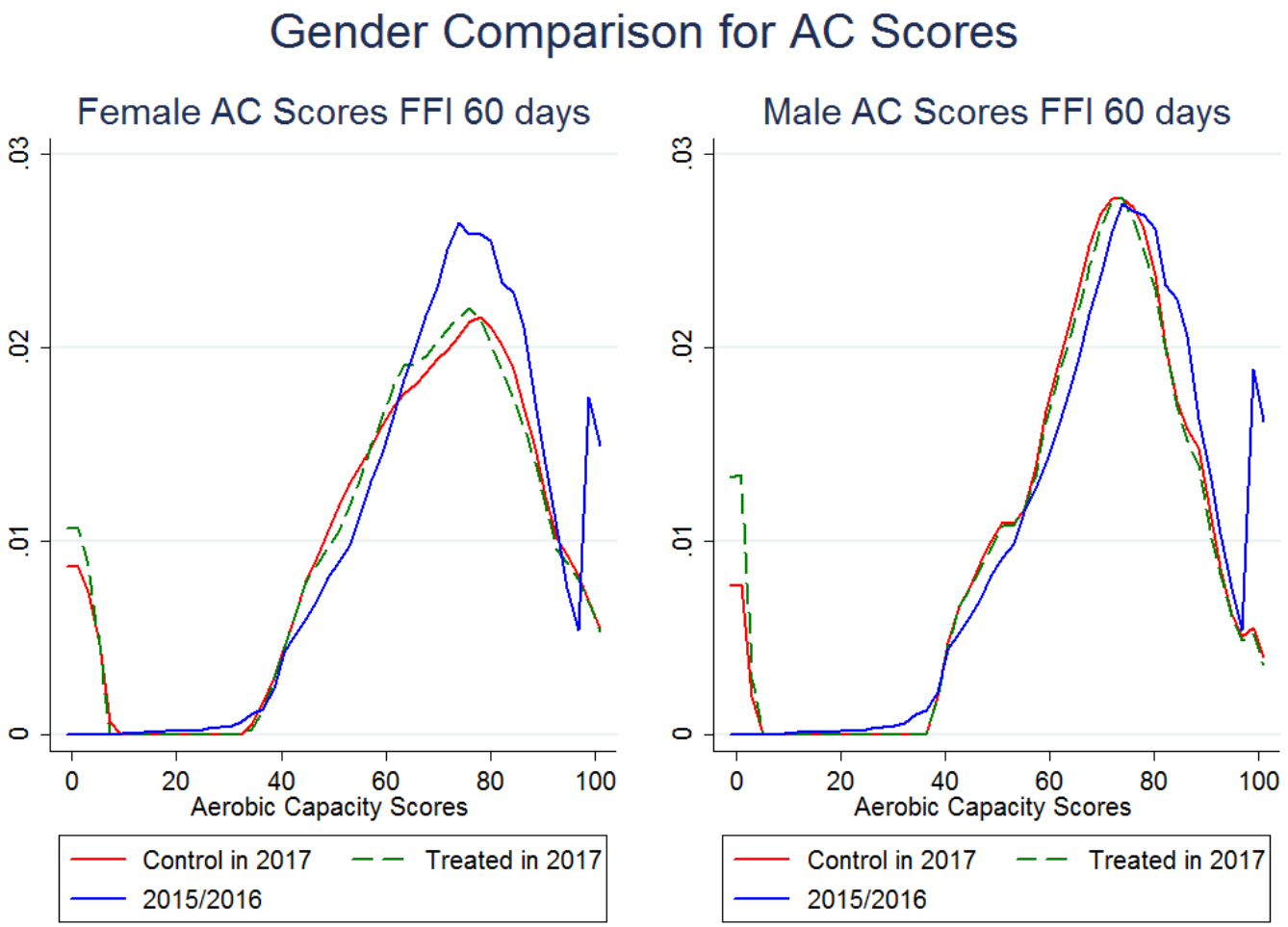

Figure 139. Gender Comparison of Aerobic Capacity Scores for FFI 60 Days or Greater

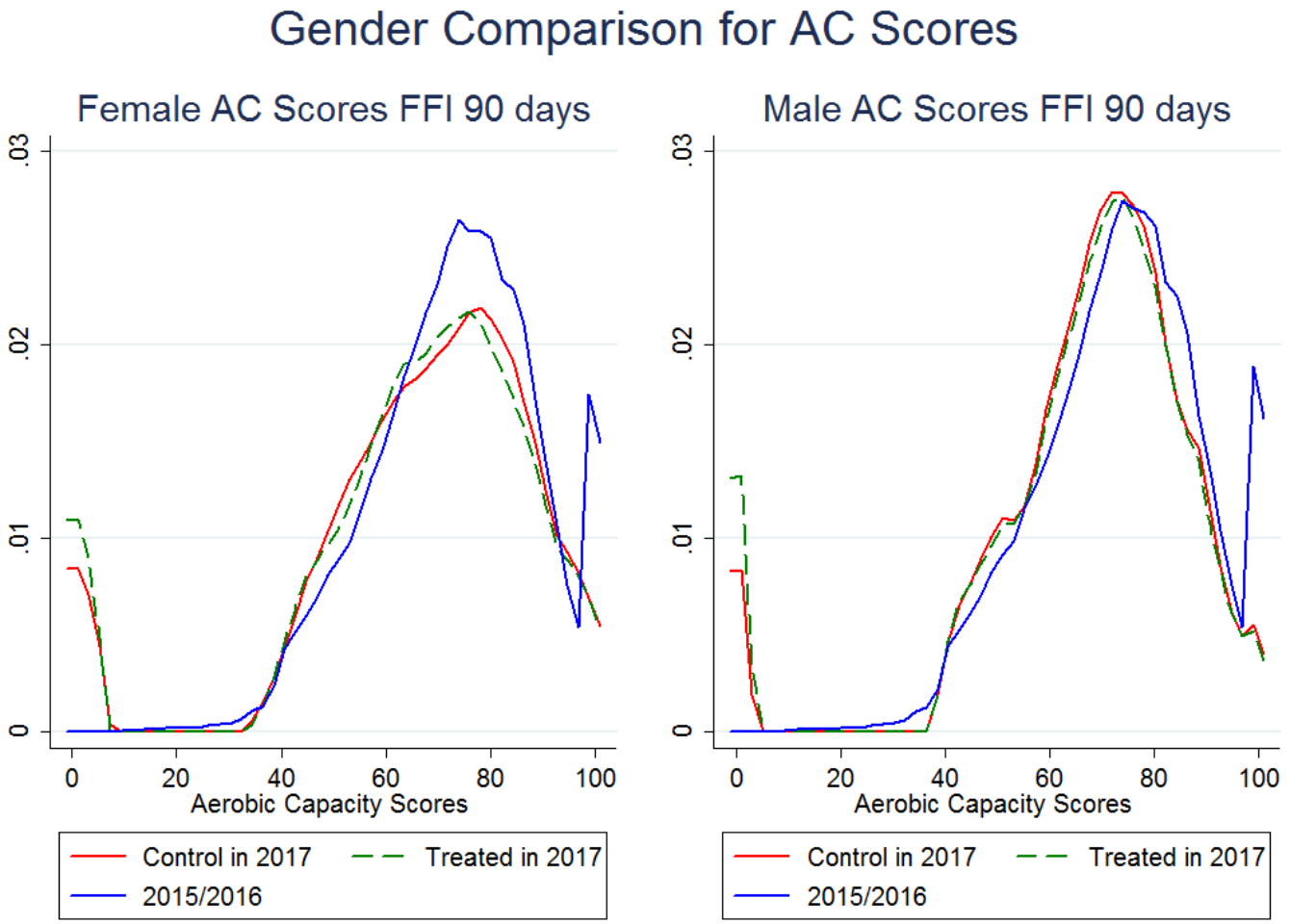

Figure 140. Gender Comparison of Aerobic Capacity Scores for FFI 90 Days or Greater

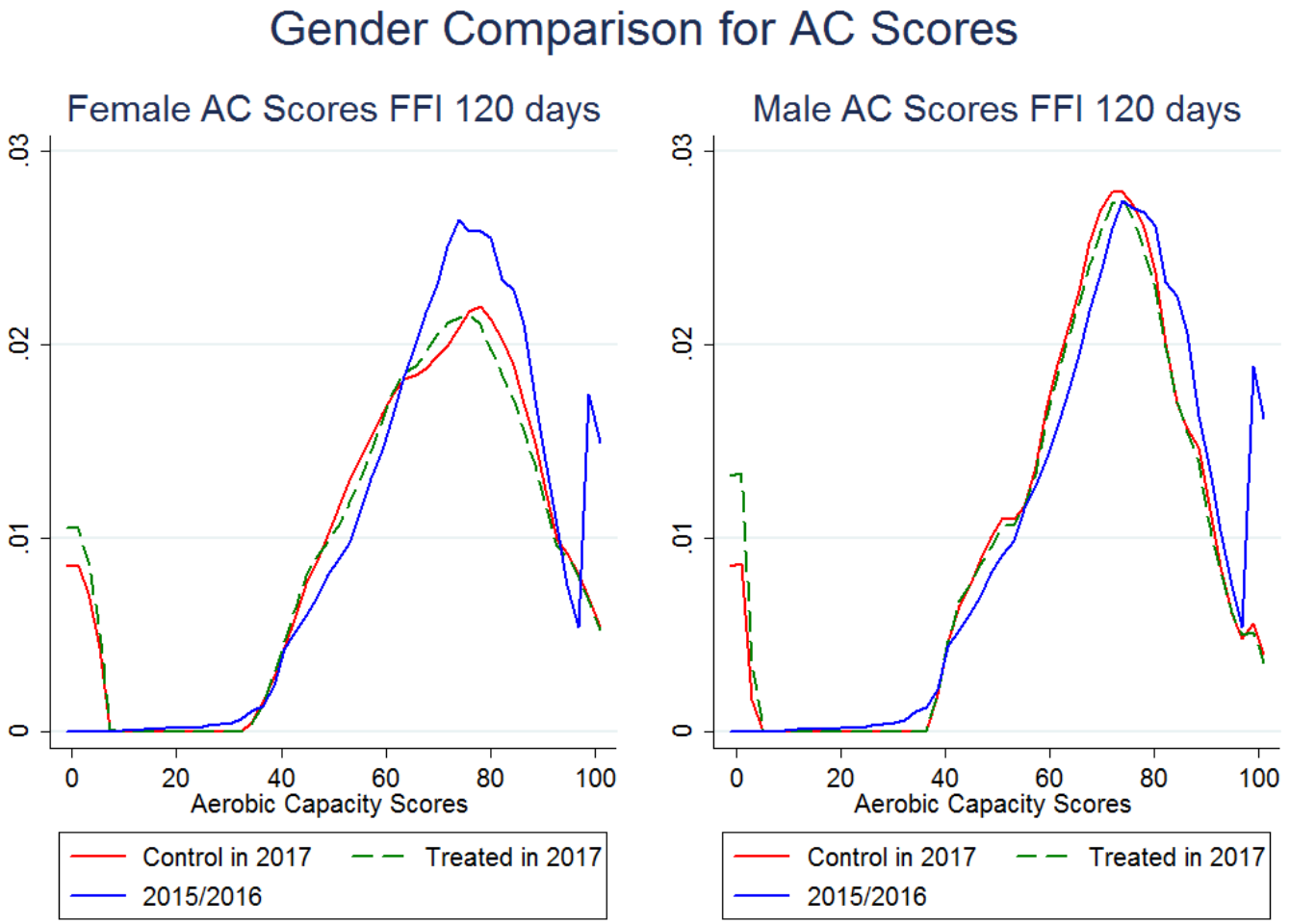

Figure 141. Gender Comparison of Aerobic Capacity Scores for FFI 120 Days or Greater

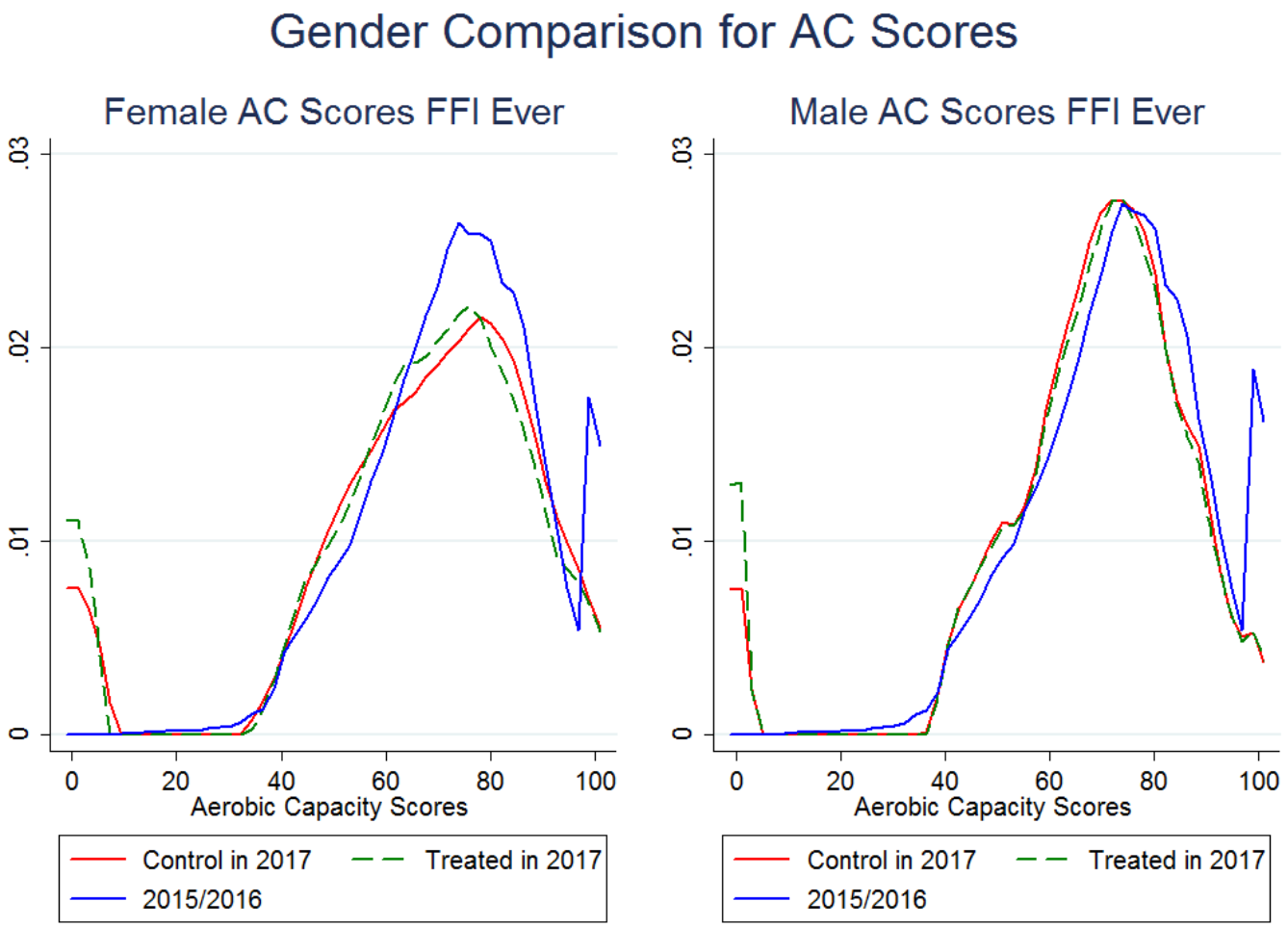

Figure 142. Gender Comparison of Aerobic Capacity Scores Ever Having an FFI

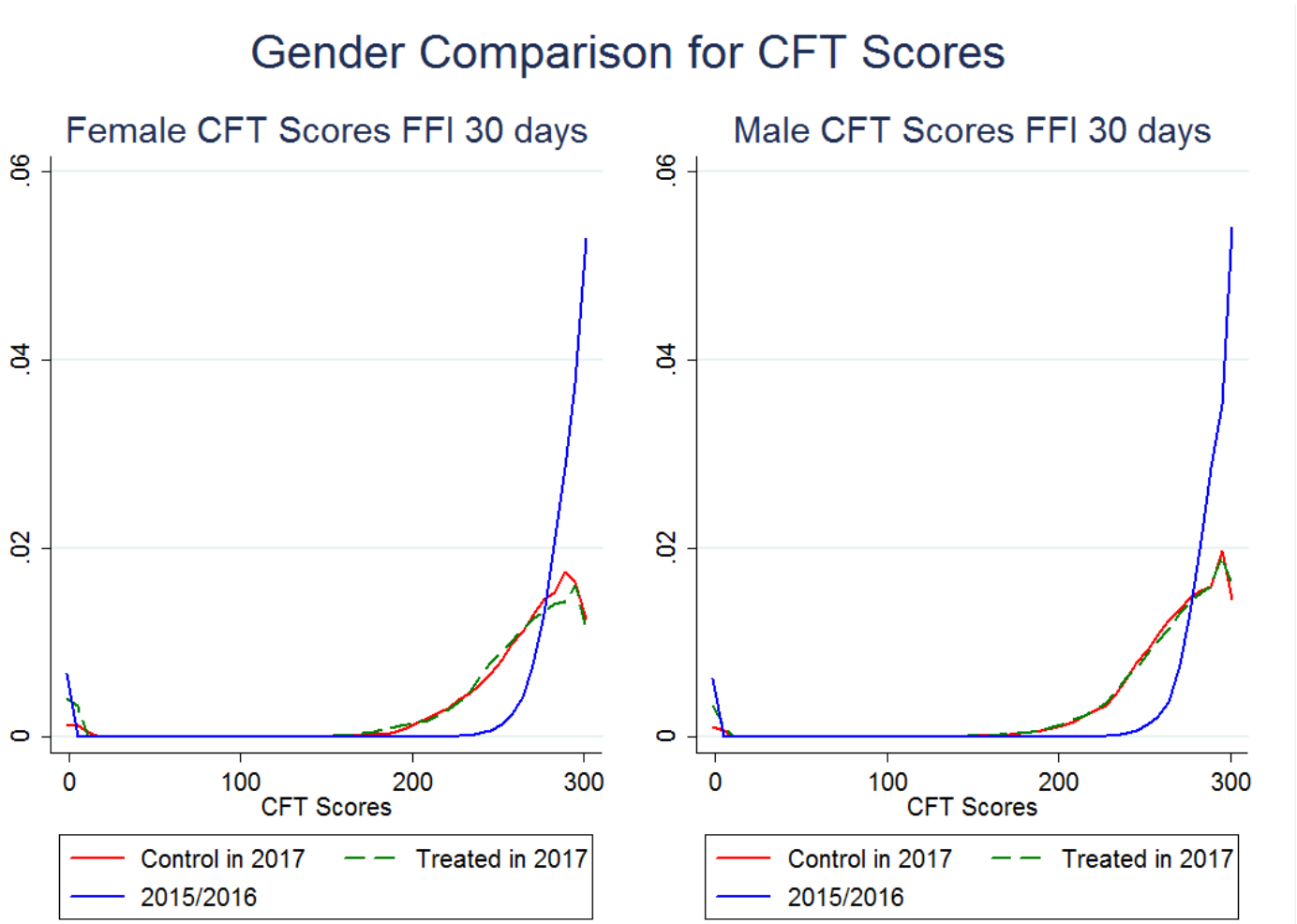

Figure 143. Gender Comparison of Combat Fitness Test Scores for FFI 30 Days or Greater

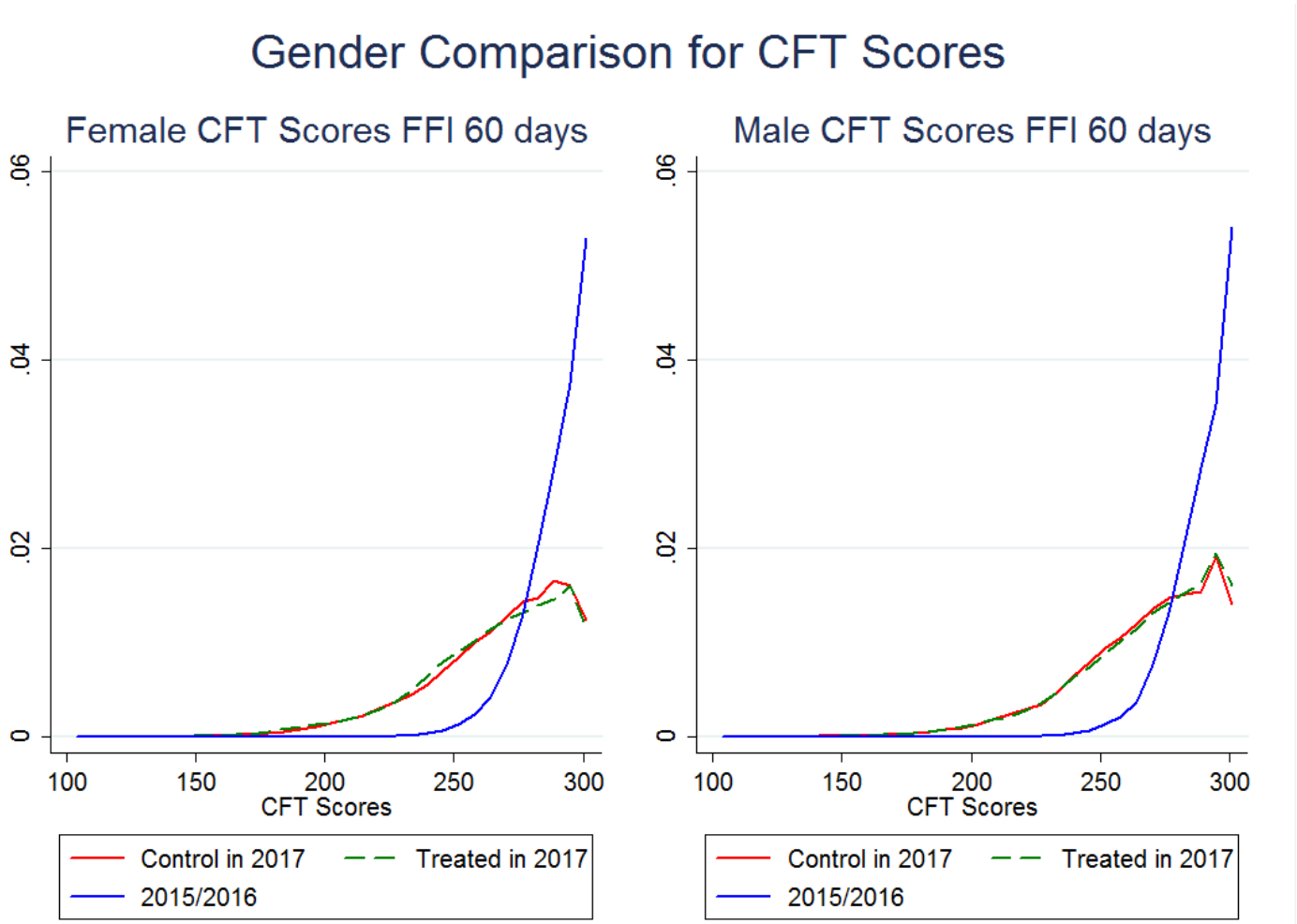

Figure 144. Gender Comparison of Combat Fitness Test Scores for FFI 60 Days or Greater

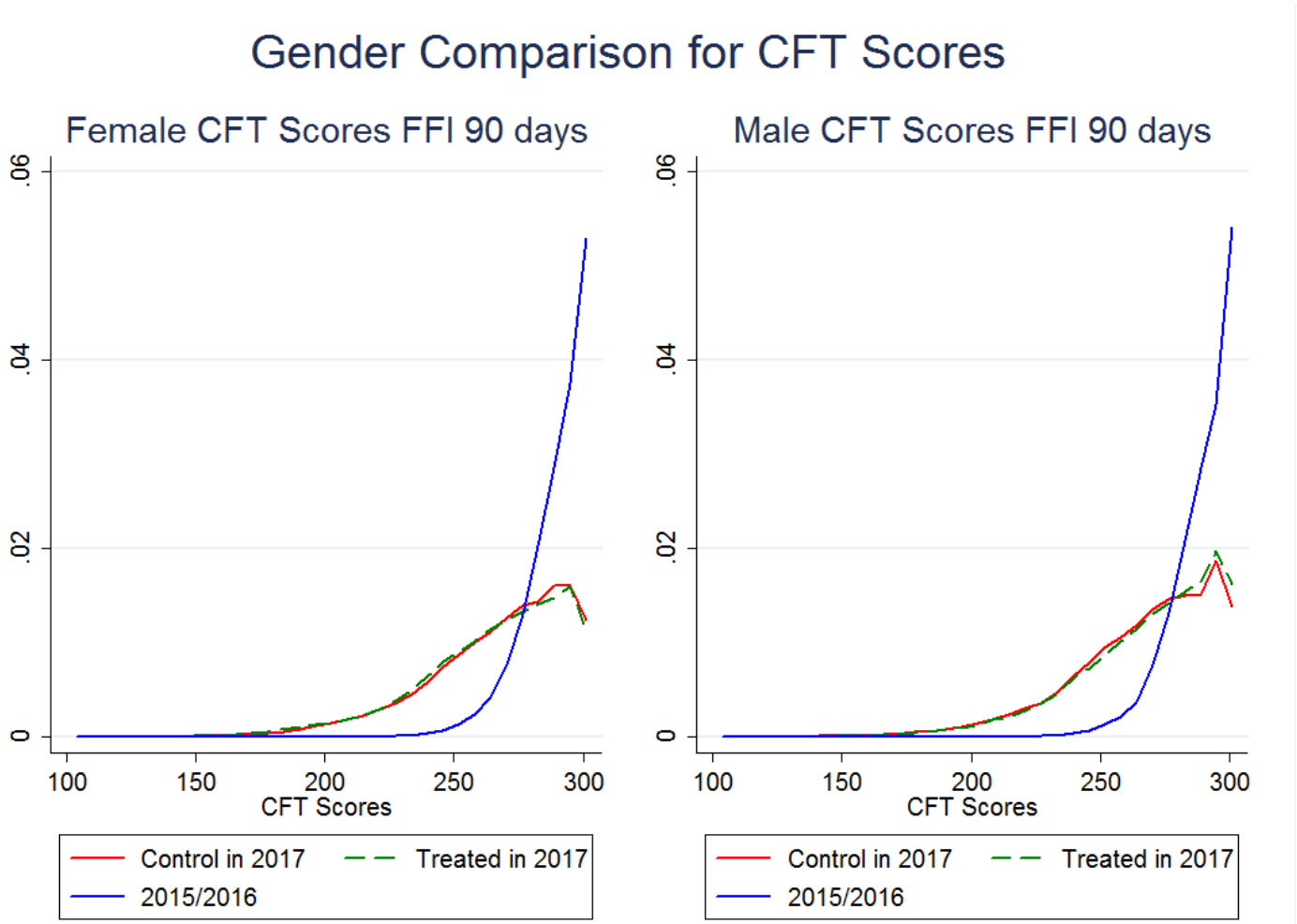

Figure 145. Gender Comparison of Combat Fitness Test Scores for FFI 90 Days or Greater

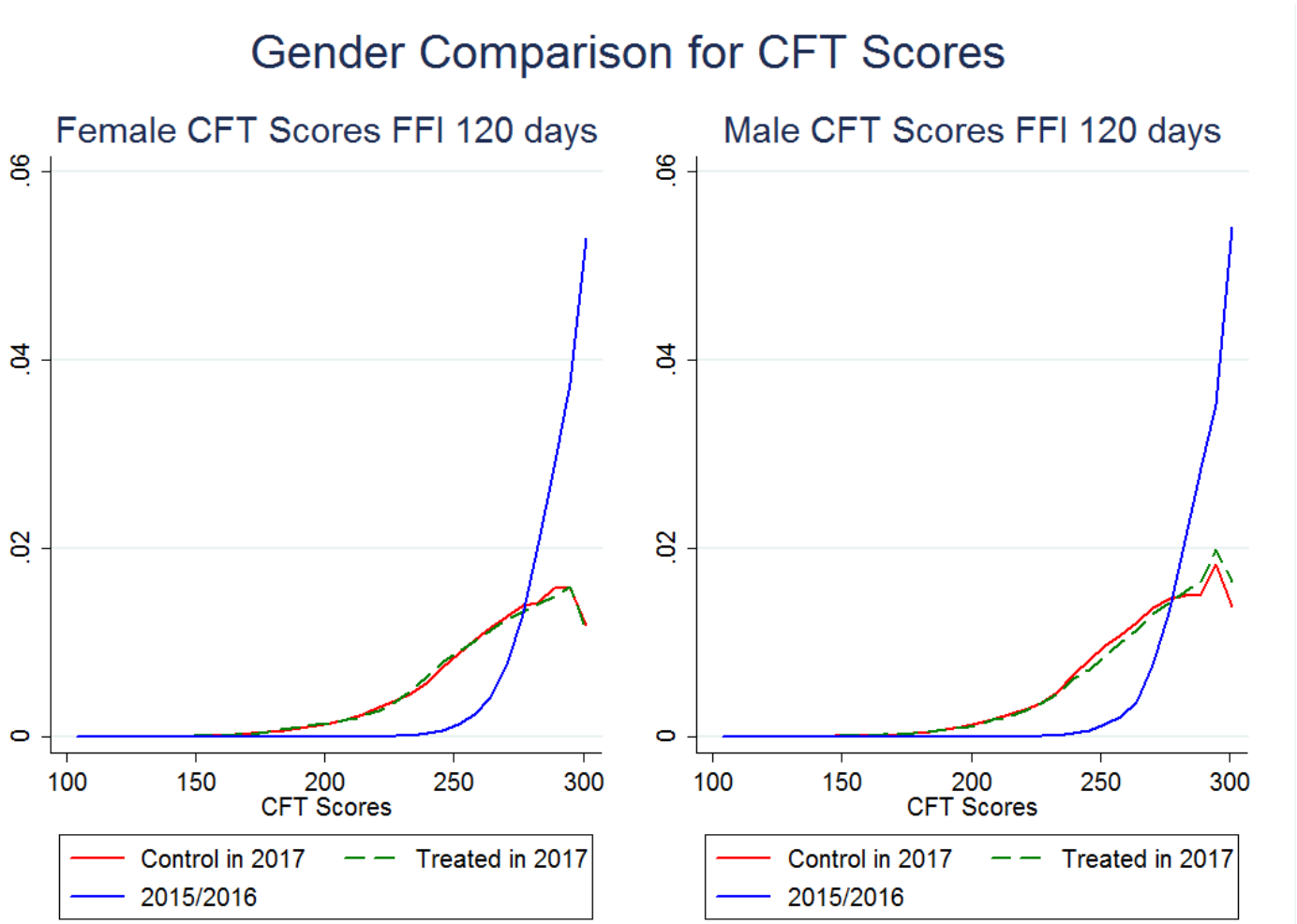

Figure 146. Gender Comparison of Combat Fitness Test Scores for FFI 120 Days or Greater

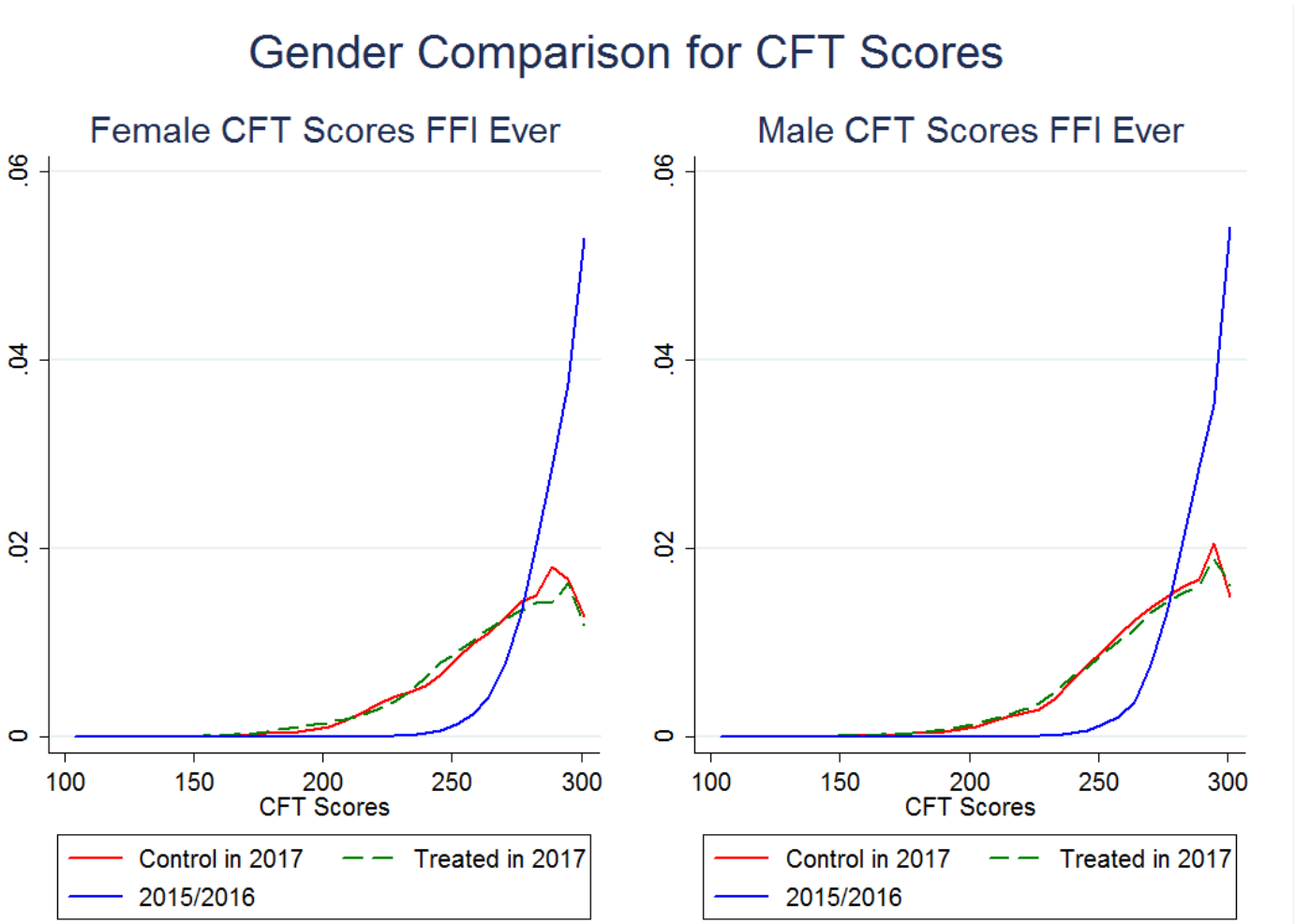

Figure 147. Gender Comparison of Combat Fitness Test Scores Ever Having an FFI

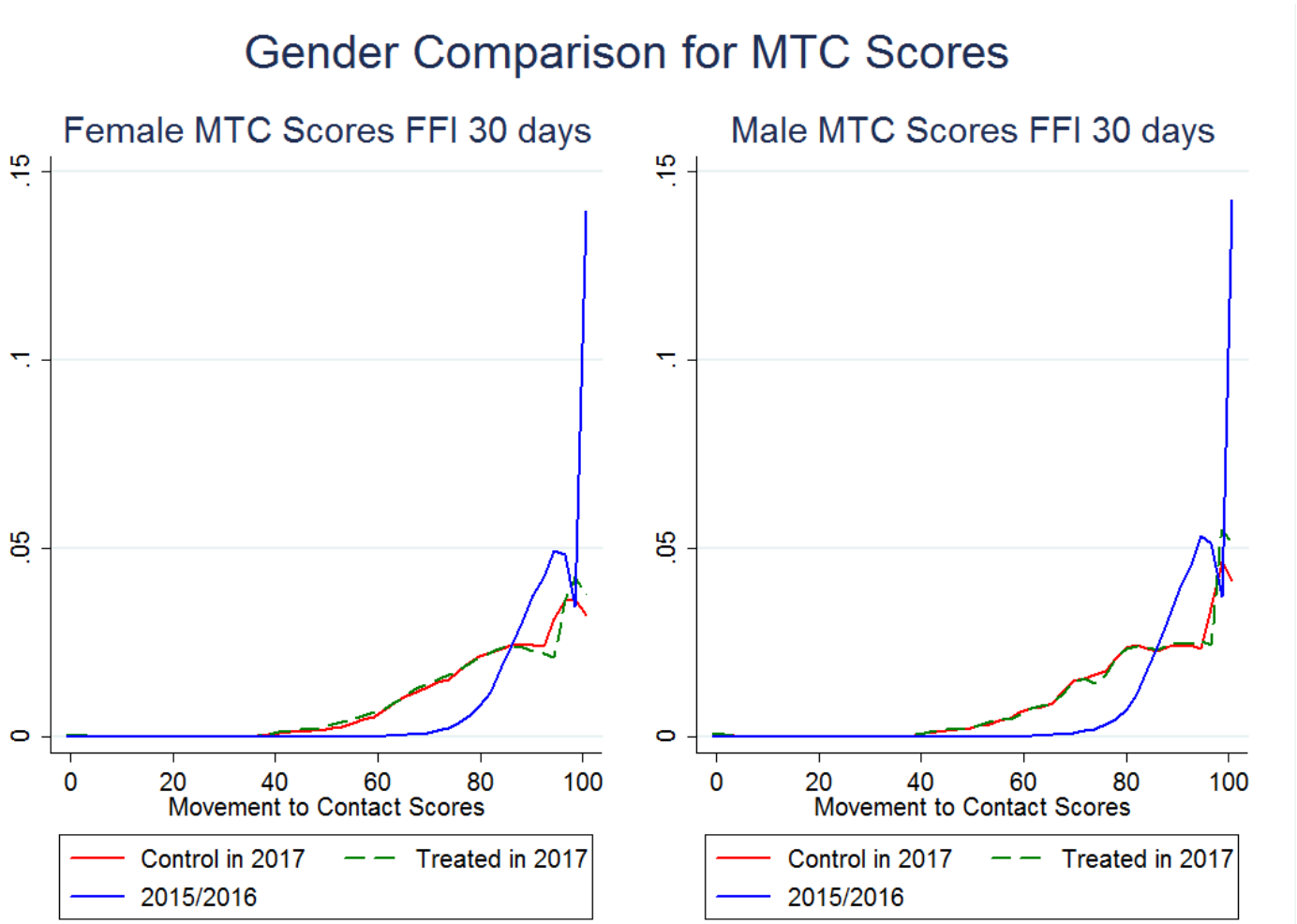

Figure 148. Gender Comparison of Movement to Contact Scores for FFI 30 Days or Greater

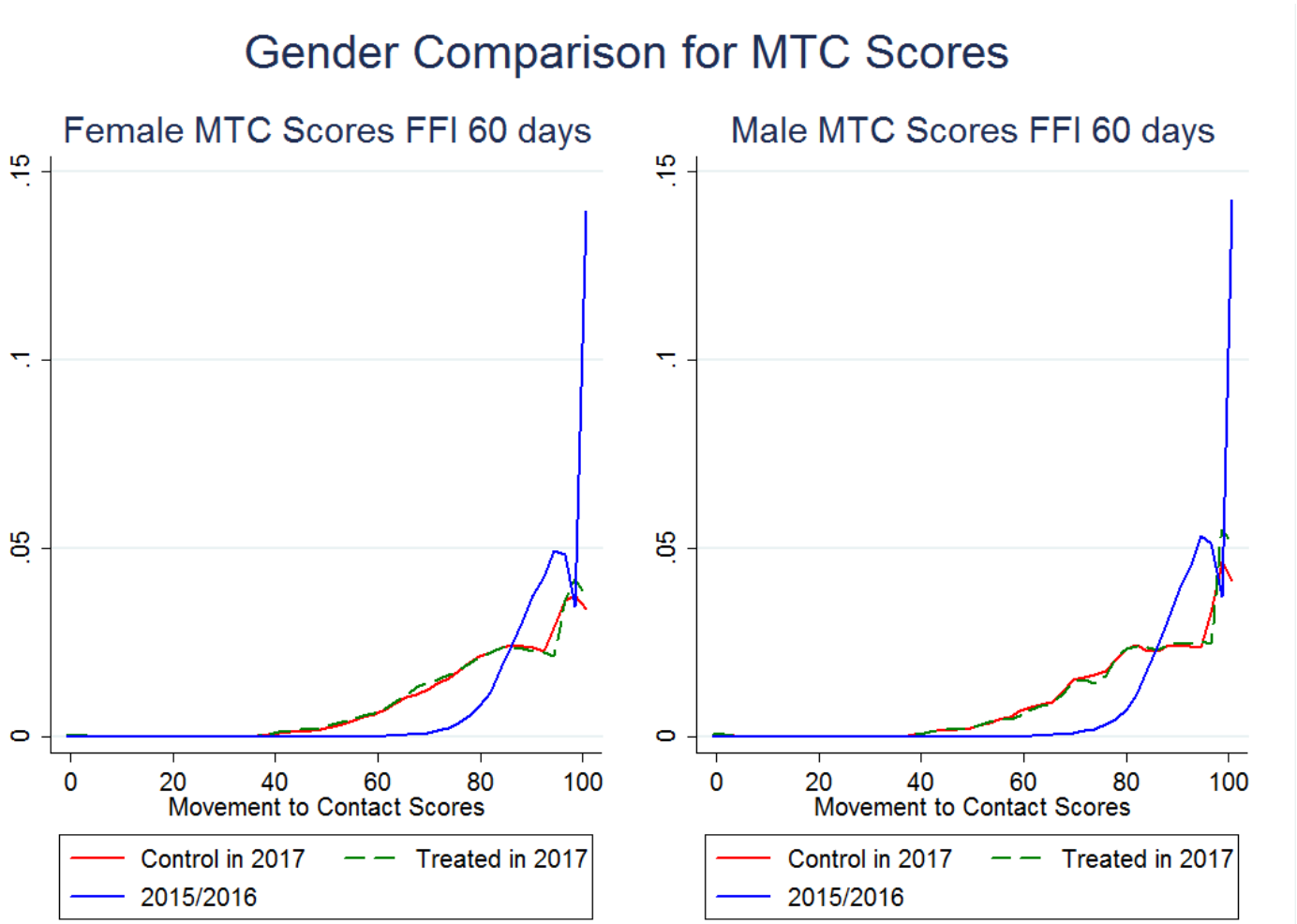

Figure 149. Gender Comparison of Movement to Contact Scores for FFI 60 Days or Greater

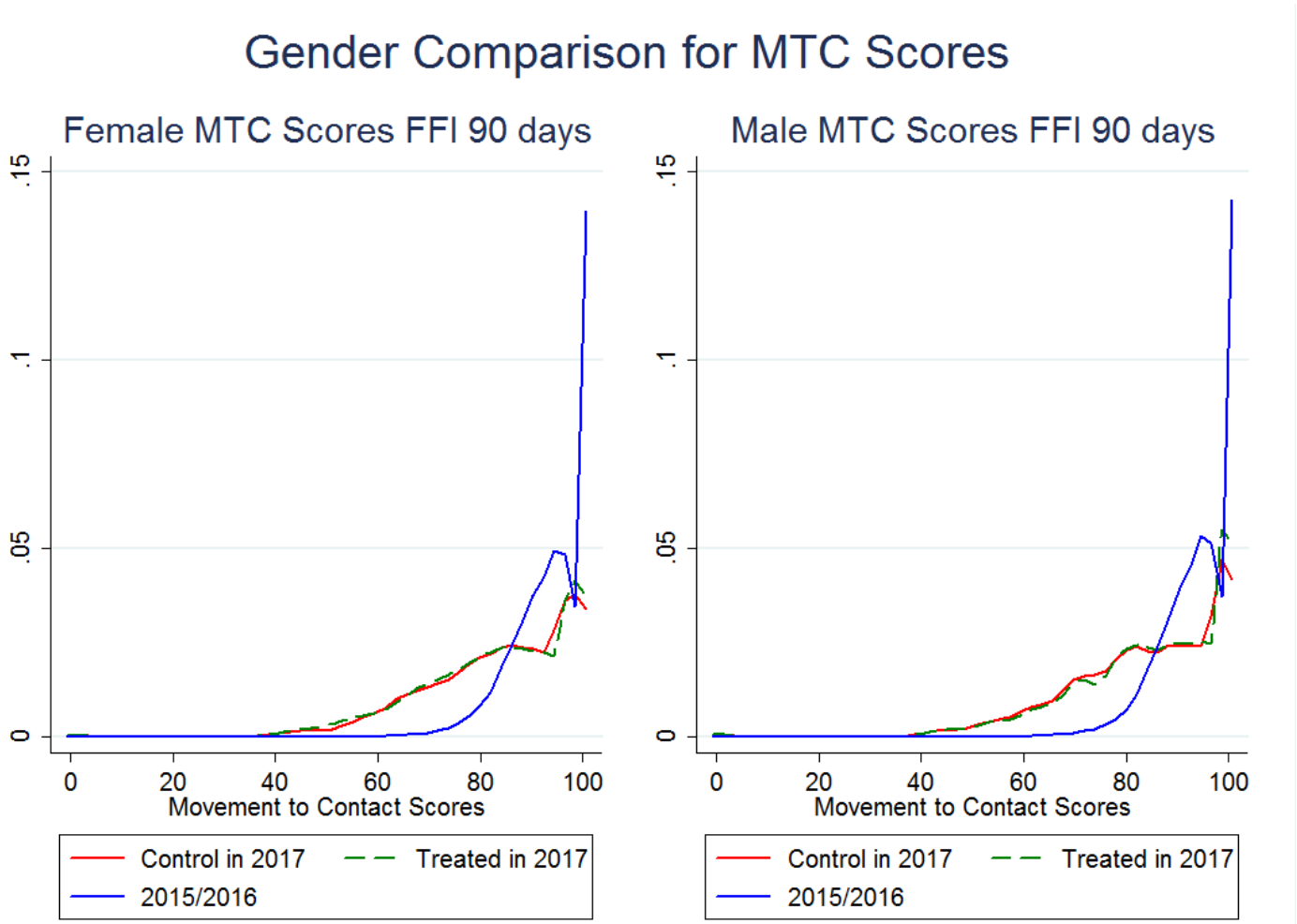

Figure 150. Gender Comparison of Movement to Contact Scores for FFI 90 Days or Greater

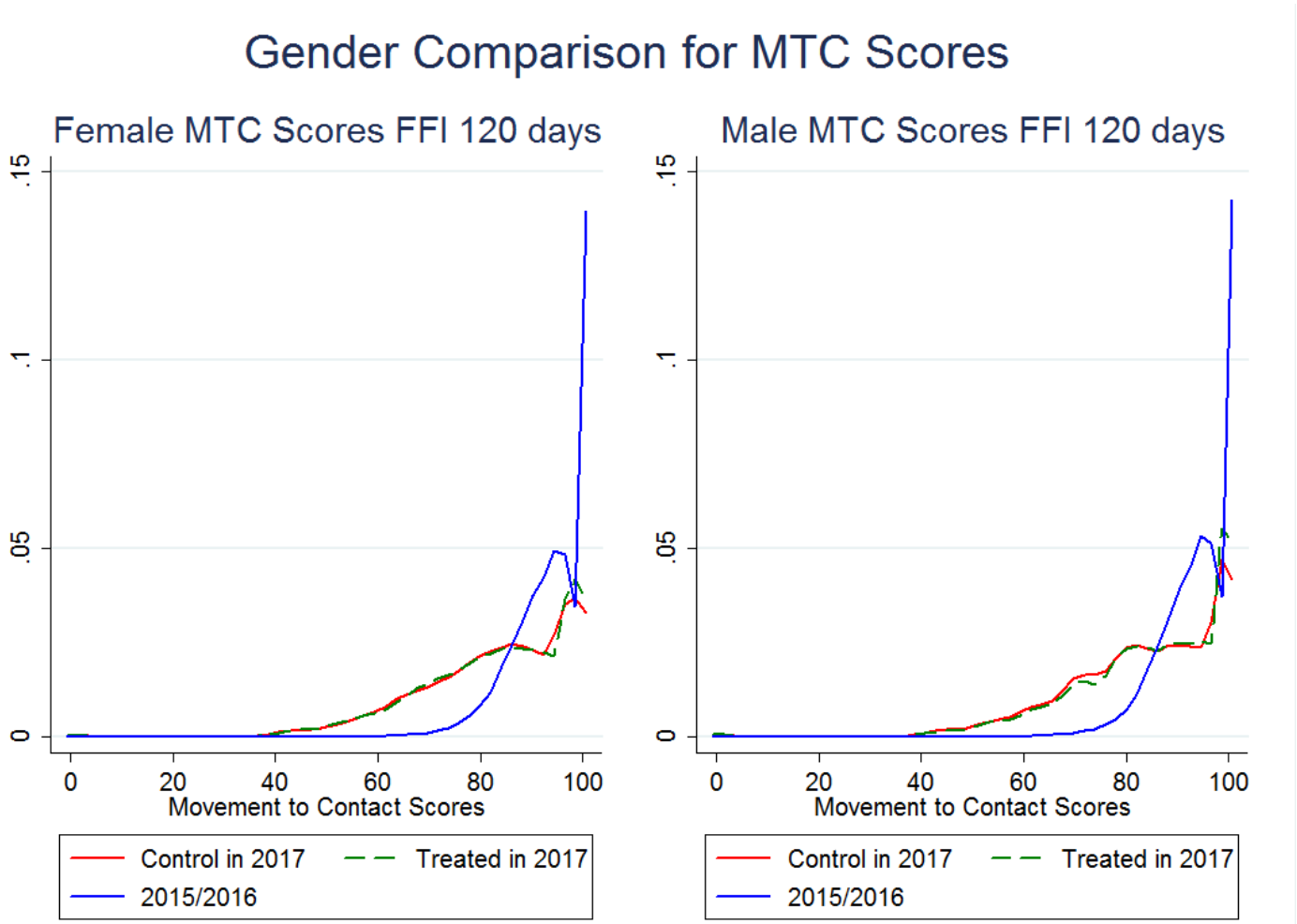

Figure 151. Gender Comparison of Movement to Contact Scores for FFI 120 Days or Greater

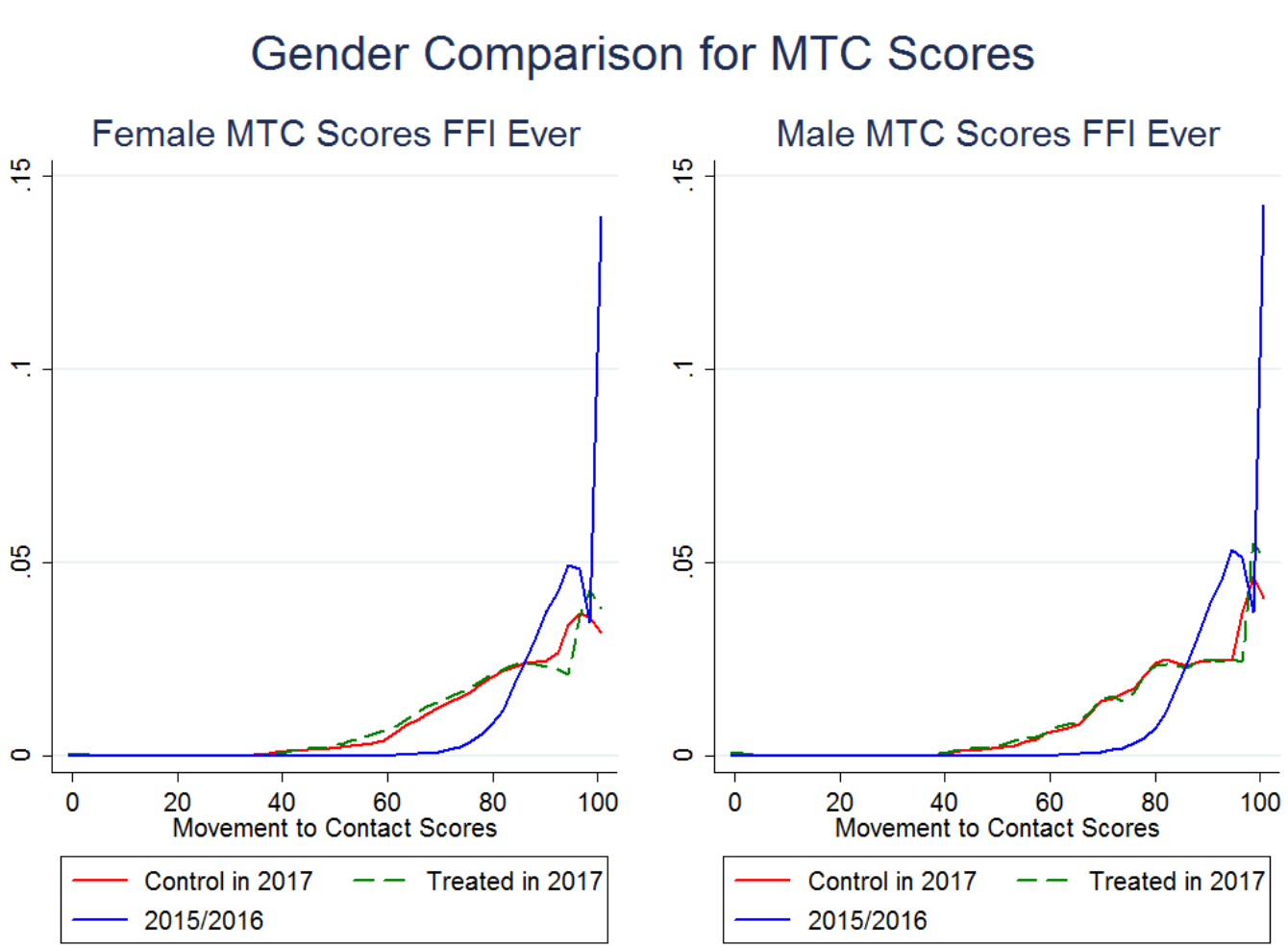

Figure 152. Gender Comparison of Movement to Contact Scores Ever Having an FFI

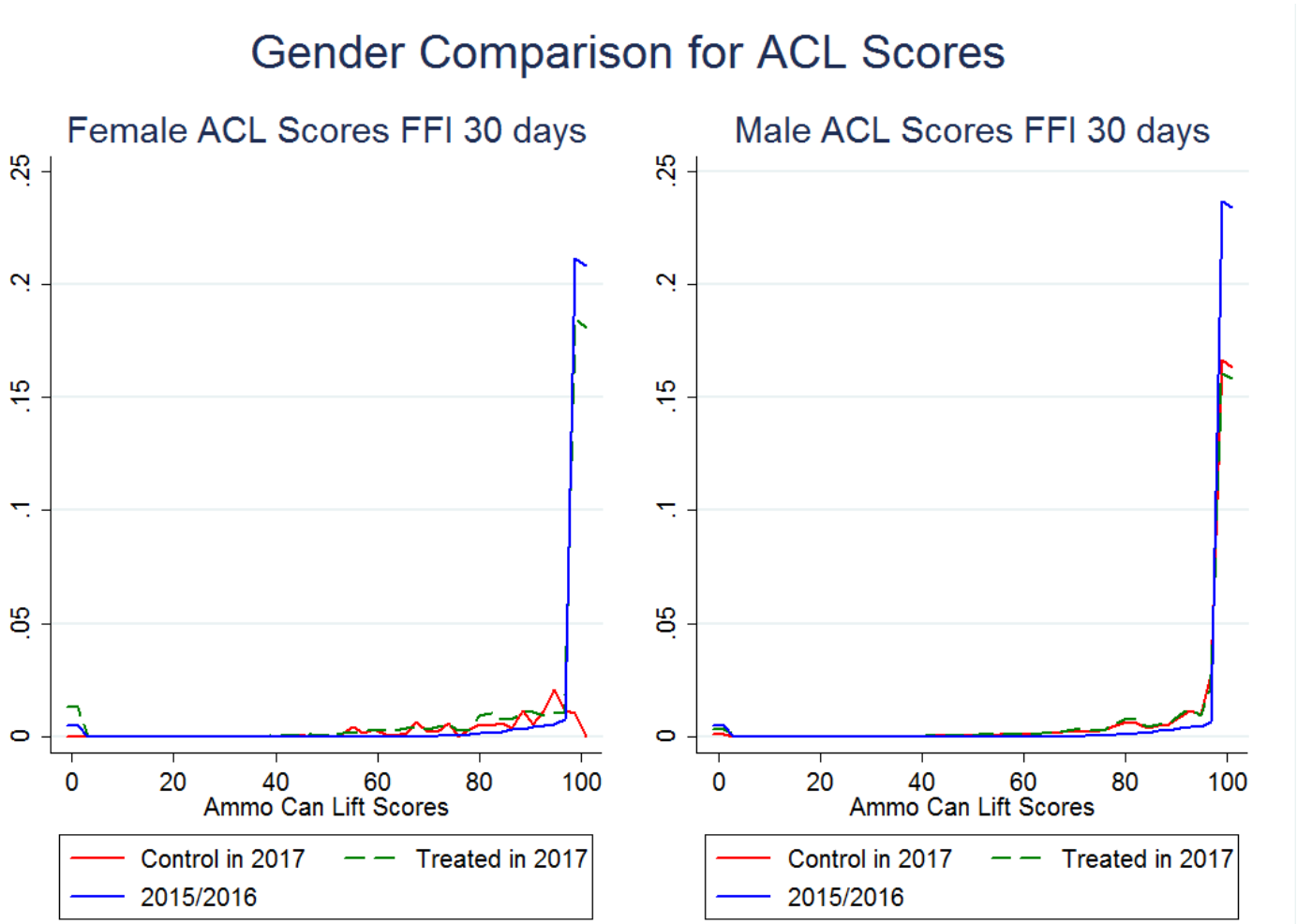

Figure 153. Gender Comparison of Ammo Can Lift Scores for FFI 30 Days or Greater

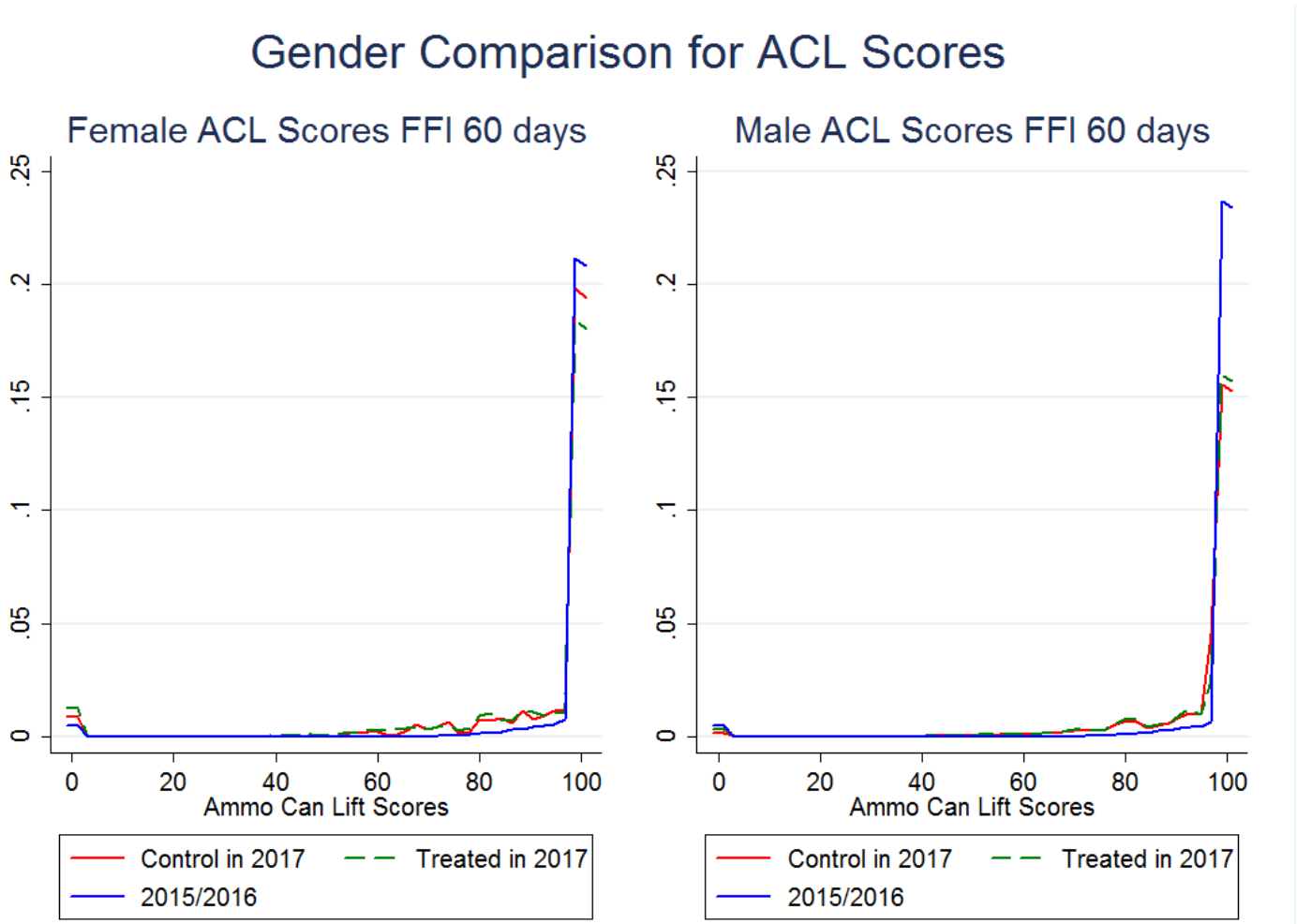

Figure 154. Gender Comparison of Ammo Can Lift Scores for FFI 60 Days or Greater

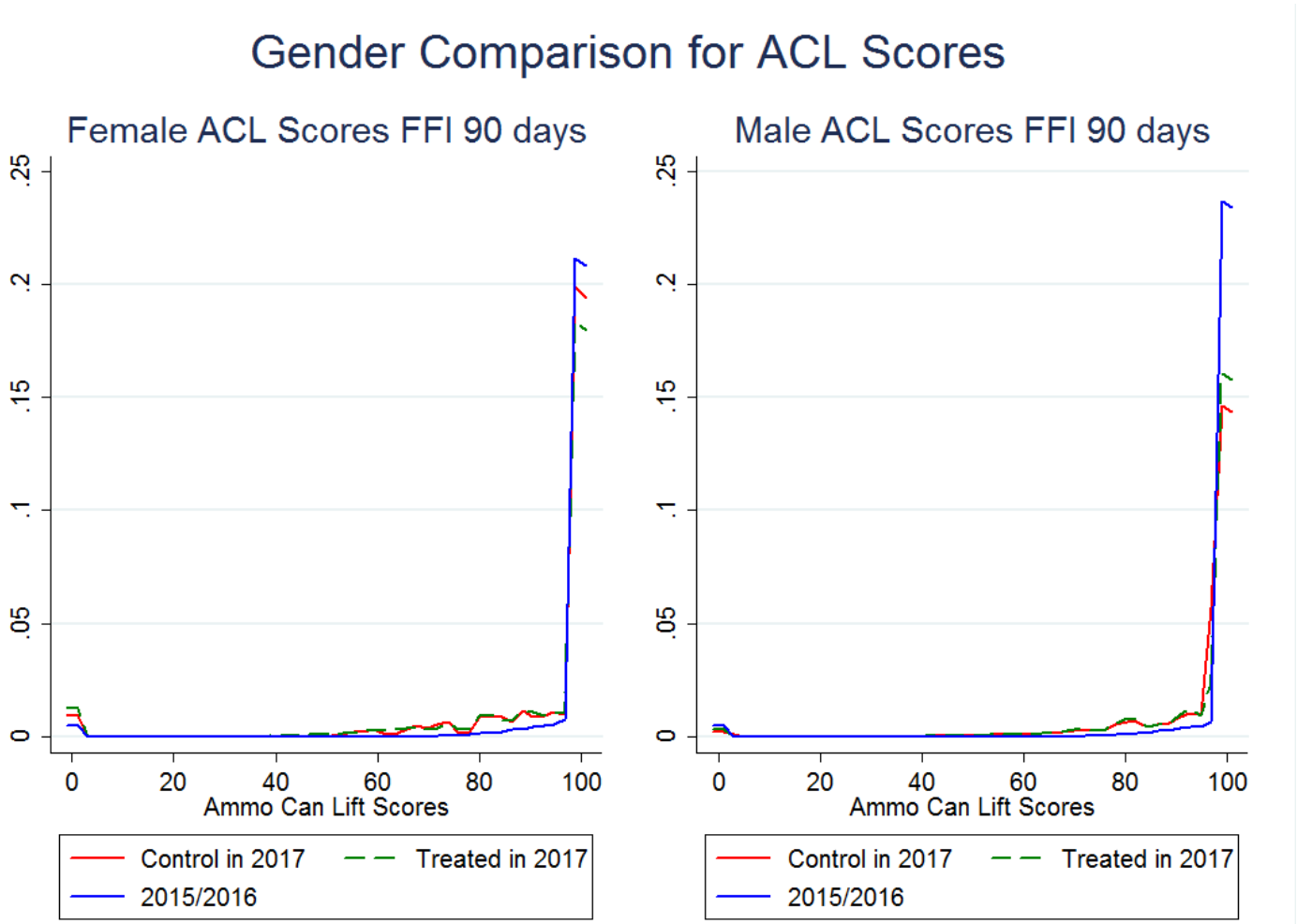

Figure 155. Gender Comparison of Ammo Can Lift Scores for FFI 90 Days or Greater

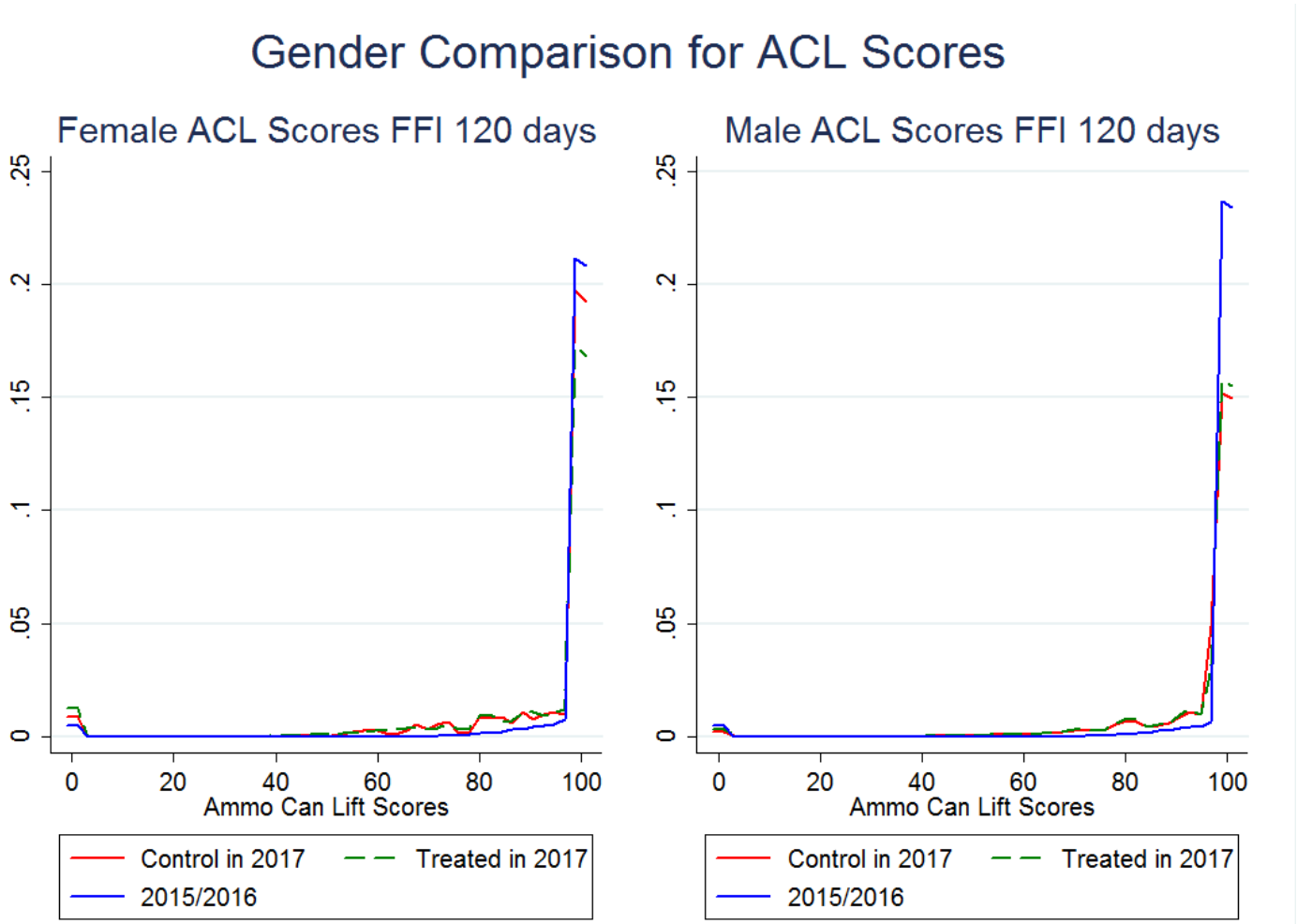

Figure 156. Gender Comparison of Ammo Can Lift Scores for FFI 120 Days or Greater

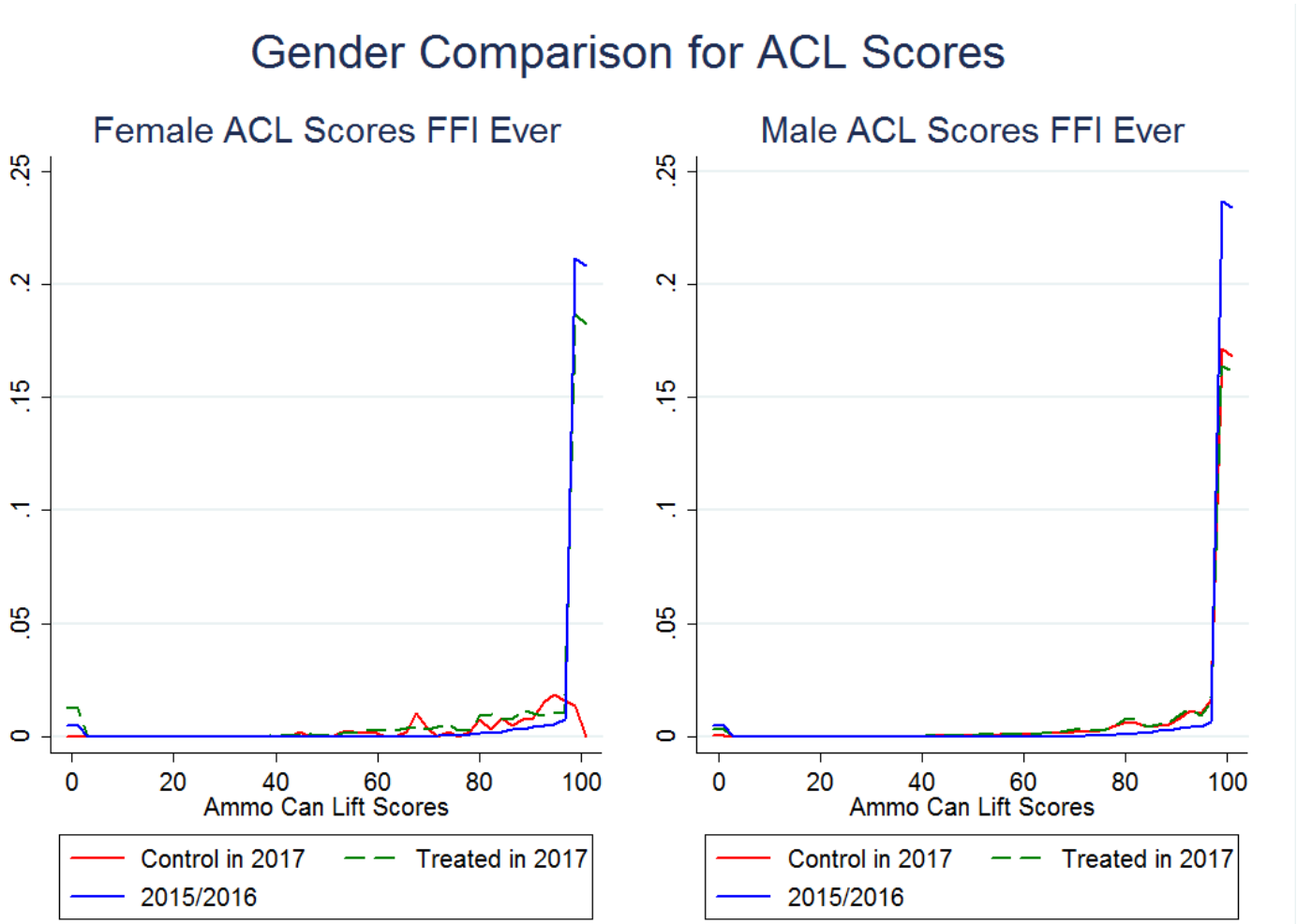

Figure 157. Gender Comparison of Ammo Can Lift Scores Ever Having an FFI

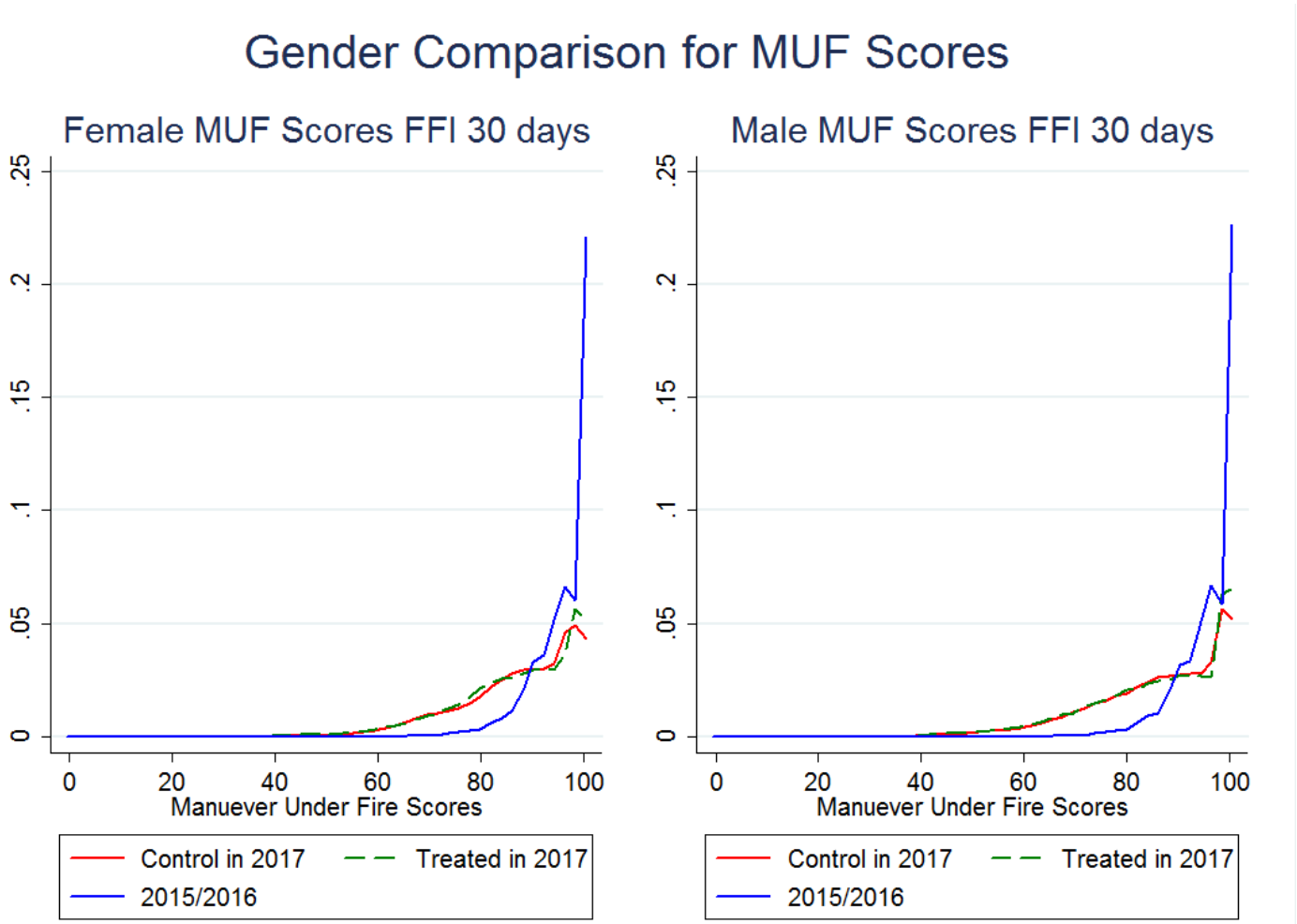

Figure 158. Gender Comparison of Maneuver under Fire Scores for FFI 30 Days or Greater

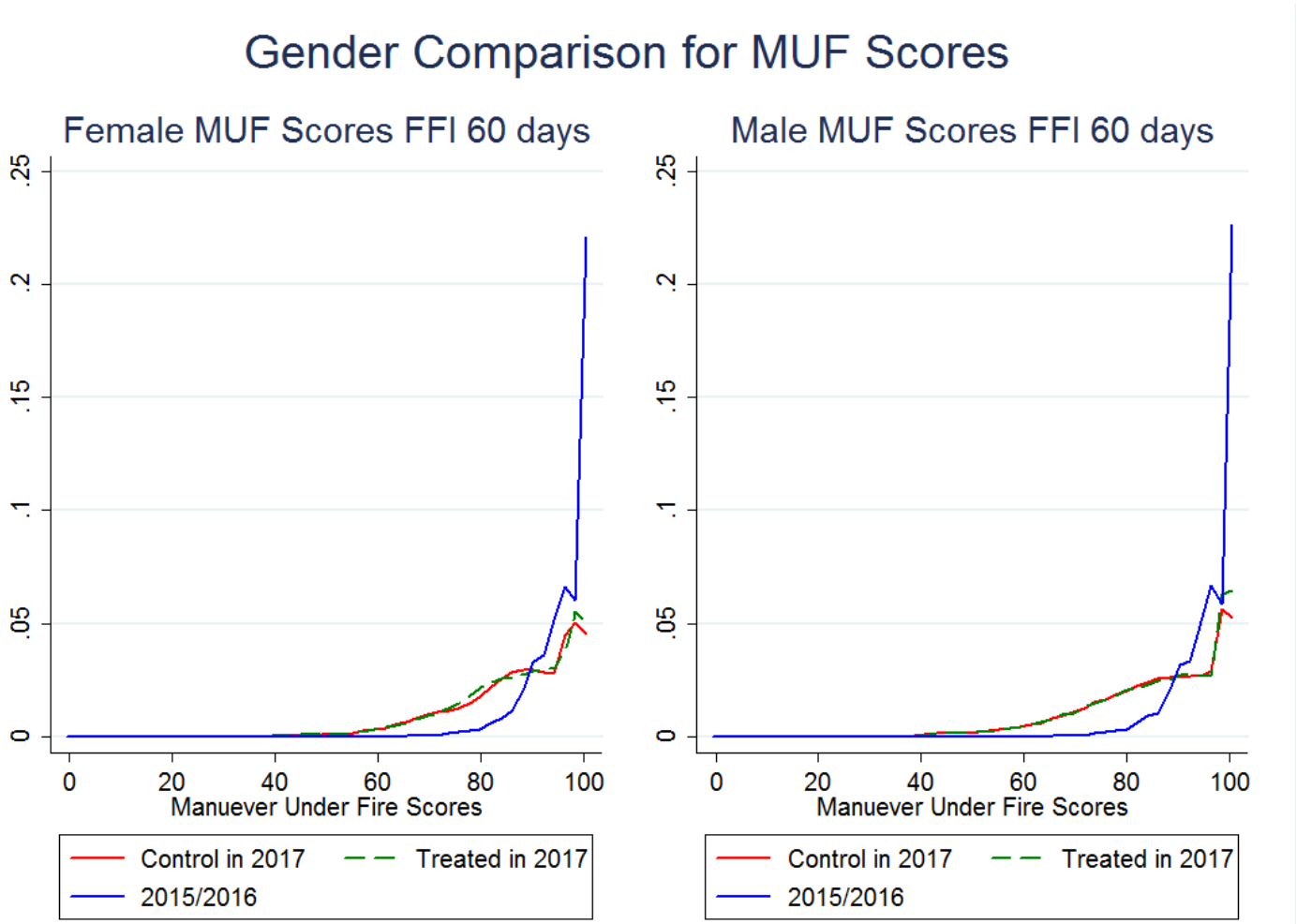

Figure 159. Gender Comparison of Maneuver under Fire Scores for FFI 60 Days or Greater

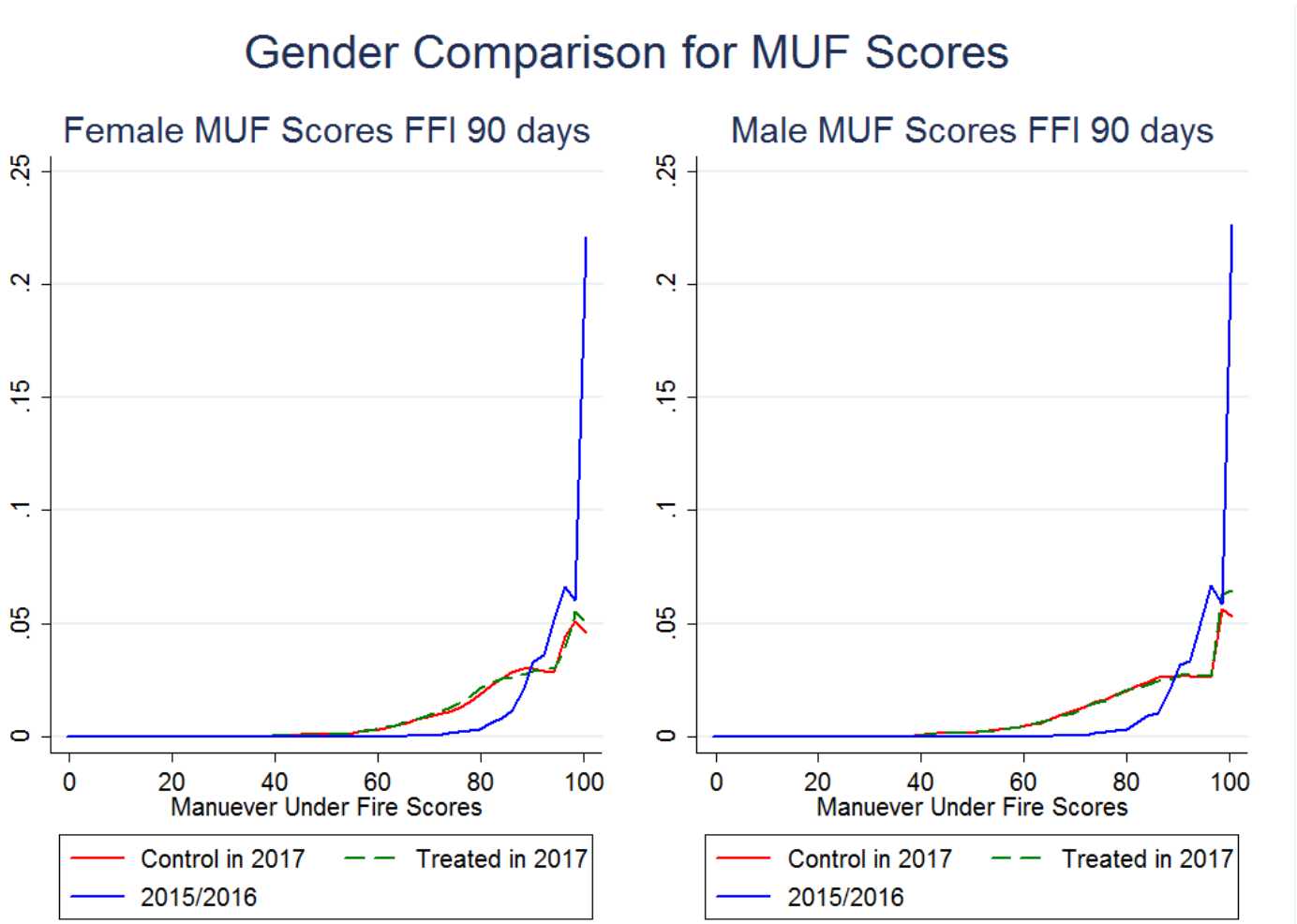

Figure 160. Gender Comparison of Maneuver under Fire Scores for FFI 90 Days or Greater

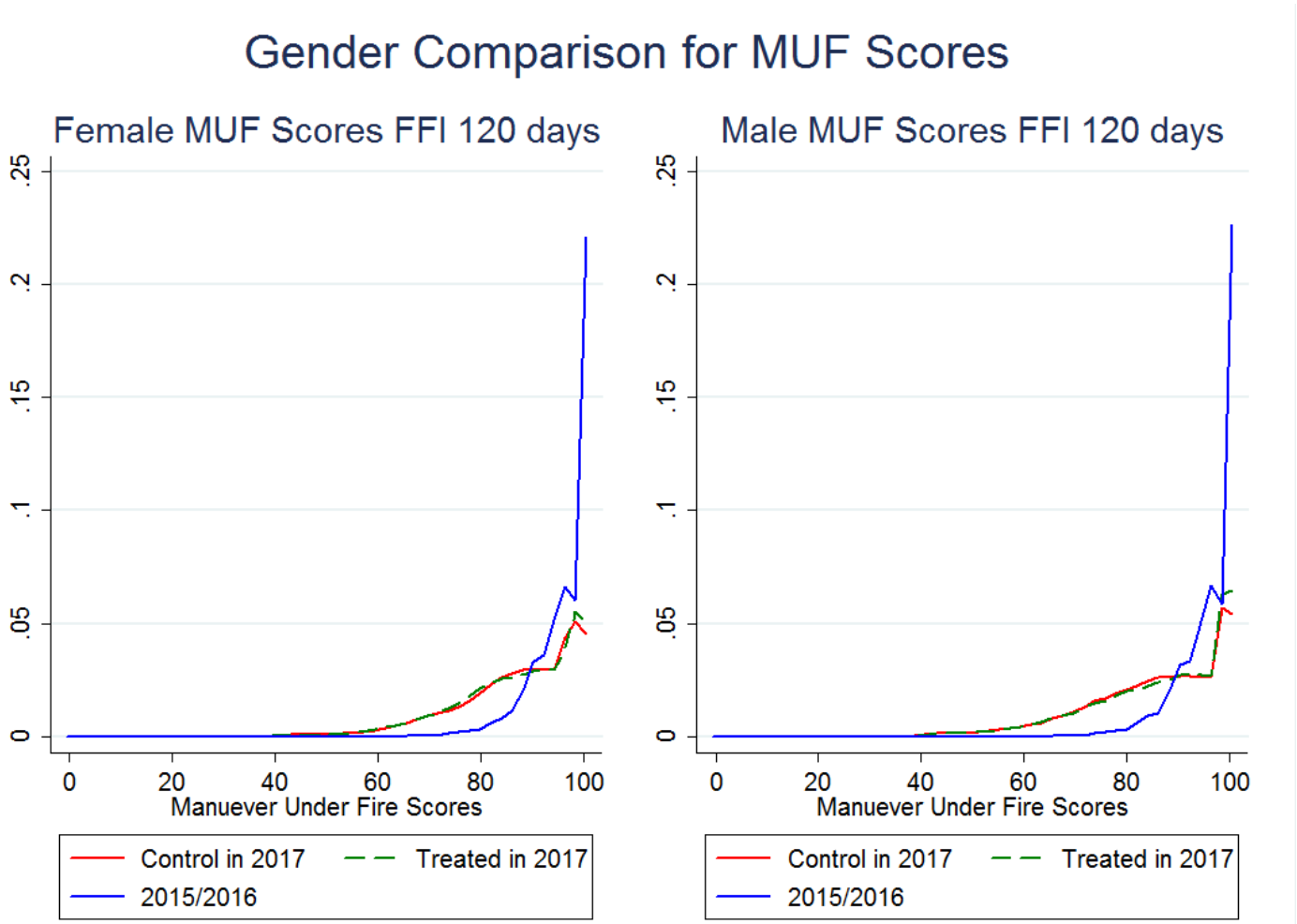

Figure 161. Gender Comparison of Maneuver under Fire Scores for FFI 120 Days or Greater

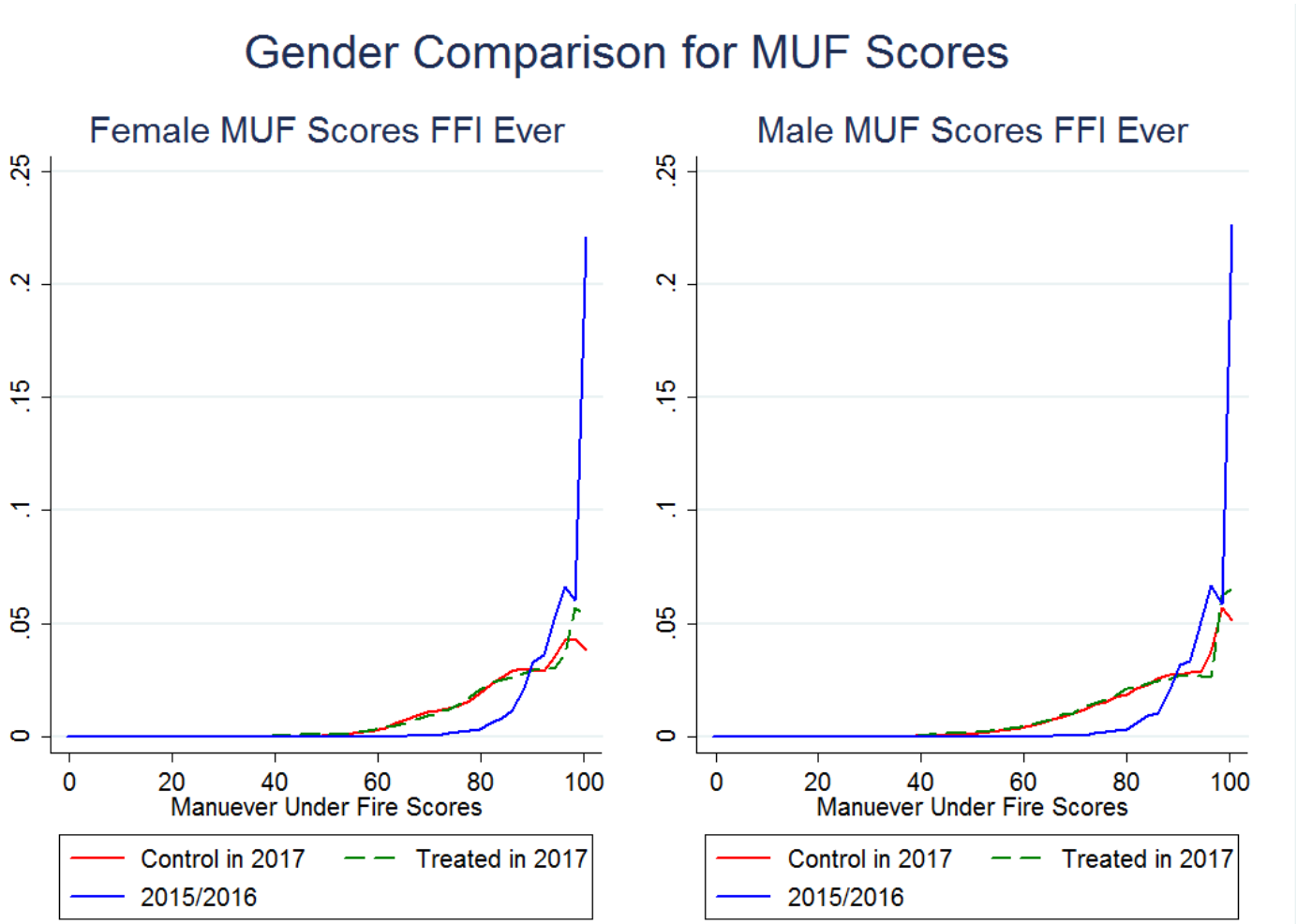

Figure 162. Gender Comparison of Maneuver under Fire Scores Ever Having an FFI

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