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EFFECTS OF PREFERRED DUTY STATION ASSIGNMENT ON THE PERFORMANCE AND RETENTION OF USMC PERSONNEL

by

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In 2019, the Commandant of the Marine Corps stated in his planning guidance that "we should use money like a focused weapon, and aim it at the exact individual we need." In response to this call for targeted talent management reform, I use FITREP duty station preference and performance data to conduct fixed effects difference-in-differences and survival analysis to examine how assignment to a desired duty station affects the future performance and retention of Marines. Results indicate that enlisted Marines who are assigned to desired duty stations early in their careers on average perform .232 points higher on their FITREPs relative to Marines who are not. Top-tier performers who receive desired orders perform .336 better than their counterparts, and Marines who request and are assigned to the operating forces outperformed peers by 0.537. Assignment to desired duty stations is also highly correlated with the retention of top-performing officers. These are the Marines we need and want fighting our nation's wars, both on the ground and at the strategic level, and results indicate that preferential duty station assignment has a particularly positive impact on them. In his guidance, the Commandant also states that "an incentives-based model would offer the ability to target incentives to specific individuals the Service wants to retain." The results of this research indicate that preferential duty station assignment has the potential to do just that.

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EFFECTS OF PREFERRED DUTY STATION ASSIGNMENT ON THE PERFORMANCE AND RETENTION OF USMC PERSONNEL

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In 2019, the Commandant of the Marine Corps stated in his planning guidance that “we should use money like a focused weapon, and aim it at the exact individual we need.” In response to this call for targeted talent management reform, I use FITREP duty station preference and performance data to conduct fixed effects difference-in-differences and survival analysis to examine how assignment to a desired duty station affects the future performance and retention of Marines. Results indicate that enlisted Marines who are assigned to desired duty stations early in their careers on average perform .232 points higher on their FITREPs relative to Marines who are not. Top-tier performers who receive desired orders perform .336 better than their counterparts, and Marines who request and are assigned to the operating forces outperformed peers by 0.537. Assignment to desired duty stations is also highly correlated with the retention of top-performing officers. These are the Marines we need and want fighting our nation’s wars, both on the ground and at the strategic level, and results indicate that preferential duty station assignment has a particularly positive impact on them. In his guidance, the Commandant also states that “an incentives-based model would offer the ability to target incentives to specific individuals the Service wants to retain.” The results of this research indicate that preferential duty station assignment has the potential to do just that.

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TABLE OF CONTENTS

LIST OF FIGURES

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LIST OF TABLES

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LIST OF ACRONYMS AND ABBREVIATIONS

3d AABn	3d Assault Amphibian Battalion
AFQT	Armed Forces Qualification Test
AS	aviation support
ATAP	Army Talent Alignment Program
CFT	combat fitness rest
CONUS	continental United States
CPG	Commandant's Planning Guidance
DoD	Department of Defense
EDIPI	electronic data interchange personal identifier
FITREP	fitness report
FMF	Fleet Marine Force
GCT	General Classification Test
GOAT	ground officer assignment tool
I-I	inspector and instructor
M&RA	Manpower and Reserve Affairs
MARADMIN	Marine administrative message
MCC	monitored command code
MCO	Marine Corps order
MMEA	Manpower Management Enlisted Assignments
MMOA	Manpower Management Officer Assignments
MMRP-30	Manpower Management Performance Evaluation
NMI	non-monetary incentive
OCD	overseas control date
OLS	ordinary least squares
PCS	permanent change of station
PES	Performance Evaluation System
PFT	physical fitness test
PMOS	primary military occupational specialty

RCT	random control trial
RELVALCUM	cumulative relative value
RS	reporting senior
SDA	special duty assignment
TFDW	Total Force Data Warehouse
TIG	time in grade
TO&E	table of organization and equipment
TOS	time on station
UIC	unit identification code
USMC	United States Marine Corps
YOS	years of service

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I. INTRODUCTION

You can get everything else wrong, but if you get the people right, you will be alright.
— Brigadier General William Bowers, USMC (Augier & Hughes, 2018)

It's like, when it comes to personnel, we never get who's right; we only get who's left.
— Overheard anonymous captain of Marines, USMC (2020)

In July 2019, the 38th Commandant of the Marine Corps, General David H. Berger, released his Commandant's Planning Guidance (CPG), which serves as the authoritative strategic document for the Marine Corps Total Force. In this document, General Berger argues that "the only way to attract and retain Marines capable of winning on the new battlefield is to compete with the tools and incentives available to them in the marketplace" (Unites States Marine Corps [USMC], 2019a, p. 7). Talent and personnel management are perennial and well-researched areas of study in both private and public industries due to the high cost of recruiting, training, and hiring replacement personnel and the importance of employee performance to the success of an organization. Despite numerous calls for talent and personnel management reform within the Marine Corps, however, little research has examined the effects of duty preferences and assignment on Marine retention and performance.

Conversely, the Army has recently rolled out its Army Talent Alignment Program (ATAP), which serves as a marketplace in which Army officers can list their desired duty assignments and match with commands that are looking for specific traits and capabilities in their officers. According to Major General Joseph Calloway, commander of the U.S. Army Human Resources Command, in its first year, ATAP ensured that

> more than 55% of officers receiv[ed] their first-choice assignment and more than 80% of the officers receiv[ed] an assignment from their top 10% of preferenced jobs. Of those numbers, 47% of assignments had one-to-one matches, meaning the officer and the unit made one another their top preference. (Kimmens, 2020)

Though it will be a few years before the effects that ATAP has had on the Army's retention of high-performing officers can be measured, the results of this year's slating

process indicate that it is possible to meet mission requirements while taking into account the preferences of individual officers and commands.

In the military, numerous policies limit the monetary incentives the DoD can use to retain its top talent which necessitates thorough research and evaluation of alternative incentives for its high performers. As such, it is crucial that the Marine Corps examine all possible non-monetary talent management tools at its disposal. Using civilian studies and analysis of the talent management systems of other service branches as a foundation, I build a thorough research study that examines the effect of obtaining desired duty assignments on the retention and performance of Marines.

As General Berger outlines in the CPG 2019, "the essence of all manpower systems is to encourage those you need and want to stay…our current system lacks the authorities and tools to accomplish that simple outcome in anything but a blunt way" (USMC, 2019a, p. 7). In order to thrive in future amphibious operations, the Marine Corps must join the 21st century in terms of talent management, retention, and specialization.

A. PURPOSE

Currently, the Marine Corps has no incentive-based model for retention of top performers and lacks the duty assignment systems used by other services to optimize both servicemember and command utility. I believe that creating a system or marketplace capable of matching Marines to their desired duty assignment will aid in both their retention and performance. It is vitally important, however, to use econometric analysis to ensure that using personnel preference matching will, in fact, deliver those desired effects. The purpose of this research is to assess the impact that obtaining desired duty assignments has on the performance and retention of Marine Corps personnel to determine whether duty assignment can be used as an incentive-based tool for talent management within the Marine Corps.

B. SCOPE AND METHODOLOGY

Two research questions frame this study: (1) What are the direct performance effects of Marines obtaining a desired duty assignment compared to Marines who obtain

an undesired duty assignment? and (2) What are the direct retention effects of Marines obtaining a desired duty assignment compared to Marines who obtain an undesired duty assignment? My hypothesis is that Marines who obtain desired duty assignments outperform and outlast Marines who receive orders that do not align with their preferences.

For this study, I use demographic, performance, and duty station preference data for active-duty Marines from 2013 to 2020 from the Marine Corps' Total Force Data Warehouse (TFDW) to conduct a time-fixed fixed effects difference-in-differences analysis that compares the performance trends of Marines who obtained a desired duty station early in their career to those who did not. For the measure of performance, I chose the fitness report (FITREP) relative value at processing (RELVALPROC) because it measures performance at a moment in time while controlling for differences in reporting senior (RS) evaluation tendencies. A more in-depth discussion of this decision can be found in Chapter IV. I compare these values both before and after duty station assignment for three groups: (1) Marines who were assigned a desired duty station; (2) Marines who were not assigned a desired duty station; and (3) Marines who indicated no duty assignment preference. To compare the retention of Marines who obtained a desired duty station relative to those who did not, I use survival analysis to determine whether there was a statistically significant difference in the two groups' average years of service. I use years of service as the metric of retention because this variable measures the total time a Marine spends in the Marine Corps.

On each FITREP, Marines record their top three duty station preferences. This data poses a unique opportunity for analysis because these inputs are not considered during the personnel assignment process (Gonnella, 2020). This means that assignment to a desired duty station as declared on a FITREP is truly random. The method of input for these preferences also enables me to compare performance and retention rates between different categories of Marines who obtained a desired duty station. Marines can choose between listing the specific monitored command code (MCC) of the unit they want to be assigned to or selecting from pre-populated categories such as "recruiting duty" or "security forces-Atlantic," for example. Please see the Appendix for a full list of these pre-populated options. This allows for comparison not only of the performance and retention of Marines

who obtained their preference to those who did not, but also the performance and retention of Marines with different sets of duty assignment priorities.

C. RESULTS AND FINDINGS

As hypothesized, assignment to a desired duty station does have a statistically significant impact on the future performance of Marines. When Marines are assigned to desired duty stations early in their careers, they perform on average 0.213 points higher on their FITREPs relative to Marines who were not assigned to desired duty stations. Top-tier performers who received orders to a preferred duty station performed 0.336 points better than other top-tier performers who did not obtain desired duty stations. Marines who requested and were assigned to the operating forces particularly outperformed peers who requested but were not assigned to the operating forces by 0.537. There is also statistically significant correlation between assignment to a desired duty station and total years of service. Results indicate that officers and top performers particularly outlast their counterparts when they are assigned to a preferred duty station early in their careers. Additional results can be found in Chapter V. As a result of this research, my primary recommendation is that the Marine Corps refine its processes for soliciting, storing, and synthesizing Marines' duty station preferences. Doing so will better arm Marine Corps policymakers with the information and tools necessary to employ preferential duty assignment as an incentive for continued service and performance in the future.

D. ORGANIZATION OF CHAPTERS

In Chapter II, I discuss the anticipated changes to the future state of warfare that substantiate the need for ratification of talent management processes, describe the process for listing duty station preferences on FITREPs, and outline the current assignment policies for both officers and enlisted personnel in the Marine Corps. In Chapter III, I discuss the findings of a significant body of research into non-monetary incentives, duty assignment preferences and matching, and their implications on my own research. In Chapter IV, I describe the data and methodologies behind my research, and in Chapter V I break down the results of my research as well as its limitations. In Chapter VI, I outline my

recommendations for future research and policy changes, and I present my concluding remarks.

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II. BACKGROUND

The amphibious warfare of the future will be characterized by accelerated technological advancement, additive manufacturing, and increased reliance on unmanned/ autonomous vehicles and weapons systems. Though advancements in technology may result in a reduction of the number of Marines needed across the force, they will, somewhat paradoxically, also facilitate an increase in the quality of Marines required to carry out the mission. This changing character of warfare will facilitate increased investment in retaining well-trained Marines with specialized skillsets to employ these rapidly advancing systems. By implementing non-monetary incentive models to retain the nation's most talented Marines, the Marine Corps can best posture itself for success in 21st-century amphibious warfare.

As the character of amphibious warfare has changed throughout its history, the Marine Corps has often focused its efforts on innovating systems and force design to react to these changes while relying on the steadfast, reliable, and resilient nature of Marines to employ them. However, advanced equipment in the absence of trained personnel to employ that equipment is useless. It is time the Marine Corps treats its most expensive and irreplaceable resource—people—as a capability worth innovating and investing in. If the Marine Corps wants to remain the expeditionary force in readiness for amphibious operations, it must be prepared to modernize its manpower systems to align with the changing character of warfare. Specifically, the Marine Corps must think outside the box to create non-monetary incentives, such as preferential duty assignment for top performers, to improve retention of the Marine Corps' most talented personnel.

A. FITREP DUTY STATION PREFERENCES

Per Marine Corps Order (MCO) 1610.7A, *Performance Evaluation System*, active-duty Marines have the option to indicate up to three desired duty stations in Section 9 of their FITREP, as is illustrated in Figure 1, before submitting it to their RS for evaluation (USMC, 2018).

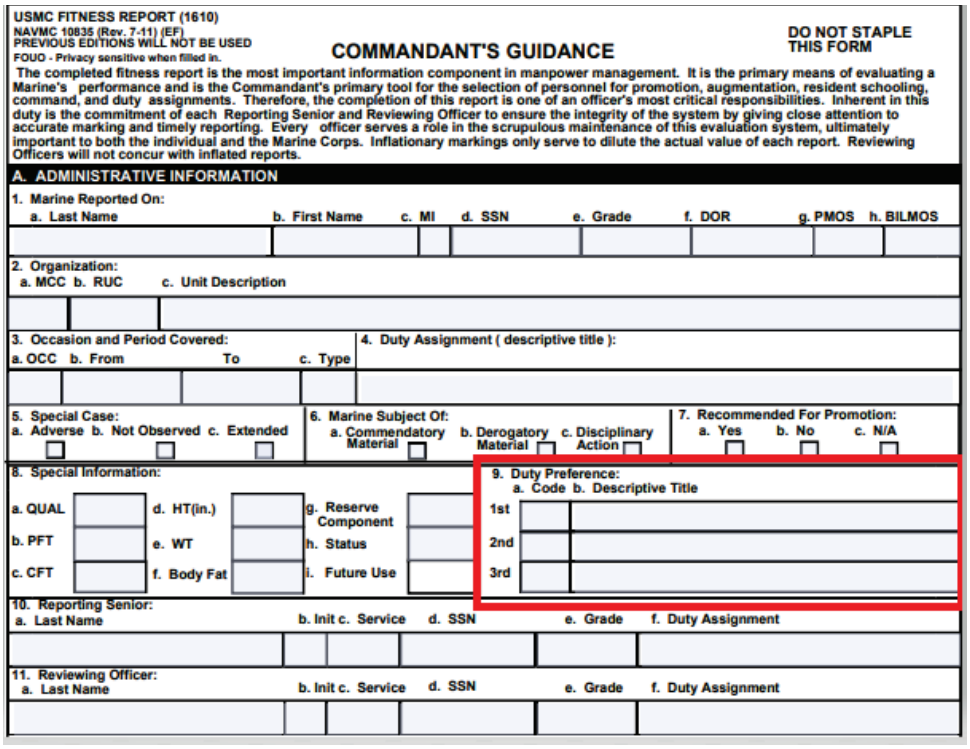

Figure 1. Duty Station Preferences on FITREP

Marines can choose to type in the specific MCCs of the units they want to be assigned to, choose from a pre-populated menu of 49 pre-populated categories of preferences, submit no preferences, or select a combination of the three as is illustrated in Figure 2.

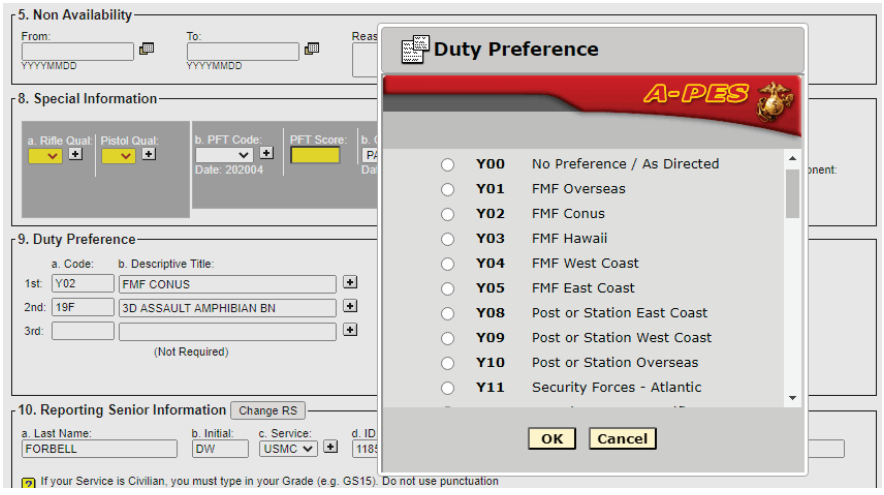

Figure 2. Duty Preferences with Pre-populated Y-Preferences

These preferences are captured and maintained by TFDW but are not used during the assignment process (Gonnella, 2020). The pre-populated categories illustrated in Figure 2 and listed in their entirety in the Appendix are not defined within MCO 1610.7, the FITREP itself, or in any other publication that I could find. Some categories listed in the auto-populated list, such as "Staff Duty Afloat (West)," are not common to the Marine Corps vernacular and are also not defined in any publication that I reviewed. Similarly, there is no associated list of MCCs that map to these pre-populated categories.

B. GENERAL ASSIGNMENT POLICY

The process of assigning Marines to duty stations and billets across the Marine Corps is delegated to the Deputy Commandant for Manpower and Reserve Affairs (M&RA) by the Commandant of the Marine Corps and is a function of manning and staffing. Per MCO 5320.12H, *Precedence Levels for Manning and Staffing* (2019), *manning* is defined as "how many billets the Marine Corps can afford to buy," and *staffing* is defined as assignment of "available, chargeable inventory against billets bought" (p. 2). The Marine Corps rarely has enough Marines to fulfill all requirements, so it has established written guidance to facilitate proper staffing and manning. Because the inventory of personnel available rarely fulfills the requirements as outlined in the table of organization and equipment (TO&E), the Marine Corps assigns one of four unit precedence-level categories and associated minimum or "red-line" manning and staffing levels each year to each unit identified with a unit identification code (UIC). The following precedence level categories are listed in priority order: excepted command, operating forces command, priority command, and proportionate share command (USMC, 2019b, p. 2). The "red-line" manning levels for each of these unit categories facilitates the assignment process for the monitors.

C. OFFICER ASSIGNMENT PROCESS

Officer duty assignments are handled by monitors who work at Manpower Management Officer Assignments (MMOA). Each monitor can expect to manage the career progression of up to 1,700 officers in a given specialty (Boada, 2019). Per MCO

1300.8, *Marine Corps Personnel Assignment Policy* (2014), the very first paragraph of the Officer Assignments chapter states:

> Monitors make officer assignments based on the following priorities (listed in order of precedence): a. Needs of the Marine Corps. b. Career Progression (Operating Forces, Supporting Establishment, Seniority). c. Overseas Control Date (OCD). d. Individual preference. e. Restricted officers (warrant officers and limited duty officers) must only be assigned to restricted officer billets within their respective MOSs. (USMC, 2014, p. 2-1)

Monitors are selected from the general population and serve in the billet for the standard 36 months before returning to the fleet. These monitors conduct a "roadshow" once a year, where they visit every major Marine Corps base to meet with the officers who fall under their jurisdiction. This process is supposed to provide officers transparency and input into the assignment process but, as is noted in the MCO above, this is rarely the case.

Officers who are due to rotate from their first duty assignment are often sent preference surveys, though—once again—the officers are screened and assigned based on the "needs of the Marine Corps" (USMC, 2014). These surveys are also not kept on file. One recommendation I would make is that these surveys be retained for further analysis into duty station preference matching. Once all manpower requirements are determined based on manning and staffing inputs, M&RA begins the screening process for command, special education programs, recruiting duty, resident professional military education, and other selective programs. Marines are screened and routinely selected for these programs whether they have interest in them or not. Assignment to most of these programs incurs a service obligation of at least three years and sometimes a "payback tour." Turning down these orders can result in processing for separation from the Marine Corps.

Once the results of these screening boards are announced via Marine administrative message (MARADMIN), monitors begin the process of slating all officers within their given occupational field and grade-range who are due to rotate. Orders are then issued to the officers and modified as required to meet new Marine Corps requirements. Figure 3 graphically depicts this process. Though Marines input their duty station preferences into

each FITREP they submit, MMOA has confirmed that these preferences are not referenced for the purposes of assignment (Gonnella, 2020).

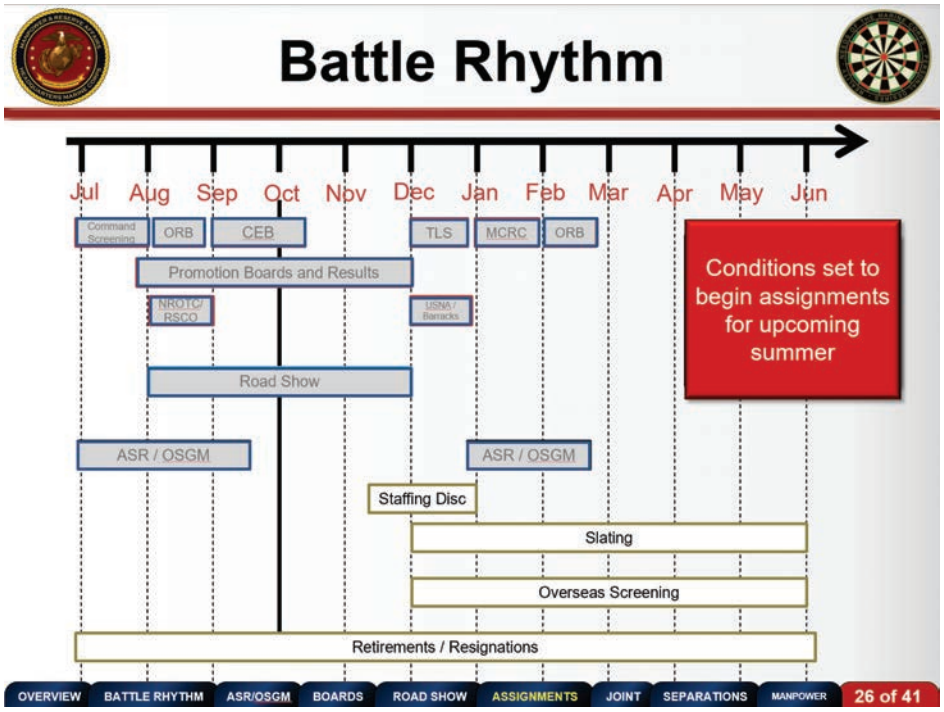

Figure 3. MMOA Assignment Battle Rhythm. Source: MMOA FY20 Roadshow PowerPoint.

D. ENLISTED ASSIGNMENT PROCESS

The enlisted assignment process is similar to that of the officer corps. Manpower Management Enlisted Assignments (MMEA) is in charge of assigning enlisted Marines to follow-on duty stations. MMEA monitors are enlisted personnel who fulfill the role of monitor for approximately 36 months before rotating back to the fleet, similar to their MMOA counterparts. Each monitor can expect to have between a few hundred and a few thousand Marines in their given occupational specialty and grade-range, known as the monitor's "population." Monitors will conduct "roadshows" to meet with Marines and gather information regarding their expected rotation date, eligibility, and preferences.

A key component of the enlisted assignment process is special duty assignments (SDA). These are considered career-enhancing (and for many specialties, career-required)

assignments to recruiting, the drill field, and Marine security guard duty. Marines can submit packages to obtain an SDA but can also be selected by the SDA selection team and be required to submit a package to determine eligibility. Similar to the officers, assignments to SDAs and other specialty programs such as assistant Marine officer instructor and combat instructor require screening. Once these programs have been staffed and announced via MARADMIN, monitors begin slating their population of Marines for assignment based on the manning and staffing precedence levels.

E. DISCUSSION

There has been a great deal of discussion in the Marine Corps and in the literature I reviewed surrounding automating the personnel assignment process. Many believe it can save the Marine Corps time and money while optimizing the utility of individual Marines. The proposals range from the use of a single-commodity network flow optimization program that weights Marine Corps requirements and personnel preferences, to the creation of a marketplace in which Marines can interact with commands directly, similar to the ATAP system recently implemented by the Army. Though my research does not directly evaluate any of the proposed assignment systems, my analysis contributes to the general body of research surrounding the feasibility and viability of preferential duty assignment as a non-monetary incentive. In the following chapter, I discuss the existing body of research surrounding non-monetary incentives and preference matching, and how they relate to the Marine Corps assignment process.

III. LITERATURE REVIEW

The literature reviewed for this thesis can be broken down into two major areas of study: (1) nonmonetary incentives and preferences and (2) duty assignment preferences and matching. Inherent in both categories of research related to talent management are the questions *Is this effective?* and *Is this practical?*, which can be more broadly defined as the associated benefits and costs, respectively, of a given talent management tool. My research, by utilizing standardized duty station preference data obtained through fitness reports, provides both broader and deeper analysis into the viability of utility-optimizing duty assignment tools and their projected effect on retention and performance. These studies provide insight into possible outcomes of my study, inform my decisions regarding the processes and procedures used in data analysis, and bolster my hypothesis that Marines who obtain desired duty assignments outperform and outlast Marines who do not.

A. NON-MONETARY INCENTIVES AND PREFERENCES

In the civilian realm, studies devoted to the impact of non-monetary incentives (NMIs) on employee satisfaction, performance, and retention are limited compared to studies related to monetary compensation. However, there is an expanding body of literature that suggests that nonmonetary factors, such as job assignment and satisfaction, are important to employee productivity, and these studies provide insight into potential incentives for the Marine Corps. The bulk of the DOD-related research into investment in human capital, however, centers around NMIs—such as duty station preferences—due to the numerous rules and regulations governing the way the DOD can promote and compensate its service members. My research builds upon this body of literature by analyzing the effect that increased control over job assignment in the Marine Corps has on the productivity and longevity of Marines' careers.

Ichniowski et al.'s (1997) study of steel line workers at 26 plants finds that certain NMIs (referred to in the study as *human resource management practices*)—such as flexible job assignment, employment security, and job training—led to increased employee productivity when compared to more narrow and traditional job descriptions and strict

hourly wage models. This study aims to contribute empirical evidence to the growing body of qualitative research surrounding the effects of NMIs on employee productivity. The study designs a fixed effects model using a panel data set of 2,190 monthly observations of the productivity of steel line finishers at plants with varying levels of NMIs to determine whether certain NMIs or combinations of incentives lead to greater quality and quantity of steel outputs compared to those plants that do not use NMIs. The results indicate that steel production plants that use the "very cooperative and innovative" NMIs experience seven percentage points more steel production than those that use the "least cooperative and innovative" NMIs (Ichniowski et al., 1997). The study also provides a cost-benefit analysis that illustrates that steel plants that invest in the most progressive combination of NMIs can see as much as a $1.17 million increase in operating profits. Though this study evaluates the effectiveness of over 15 NMIs, both individually and in combination, and provides a detailed cost-benefit analysis, it is limited in scope and by the number of observations available. The authors also focus on broadly applied incentives and not on how those incentives interact with employee preferences. My research includes a sample-size of over 27,000 observations of Marines' performance and retention while taking into account the role employee preference plays in the effectiveness of NMIs.

Another study by Stitt (2009) expands upon a growing body of research into the military's use of NMIs to facilitate talent management by assessing the costs associated with NMIs as opposed to merely the rewards. Stitt's thesis uses a linear programming assignment optimization model to assign 45 Sailors to 60 billets with 50% weight on both Navy preferences and Sailor preferences to answer the research question, "What is the cost of those non-monetary incentives that restrict sailor assignments in the Navy's Sailor detailing process?" (Stitt, 2009). Stitt runs 81 sequences of assignment that consider different weights of Sailors' homeport, billet, platform, and geographic stability preferences as well as the U.S. Navy's permanent change of station (PCS), training, and fit costs to acquiesce to those preferences. The results indicate that as 50% more weight is placed upon a Sailor's preferences in assignment, the cost associated with that assignment increases by about 30%. While this research contributes significantly to the "cost" side of a cost-benefit analysis of preference-based assignment tools in the Navy, it does not

consider the effect that NMIs have on performance or retention. My research helps to illustrate the "benefit" side of duty station-related NMIs to further inform policymakers as to the viability and applicability of a preference-based duty station assignment tool specifically within the Marine Corps.

V. L. Butler and V. A. Molina (2002) examine the research question, "What are the top Sailor preferences influencing the enlisted distribution process in the Aviation Support Equipment Technician (AS) community?" Butler and Molina use research into the Navy's current Manpower, Personnel, and Training Systems; discussions, interviews; and surveys to conduct a first-time qualitative analysis of the current distribution of enlisted Sailors within the AS community as well as the viability of a future two-sided matching assignment process. Their results indicate that while the U.S. Navy's current AS assignment process assumes that Sailor preferences are based strictly upon type of duty, type of billet, and duty location, most AS Sailors' preferences are affected primarily by "civilian spouse employment opportunities, co-location with spouse/family accompaniment" opportunities, affordable cost of living, and home ownership viability (Butler & Molina, 2002). The authors conclude that the U.S. Navy should place more emphasis on Sailor preferences during the distribution process, recommend that the U.S. Navy automate the enlisted duty preference process, and include many of the factors listed above in the Enlisted Duty Preference Form. While this study conducts a thorough qualitative analysis of Sailor and command assignment preferences and input, it does not include the quantitative analysis necessary to address possible outcomes of superior preference matching on talent management, retention, or mission readiness. By using econometric models to examine the effects that a servicemember's assignment has on performance and career longevity, my research can provide policymakers the data necessary to determine whether investment in superior duty station preference-matching technologies is worthwhile for the Marine Corps. To effectively gauge returns to investment in preference-matching, however, it is important to ensure that all other variables are held constant. To do that, it is necessary to conduct within-group analysis to control for differences in preferences.

In a 2002 study, S. B. Dale and A. B. Krueger estimate the financial return to individuals who attended elite private colleges compared to those who attended public universities. Instead of merely considering which institutions students attended and their subsequent earnings, Dale and Krueger (2002) also examine the colleges to which students applied and the colleges to which the students were accepted to. In doing so, they control for the preferences and type of person each applicant is. They examine the difference in earnings not only between private and public-school graduates, but also between graduates who applied to and were admitted by the same types of universities. This within-group analysis enables me to similarly analyze the difference-in-differences of returns to duty station preference matching between groups of Marines with similar preferences. For example, I can compare the outcomes for Marines who prefer to be assigned based on location separately from Marines who specifically want to serve in the operating forces. In doing so, I am able to control for the category of preferences that a Marine has—a previously intangible and thus immeasurable variable. Adapting Dale and Krueger's within-group difference-in-difference models enables me to control more accurately for Marines with similar preferences and their unobservable traits, thus more precisely estimating the actual performance and retention returns to preference-matching.

B. DUTY ASSIGNMENT AND MATCHING

The literature related to duty assignment and matching in the DoD includes a healthy balance of empirically based research into optimization and market-based approaches as well as qualitative assessments of attitudes and proposed improvements surrounding the current assignment and matching processes. While there is research that suggests that the use of algorithms to better match servicemembers' preferences with command needs is viable, and research that indicates servicemembers' may experience increased utility if they could play a greater role in the duty assignment process, I found no research that examines the actual empirical effect that obtaining desired duty assignments has on retention and performance of personnel. My research builds upon this incomplete body of literature by analyzing the effect that increased control over job assignment in the Marine Corps could have on the productivity and longevity of Marines' careers.

Alger's (2019) thesis investigates the current Marine Corps officer assignment system and uses an optimization model to analyze the viability of an automated officer assignment process that matches officers' preferences with command requirements. Unlike other research into Marine Corps duty station assignment, Alger uses a single-commodity network flow problem that equally weights both officer duty station preferences and billet requirements to minimize costs while meeting mission requirements, similar to the Army's recent ATAP endeavor. By creating a Ground Officer Assignment Tool (GOAT), Alger was able to match 1,666 Marines to 1,666 billets while achieving a 75% success rate in assigning officers to one of their top two billets, and an 86% success rate in assigning officers to their top geographic preference. While Alger was able to successfully demonstrate that an optimization of duty assignment model could improve officer utility, it is limited in scope. While officer utility is important, officers make up only about 11% of Marine Corps personnel. This study also did not examine the effect that optimizing officer utility has on subsequent productivity and talent retention. My research can help determine whether a tool similar to the GOAT is a worthwhile investment for the Marine Corps by analyzing the effect that being assigned to a preferred duty station has on officer and enlisted Marines' productivity and retention.

A qualitative study conducted by M. Ramirez and D. H. Park in 2003 examines enlisted Marines' satisfaction with the duty and billet assignment process through the distribution of surveys and personal interviews. Their study aims to address the following research questions:

- What are the perceptions from the Marine Corps Operating Forces regarding the current assignment process?
- Does the Marine Corps need new tools to improve the assignment process?
- What new tools can be introduced to make the process more efficient? (Ramirez & Park, 2003)

The authors find that 36% of the 95 Marines surveyed stated that they were not satisfied with the assignment process, and 72% of those stated the primary reason for their discontent was the lack of duty station/billet choices. Of the 95 Marines surveyed, 44%

had only one or two assignment options available to them when speaking to their monitor about follow-on orders.

In interviews, many Marines voice frustration with how difficult it was to obtain information about open assignments and the timing of those assignments. Similarly, Marines expressed that when they spoke to monitors, they felt as though their monitors' primary objective was to fill vacancies quickly, instead of matching Marines' preferences with the demands of the operating forces (Ramirez & Park, 2003). Of the Marines surveyed, 33% state that their monitors were "not very receptive to resolving conflict between [their] personal desires and the needs of the Marine Corps," and 44% of respondents stated that their monitors do not treat all Marines fairly in the assignment process (Ramirez & Park, 2003). Though not asked specifically if the ability to choose their next assignment would increase the likelihood that they stay in, "90% of the survey group agreed that if they could choose their next assignment using the Internet, it would increase their satisfaction with the process." When asked, "If you have decided to leave, what had the greatest influence on your decision?," approximately 25% of respondents answered "assignment" (Ramirez & Park, 2003). The authors also compare the Marine Corps' enlisted assignment process with that of the Navy, which provided a good foil for the Marine Corps' process. Many Sailors are "not only satisfied with their desired duty preference, but receive satisfaction from the process itself," and it appears that Marines value the same considerations and want to feel like a valued commodity within the Marine Corps (Ramirez & Park, 2003).

This study provides a great deal of insight into the frustrations and ideals of enlisted Marines as well as qualitative evaluations of current and proposed assignment systems. However, the authors were limited to 95 qualitative observations, all of whom were stationed in California. Also, many of the assignment processes that were on the rise in 2003 are either no longer applicable or have been optimized and improved since this study. My quantitative research bridges the gap between how Marines feel about the assignment process and what actually happens to their performance and retention when their preferences are filled.

V. L. Butler and V. A. Molina's (2002) thesis also aims to address the research questions, "What are the top command preferences influencing the enlisted distribution process in the AS community?" and "How are command and Sailor preferences currently accounted for in the enlisted distribution process?" The authors find that of the 100 surveys distributed to commands, "85% of the respondents state that they do have input in the distribution process" and 95% report that they communicate directly to the detailer but that, conversely, Sailors' input into the distribution process is minimal (Butler & Molina, 2002). Specifically, the authors conclude that "there is a need for an improved enlisted distribution process that incorporates Sailor and command preferences" and that "Sailors dissatisfied with the detailing process are less likely to reenlist" (Butler & Molina, 2002). They recommend that the U.S. Navy restructure the detailing processes to improve retention and mission readiness. While this study conducts a thorough qualitative analysis of Sailor and command assignment preferences and input, it does not include the quantitative analysis necessary to address possible outcomes of superior preference matching on talent management, retention, or mission readiness. By using econometric models to examine the effects of servicemembers' obtaining a desired duty assignment on performance and career longevity, my research can provide policymakers the empirical analysis necessary to determine whether investment in market-based and preference-matching tools is a worthwhile investment for the Marine Corps.

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IV. DATA AND METHODOLOGY

A. DATA DESCRIPTION

1. Data Sources

The data for this study come from three sources: Total Force Data Warehouse (TFDW), MMRP-30, and M&RA. The TFDW data spans January 2013 to March 2020 and includes data related to an individual Marine's unit MCC, unit orders assignment date, armed forces qualification test (AFQT) and general classification test (GCT) scores, ethnicity, race, gender, and total years of service for all active-duty Marines. MMRP-30 provides FITREP data for each report written on an active-duty Marine between January 2013 and March 2020 as well as the list of 49 prepopulated duty assignment categories available on FITREPs (see Appendix). This FITREP data provides snapshots by FITREP dates related to performance and duty station preferences, rank, time in grade (TIG), primary military occupational specialty (PMOS), physical fitness test (PFT) and combat fitness test (CFT) scores, and date of rank for each FITREP written on a Marine. Finally, M&RA provides a comprehensive list of MCCs of every unit in the Marine Corps. I use this list to determine whether the duty station MCC Marines were assigned to matches the preferences they indicated on their most recent FITREP prior to assignment.

2. Data Cleaning and Merging

To begin, I merge the TFDW data outlined above to the MMRP-30 FITREP data by each Marine's electronic data interchange personal identifier (EDIPI), resulting in 2,292,742 reports for 997,412 Marines between 2013 and 2020. On each FITREP, Marines have the option to declare up to three preferred duty stations. However, these data fields can be populated by actual MCC codes or more general categories such as "recruiting duty" or "post or station-west coast." Meanwhile, the data on orders received indicates the specific MCC code and date a Marine is assigned to that unit.

To determine whether a Marine was assigned a desired duty station (I refer to this group of Marines as "preferred" from here on in) or was not assigned to a desired duty station (henceforth referred to as the "control" group), I first hand-map of the list of 2,967

MCCs provided by M&RA to the 49 categories of duty station preferences as listed in the FITREP pre-populated module (see Appendix). This creates an MCC matrix that indicates which MCCs fall under each Y-category. For example, MCC code 19F, which represents 3d Assault Amphibian Battalion (3d AABn), falls under three categories: Y02- FMF, Y04-FMF-West Coast, and Y09-Post or Station West Coast. On the MCC matrix, there is a "1" listed under each of these categories and a "0" is listed under each category that 19F does not fall under.

Using this MCC matrix, I map each of the three declared preferred duty stations on a Marine's FITREP to every Y-category. Next, I match the MCC indicated in a Marine's follow-on assignment orders to each of the Y-categories indicated in the MCC matrix. Combining this information enables me to determine whether a person's Y-preference on the FITREP was met when assigned a specific MCC during the orders assignment process. Thus, when a Marine does not declare a specific MCC but a more general Y-category in their FITREP preferences, I can still indicate whether a Marine received orders that matched their preference.

3. Final Sample

I limit my analysis to the impact of assignment to a preferred station on Marines' subsequent performance and retention early in their careers because I believe that Marines' experiences in the Marine Corps after a few years on active-duty service will have a significant impact on their long-range view of the institution as a whole. After Marines have a tour or two, they have a better idea of what they really want to do with their Marine Corps career, no matter their total length of service. The subsequent assignments are formative ones that set the tone for the rest of their time in the Corps. These assignments create the lens through which Marines examine the utility of each additional expended unit of effort and each additional year of service.

For these reasons, I limit my sample to the preferences of enlisted Marines who are sergeants with at least one year TIG, or, if no orders are assigned during their tenure as a sergeant, I use the duty station preferences they listed as staff sergeants. For Marine officers, I limit the sample to the duty station preferences of first lieutenants with at least

one year TIG or, if no orders are assigned during their tenure as a first lieutenant, I use the duty station preferences they listed as captains. For both groups, I specifically use the duty station preferences listed on the FITREP that was processed immediately before new orders were assigned. To do this, I match the "to date" of the FITREP just prior to the "orders assignment date" to determine the set of preferences to consider in my analysis. I create a binary variable titled "these preferences" to indicate which set of preferences should be used for matching. For a Marine to be considered in the preferred group, they must have been assigned to an MCC that matched one of their top three preferences as listed in the FITREP denoted by "these preferences." To do this, I compare MCCs and/or Y-preferences indicated on the appropriate FITREP to the MCC of the unit a Marine was subsequently assigned to. I create a binary variable called "GotPref" and assign Marines a "1" if their preferences match their orders or a "0" if they do not. Marines who did not list preferences in the relevant FITREP are assigned a "NoPref" indicator variable to indicate missing preferences. Next, I outline the outcome variables I measure in this study to compare Marines who received their preferred assignments to the control group.

4. Performance and Retention Outcome Variables

I use the RELVALPROC of Marines' FITREPs according to their individual RS as the performance outcome in this study. The RS is a Marine's direct superior who evaluates a Marine on 14 characteristics on a scale of 0-5. Combined, these scores make up the average of the report (ATR). These scores are converted into a relative value on a scale of 80-100 by comparing a Marine's score to other Marines of the same rank who have been evaluated by the same RS. When considering performance metrics, I had to decide between three possible variables: ATR, RELVALPROC, and cumulative relative value (RELVALCUM). ATR is simply the raw score from 0-5 of the FITREP and does not take into account the evaluation trends of RSs. I chose RELVALPROC over ATR because it adjusts for how a Marine's performance at a given moment in time compares to other Marines who were evaluated by the same RS. RELVALPROC controls for differences in standards between RSs such that a Marine who is evaluated by an RS who, on average, gives out lower scores is not penalized relative to a Marine who is evaluated by an RS who assigns inflated scores.

I chose RELVALPROC over a similar metric, RELVALCUM, because RELVALPROC is a better lens through which to observe performance trends over time. RELVALCUM is also measured on a scale from 80-100, but it changes over a Marine's entire career as the RS continues to evaluate more Marines of the same rank. While this means that, over time, RELVALCUM can become the most accurate measure of a Marine's performance at a given moment in their career relative to Marines of the same rank, it has significant drawbacks when it is observed over time. As each Marine is compared to a larger pool of Marines, the RELVALCUM of all Marines in that RS's profile will trend toward the middle, or 90. This means that top performers' scores will superficially appear to decline over time, while bottom performers' scores appear to improve simply due to the fact that all reports in the given profile are trending toward the average. This distortion adversely impacts analysis of performance trends over time. I chose RELVALPROC as the optimal measure of performance because I believe it is the most accurate and fair measure of performance as it changes over time. These scores are also easily compared between officers and enlisted because all Marines from the rank of sergeant through lieutenant colonel are evaluated using the same RELVALPROC scale.

To effectively compare performance both before and after assignment, I define the timeframe "AfterOrders" as the time from a Marine's arrival at their new duty station through up to three years after a Marine's "orders assignment date." The RELVALPROC values from this AfterOrders time are compared to the "BeforeOrders" period, which is comprised of the RELVALPROC of all FITREPS received within the three-year period prior to the "orders assignment date." This time frame is generated to best compare a Marine's average performance immediately before assignment and immediately after arrival at the new unit, based on whether that Marine was assigned to a preferred duty station or not.

I use years of service (YOS) as the retention outcome for this study because it measures the total tenure in the Marine Corps of the individuals in my study as of August 19, 2020 when the data was pulled. Other metrics, such as an indicator variable to determine retention at five or ten years were considered. I determined that, while right-censored, total YOS was a more inclusive and accurate depiction of retention due to the

fact that Marines have differing contract lengths both during the period that their preferences were made and during the subsequent assignment of orders. This affects the amount of time a Marine is required by law to remain in the Marine Corps. YOS more accurately conveys the total time a Marine chooses to stay in the Marine Corps and is an effective lens through which to conduct survival analysis to account for the censoring of this variable.

5. Summary Statistics

Table 1 reports the summary statistics of the Marines included in my final analytical sample. My final sample is made up of 27,860 Marines who were sergeants, staff sergeants, first lieutenants, or captains between January 2013 to March 2020 who received follow-on duty assignments within this timeframe. I break down the summary statistics for the Marines included in my analysis into the three sample groups listed previously. The preferred group includes 12,836 Marines, the control group includes 11,642 Marines, and the no preference group includes 3,382 Marines. For the baseline performance and demographics for all three groups, I used the PMOS category, enlisted/officer status, and RELVALPROC as annotated on the FITREP of Marines just prior to assignment. Due to an inability to obtain panel data that perfectly aligned with the FITREP data, I use the AFQT, GCT, gender and race/ethnicity indicators as listed at the time the data was obtained, August 19, 2020, with the assumption that in the vast majority of cases, these variables will not have changed over time.

The descriptive statistics indicate that all three groups are relatively similar, though preferred Marines are more likely to be in aviation or combat arms MOSs than the control group. These two communities have stricter career paths, so Marines may be indicating on their FITREPs preferences for assignments to which they are more likely to be assigned, regardless. I recommend conducting further analysis of the effects of duty station assignment on outcome variables by MOS to better examine this correlation. Preferred Marines are also more likely to be white, male, and officers. Compared to preferred Marines, no preference Marines are more likely to be female and enlisted, and to have higher AFQT scores. I examine some of these phenomena in the results section.

Table 1. Summary Statistics for Preferred, Control, and NoPref Groups

	Preferred (1)	Control (2)	Diff (3)	Preferred (4)	NoPref (5)	Diff (6)
Variable	Mean (SD)	Mean (SD)	Coeff Diff (*T*-Stat)	Mean (SD)	Mean (SD)	Coeff Diff (*T*-Stat)
AFQT	55.751	55.322	0.787*	55.751	60.838	-5.079***
	(28.299)	(28.561)	(2.328)	(28.299)	(25.394)	(-9.436)
GCT	111.870	111.821	0.019	111.870	112.118	-0.253
	(17.380)	(16.511)	(0.095)	(17.380)	(15.427)	(-0.768)
Black (0/1)	0.105	0.124	0.018***	0.105	0.118	-0.013*
	(0.306)	(0.329)	(4.622)	(0.306)	(0.323)	(-2.098)
White (0/1)	0.644	0.613	-0.028***	0.644	0.622	0.020*
	(0.479)	(0.487)	(-4.840)	(0.479)	(0.485)	(2.193)
Hispanic (0/1)	0.170	0.170	0.002	0.170	0.178	-0.007
	(0.376)	(0.376)	(0.352)	(0.376)	(0.383)	(-1.001)
Asian (0/1)	0.025	0.030	0.004*	0.025	0.024	0.001
	(0.157)	(0.172)	(2.006)	(0.157)	(0.154)	(0.226)
Female (0/1)	0.054	0.070	0.016***	0.054	0.071	-0.017***
	(0.226)	(0.255)	(5.488)	(0.226)	(0.257)	(-3.677)
CSS MOS (0/1)	0.365	0.403	0.030***	0.365	0.364	-0.001
	(0.481)	(0.491)	(5.122)	(0.481)	(0.481)	(-0.058)
Cmbt MOS (0/1)	0.255	0.228	-0.023***	0.255	0.244	0.011
	(0.436)	(0.420)	(-4.545)	(0.436)	(0.430)	(1.268)
Avn. MOS (0/1)	0.283	0.229	-0.047***	0.283	0.267	0.018*
	(0.450)	(0.420)	(-8.874)	(0.450)	(0.443)	(2.118)
Enlisted	0.767	0.758	0.016**	0.767	0.870	-0.102***
	(0.423)	(0.428)	(3.106)	(0.423)	(0.337)	(-12.922)
RELVALPROC	93.150	93.212	-0.004	93.150	92.896	0.257*
	(4.990)	(5.133)	(-0.067)	(4.990)	(5.158)	(2.388)
Observations	12,836	11,642	27,860	12,836	3,382	16,218

Note: This table summarizes demographics for preferred, control, and no preference Marines in the sample from January 2013 to March 2020. Standard deviations are listed in parentheses. Columns (1) and (2) display the mean coefficients for the preferred and control groups, respectively, and Column (3) displays the difference in coefficients between the treated (Preferred) and control (NoPref) groups. Below the coefficient differences in Column (3) are their associated *T*-statistics in parentheses. Columns (4) and (5) display the mean coefficients for the Preferred and NoPref groups, respectively, and Column (6) displays the difference in coefficients between these two groups. Below the coefficient differences in Column (6) are their associated *T*-statistics in parentheses. Statistical significance shown by *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Data source: USMC Total Force Data Warehouse.

B. METHODOLOGY

1. Random Assignment

As with most empirical research, the best possible conditions under which to evaluate the causal impacts that duty station assignment has on the determined outcome variables is through a randomized control trial (RCT). An RCT ensures that any observed effects of a treatment on outcome variables are purely the result of the treatment, as opposed to other variables that could have an impact. RCTs do this through random assignment, which controls for the effect that any other factors could have upon the results.

One of the reasons that the duty station preferences that Marines list on their FITREPs provide such a rare opportunity for analysis is that they have no impact on where a Marine is actually assigned. As mentioned previously, the preferences listed on FITREPs are not considered at all during the duty assignment process (Gonnella, 2020). Because Marines are assigned to duty stations regardless of the preferences they list on their FITREP, any assignment of a Marine to a desired duty station can be assumed to be random, though the Scope and Limitations section below provides exceptions and clarifications. Thus, any observed impact to these preferred Marines' performance and/or retention can be assumed to be reasonably uninfluenced by other factors. This effectively random assignment of Marines to duty stations enables me not only to view the impacts of desired duty assignment on outcome variables, but also to conduct within-group difference-in-differences analysis between the types of preferences that Marines have.

2. Duty Station Preference Categories

After examining their distribution, I choose to consolidate all possible preferences into five categories based on applicability and the frequency of selection. Those five categories are as follows:

- **Fleet Marine Force (FMF):** consolidates preferences for assignment to the operating forces overseas, in the continental United States (CONUS), Hawaii, on the West Coast, and on the East Coast. Includes Y01–Y05 on the FITREP preference prepopulated menu (see Appendix).

- **Geographic (GEO):** consolidates preferences for assignment based on location to any post or station overseas, CONUS, Hawaii, West Coast, or East Coast. Includes Y08–Y10 on the FITREP preference prepopulated menu (see Appendix).

- **Other:** consolidates preferences for assignment to security forces, command duty afloat, staff duty afloat, various school assignments, Inspector & Instructor (I-I) duty, recruiting, and joint staff tours. Includes Y11–Y79 on the FITREP preference prepopulated menu (see Appendix).

- **No preference (No Pref):** includes Y00 on the FITREP preference prepopulated menu and duty station preferences that are left blank (see Appendix).

- **MCC:** consolidates preferences for any specific unit based on an MCC entry as opposed to a categorical or Y-preference. Includes all typographical entries that do not directly match the three-character Y-preferences as indicated in the Appendix.

These categories enable me to explore the types of preferences that Marines have and the frequency in which they are obtained. More important, however, these categories allow me to examine the differences in outcome variables based on the category of preferences that Marines have. In this manner, I can analyze the difference in the causal estimate differences related to five "types" of Marines. This form of analysis is also known as difference-in-differences of within-group returns.

3. Models

a. Fixed Effects

My use of panel data enables me to control for time-invariant, unobservable heterogeneity using a fixed effects model. In essence, the fixed effects model holds constant all unobservable individual phenomena—motivation, risk-aversion, interpersonal skills, and so on—across every Marine in my sample. Doing so removes cross-sectional

variation and returns only the variation used to derive causal relationships. I also employ time-fixed effects to account for any varying attributes between different years. I conduct a Hausman test to determine whether a fixed effects or random effects model was most efficient for my dataset. The test returns a p-value for the test statistic (Chi-squared-stat) that was less than $\alpha = 0.05$, so I reject the null hypothesis and employ a fixed effects model. Table 1 Columns 1-3 in Chapter V also illustrate the differences in the ordinary least squares (OLS) and fixed effects models and demonstrate the superiority of the time-fixed fixed effects model. To further remove omitted variable bias related to both observable and unobservable independent variables, I implement a difference-in-differences model to control for the differences in Marines' preference-types (PrefType).

b. Difference-in-Differences

To control for the differences between Marines of differing preference types, I examine the differences in outcome variables within similar groups of Marines based on the five preference categories outlined above. This approach allows me to control for differences in preference and how those differences may affect performance and retention regardless of whether or not a Marine is assigned to a desired duty station. By comparing results within these five specific groups, I ensure that I am not comparing the type of Marine who wants to go to school to the type of Marine who wants to be stationed in Hawaii, because these Marines likely have inherently different traits and motivations. To do this, I measure the outcome variables using the models expressed in Equations 1 and 2.

The difference-in-differences approach outlined above is similar to the one used in Dale and Krueger's (2002) analysis of economic returns to private versus public colleges. The authors conduct this analysis by employing difference-in-differences analysis within specific groups of students based on which schools students applied and were accepted to. Dale and Krueger compare the economic returns between private- and public-school graduates only within groups where graduates applied and were accepted to similar schools. Their approach ensures that outcome variables are not affected by underlying factors that would lead individuals to apply to public/private schools to begin with. Similarly, my model ensures that performance and retention are not impacted by the

underlying factors that would lead Marines to submit preferences based on geographic location as opposed to likelihood of deployment, for example. Put a different way, my use of a fixed effects difference-in-differences model produces causal outcomes not only by holding constant unobservable individual factors but also by ensuring there are no pre-assignment outcome trends that differ by group.

The relevant variables are defined as follows:

- **RELVALPROC:** The average relative value of Marines' FITREPs at the time the FITREP was processed on a scale of 80–100
- **Preferred:** binary variable that indicates Marines who have/will obtain a desired duty station
- **NoPref:** binary variable that indicates Marines who listed no duty assignment preference
- **AfterOrders:** binary variable that indicates this is a FITREP observed after orders were received and arrival at new unit. One can interpret this coefficient as the average RELVALPROC of all FITREPS received within 3 years after Marines are assigned new duty station orders, relative to the average RELVALPROC of all FITREPS received 3 years prior to assignment
- **PrefType:** a set of categorical variables that indicate which of the five categories a Marine's preference falls into

In Equation 1, I estimate the fixed effects difference-in-differences of RELVALPROC between those who obtain a desired duty station and those who do not:

$$RELVALPROC_{it} = \beta_0 + \beta_1 GotPref_{it} + \beta_2 AfterOrders_{it} + \beta_3 (GotPref * AfterOrders)_{it} + \beta_4 NoPref_{it} + \beta_5 (NoPref * AfterOrders)_{it} + a_i + \tau_t + \varepsilon_{it} \quad (1)$$

where each of the variables is as defined above for individual Marine i in time t. a_i is a fixed effect to account for the unobserved, individual-specific factors that do not change

over time, τ_t is a time-fixed effect, and ε is the error term. The particular parameter of interest is β_3, the average change in performance after receiving a preferred assignment compared to Marines who did not, which allows me to isolate the effects of obtaining a desired duty station on performance from other underlying variables. I use heteroskedasticity robust standard errors clustered at the individual level to account for similarities within individuals over time. To create more accurate causal analysis, I also estimate the within-group difference-in-differences of RELVALPROC separately for various groups (e.g., enlisted versus officer, performance tertiles, and duty station preference categories).

c. Survival Analysis

I conduct the survival analysis portion of my study using the following Cox Proportional Hazard Model in Equation 2 to compare the time to separation between the control, preferred, and NoPref groups.

$$h(t|x_j) = h_0(t)exp(x_j\beta) \quad (2)$$

where h=hazard function, h_0=baseline hazard, t=survival time measured in YOS, x_j = covariates (Preferred, NoPref, and PrefType), β=coefficients of the covariates, and the "failure" variable is the binary variable "separated." This model allows me to analyze the effect that obtaining a desired duty station has on a Marine's rate of separation from the Marine Corps, known as the hazard, at a given point in time t.

In both the fixed effects and survival analysis portions of my research, I conduct subgroup analysis to investigate the impact of duty assignment on performance and retention. The subgroup analysis compares outcome variables between officer and enlisted personnel, performance tertiles, and the five categories of preferences.

C. SCOPE AND LIMITATIONS

1. Preference Matching

Though I designed this study to be as robust as I am capable of executing, there are some limitations both in terms of the scope and fidelity of results. Many of the limitations

are related to preference matching. One limitation is related to how the duty station preferences are entered into the FITREP. Though Marines can choose from the pre-selected Y-categories described in the Appendix, they can also hand input the MCC or even the Y-category they desire. For this reason, I cannot ensure that individuals enter the accurate codes to indicate their preferences. I attempt to mitigate this transcription issue by including alpha-numeric variations for the Y-preferences. For example, I list "Y00," "YOO," "YO0," "Y0O" and other variations to try to capture as many of the "no preference" Marines as possible. However, this fix is not feasible for the 2967 MCCs that Marines may have mis-entered. Thus, a Marine who enters "199F" instead of "19F" as their duty station preference will not be marked as preferred even if they are assigned to MCC:19F-3d AABn. That said, my results indicate that Marines who list specific MCCs as preferences have the highest rate of obtaining desired duty stations of all five categories, so any issues created by typographical errors appear to be minimal.

Another limitation is that the pre-populated menu for specific duty station categories does not define which MCCs fall under each category. Because of this, a Marine could choose a pre-populated option that does not actually align with their desires. For example, Y13 is labeled "Command Duty Afloat (East)," and nowhere in MCO 1610.7 (Performance Evaluation System [PES] manual) or any other order that I found does it define which MCCs fall under this category. For this reason, the assumptions I make in this study about which MCCs fall under specific Y-categories, like the assumptions of other Marines, may be incorrect, resulting in inaccurate preferred/control observations. Another concern is consistency of MCCs and unit location. MCCs may have changed, as M&RA posts an updated MCC list every year. Certain units may have moved or consolidated to different coasts, and different boundaries may be drawn annually to accommodate different recruiting requirements. For example, recruiting stations in South Dakota that were originally 8th Marine Corps District in one year may become a part of 9th Marine Corps district the next. This means that a Marine who entered Y44: "Recruiting Duty-8th District" and was assigned to a recruiting station in South Dakota may have originally received their preference but will be considered as not having received their preference in this study.

Though these inconsistencies are few and far between, they may negatively, though minimally, affect causal outcomes.

2. Reliability of Preferences

The scope of this research is primarily limited by an observed lack of duty station preferences among Marines, which limits the overall number of observations. Specifically, 12% of Marines in my sample indicated no duty station preference on their FITREP. My assumption is that in most cases, this is more an indication that Marines are aware that the preferences listed on FITREPs are not considered during assignment than an indication that 12% of the sample have no actual preference. I have had numerous conversations with Marines who were told by their RSs to forgo submitting preferences because they are not considered during the assignment process. Others were told that not listing preferences indicates to promotion boards that they are more selfless and willing to go wherever the Marine Corps sends them. For this same reason, Marines may submit inaccurate preferences to appease their RSs. A Marine may truthfully want to be go into recruiting, for example, but has been told by his RS that the best Marines prefer the FMF to any other assignment. In this situation, the Marine has no incentive to be honest about his preferences as they will not affect his assignment, but he does have an incentive to list what he knows his RS will respect in pursuit of a better evaluation. Similarly, I know a Marine officer who was advised that it was the "consistency of duty station preferences over time" that mattered to the Marine Corps, so she has maintained the same three duty station preferences throughout the past six years, despite the fact that her true preferences have changed (A. Sawyer, personal communication, December 8, 2018). This sentiment was echoed by a gunnery sergeant who has observed similar guidance throughout his 14 years of service in the Marine Corps (M. Cox, personal communication, March 6, 2021). All of these situations could lead to inaccurate causal outcomes due to the fact that my hypothesis is that Marines perform better and stay in longer if they are assigned to a duty station they genuinely prefer, not the duty station they felt compelled to list due to various external factors.

3. Scope of Preference

The duty preferences listed on FITREPs are also only based on unit and do not capture other assignment-related preferences, such as the billet a Marine would like to fill at the desired duty station, or anticipation of deployment opportunities. If a Marine is assigned to the unit they desire but is placed in an undesired billet, the results may in fact understate the true returns to performance and retention of duty assignment. For example, if a Marine wants to go to 3d AABn to deploy as a company commander and is subsequently assigned to 3d AABn but as the assistant operations officer with no opportunity to deploy, this Marine would be placed in the preferred group for the sake of this study but is unlikely to exhibit the same performance and retention outcomes as other preferred Marines because their true preferences are not being met. Similarly, Y26 and Y27 on the preference pre-populated menu indicate "overseas with dependents" and "overseas without dependents," respectively. Unfortunately, I am unable to consider preferences like these within the confines of this study, though there may be merit in examining them further in future research. In Chapter VI, I discuss my recommendation for remedying more of these limitations and broadening the scope of future studies.

V. RESULTS

A. GENERAL PREFERENCE, PERFORMANCE, AND RETENTION TRENDS

1. Preference and Assignment Trends

First, I explore the general trends in duty station preference categories overall. Figure 4 illustrates the total distribution of preferences based on the five categories I outlined above.

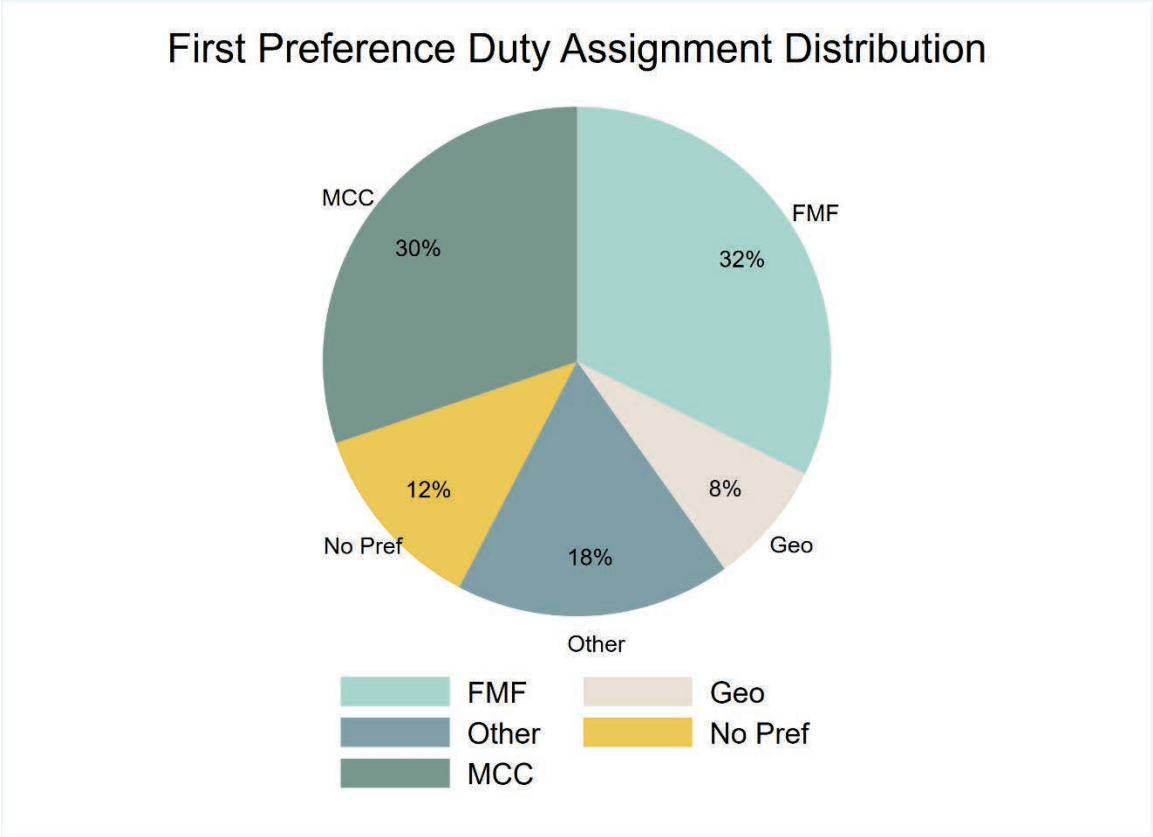

Figure 4. First Preference Distribution for Total Population

Of particular interest is the fact that 30% of Marines chose to look up and hand-enter the specific MCC of their first-choice duty station. This is significant because it takes more time and effort to lookup the MCC for a specific unit, and many Marines, in my

experience, are never counseled on this process or how to obtain the MCC list. This category does, however, capture all preferences that do not fall into the Y-categories, so MCC-Type would also capture all typographical errors and/or "random inputs."

Nearly a third of the sample selected one of the five FMF-Type preferences from the pre-populated list. This could be indicative of a number of Marine Corps-specific trends, including a true or indoctrinated desire to return to "the fleet." The career progression of most Marines is reliant upon serving in specific roles in the FMF/operating forces. Studies have shown that Marine officers who spend too much of their career away from the FMF in particular have lower rates of promotion, comparatively (Gonnella, 2020). The FMF-Type preferences are also the first five options that populate on the pre-populated menu after the "no preference" option, so their frequency of selection could also reflect tendency to take the path of least resistance when filling out an optional section of a FITREP.

The FMF-Type preferences are immediately followed by the three Geographic-Type preferences on the pre-populated list and then the 38 categories that make up the "other" category which notably include school, recruiting, and joint duty preferences. Similar to the analysis of the FMF-Type preferences, the relatively low rate of geographic and Other-Type preferences could reflect the emphasis the Marine Corps places on "fleet time" early in Marines' careers and, inversely, the lack of emphasis placed on other kinds of assignments. Marines early in their careers are also assumedly more easily influenced by the messaging of the Marine Corps, the recommendations of their superiors, and the pressures to conform to the perceived "right career path." I predict that an analysis of the distribution of these preference categories later in Marines' careers might yield significantly different results.

Only 12% of the population indicated no duty station preference, either by leaving Section 9 of the FITREP blank or by selecting "Y00" from the pre-populated duty station preference options. As I discuss in the Scope and Limitations subsection of Chapter IV, even though this is a relatively small proportion of the population, I still believe this number may be inflated and reflects the perceived "futility" of inputting preferences that are not

considered during the assignment process as opposed to an honest reflection of apathy as it relates to duty assignment.

Figure 5 depicts the distribution of preference types between officer and enlisted personnel. As illustrated, fewer enlisted Marines indicated duty station preferences or Other-Type preferences than the officers. This may reflect on the specific circumstances related to the sample population I analyze. At the point in time that I examine Marines' duty station preferences, first lieutenants will have submitted at least six FITREPs and may subsequently have a better understanding of how to fill out preferences than their sergeant counterparts. The sergeants I observe may have submitted a FITREP to their RS for the first time and may not be fully abreast of the process.

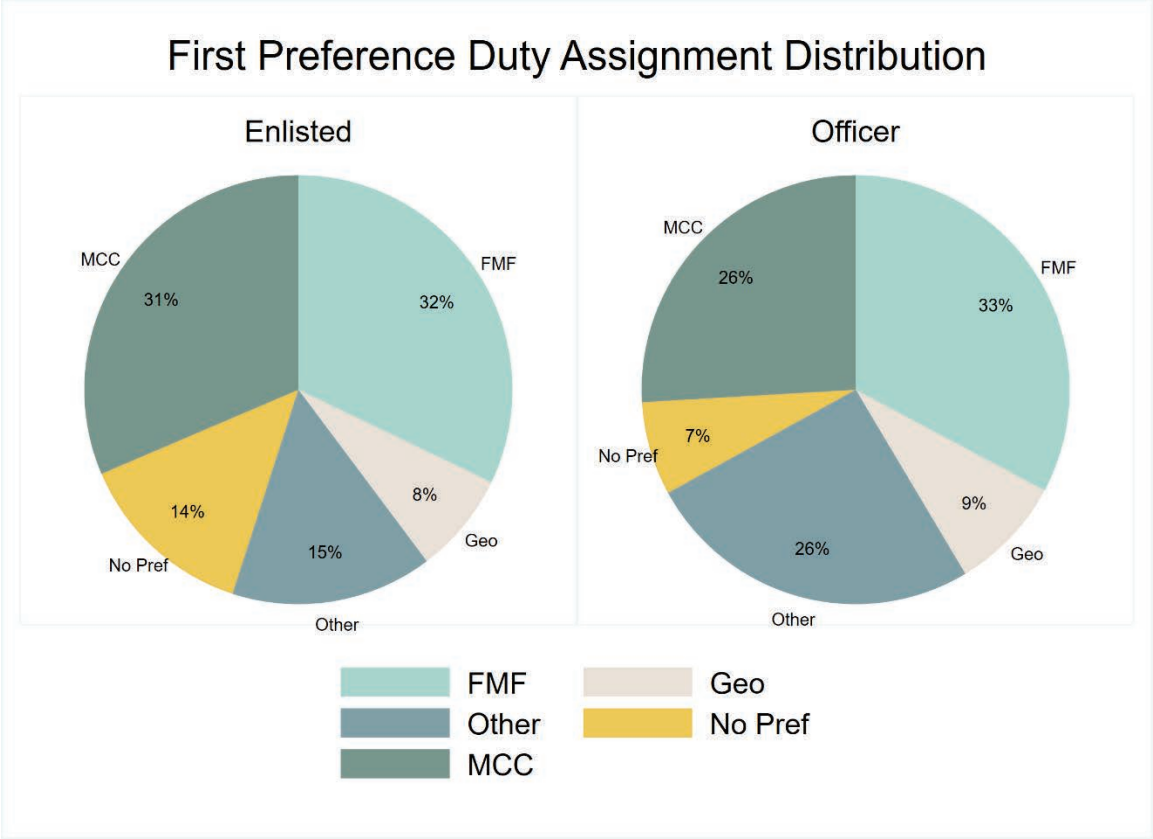

Figure 5. Officer Versus Enlisted First Preference Distribution

Figures 6 illustrates the proportion of individuals who obtain a desired duty station, do not obtain a desired duty station, and have no preference—broken down by officer and enlisted status.

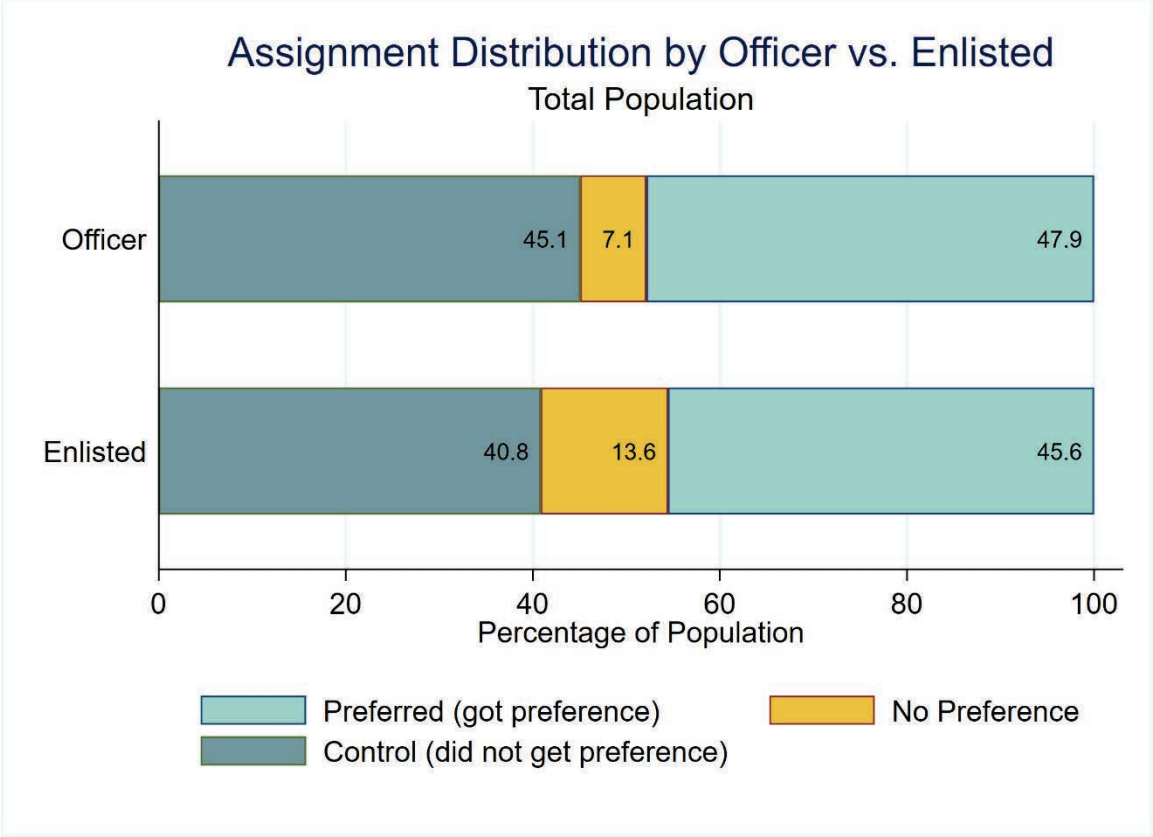

Figure 6. Officer Versus Enlisted Assignment Distribution

Per Figure 6, rates of obtaining a desired duty station are greater than hypothesized. I cannot conclude from this data whether this is simply due to the fact that Marines' preferences line up with the needs of the Marine Corps or whether there are active attempts by monitors to solicit and match Marines' desires. I am aware that monitors often send out surveys to Marines that are due to PCS. The results in Figure 6 indicate that these surveys may be (a) reflecting the same preferences Marines list on their FITREPs and (b) taken into account by monitors during the assignment process.

Enlisted Marines have a higher rate of indicating no preference, which explains the lower rates of both obtaining a desired duty station preference and not obtaining a desired duty station preference. The fact that the rate of indifference toward duty station assignment in enlisted personnel is nearly double that of the officer corps raises questions about whether all Marine Corps personnel are being educated equally on different types of duty assignments. This difference may also indicate that enlisted Marines perceive greater futility in expressing their duty station preferences despite similar rates of assignment to preferred duty stations. In the following paragraphs, I examine the effects that obtaining a desired duty station has on future performance.

2. General Impacts to Performance

Figure 7 illustrates the general difference in performance outcomes between Marines who obtain a desired duty station, those that do not, and those with no preference over time.

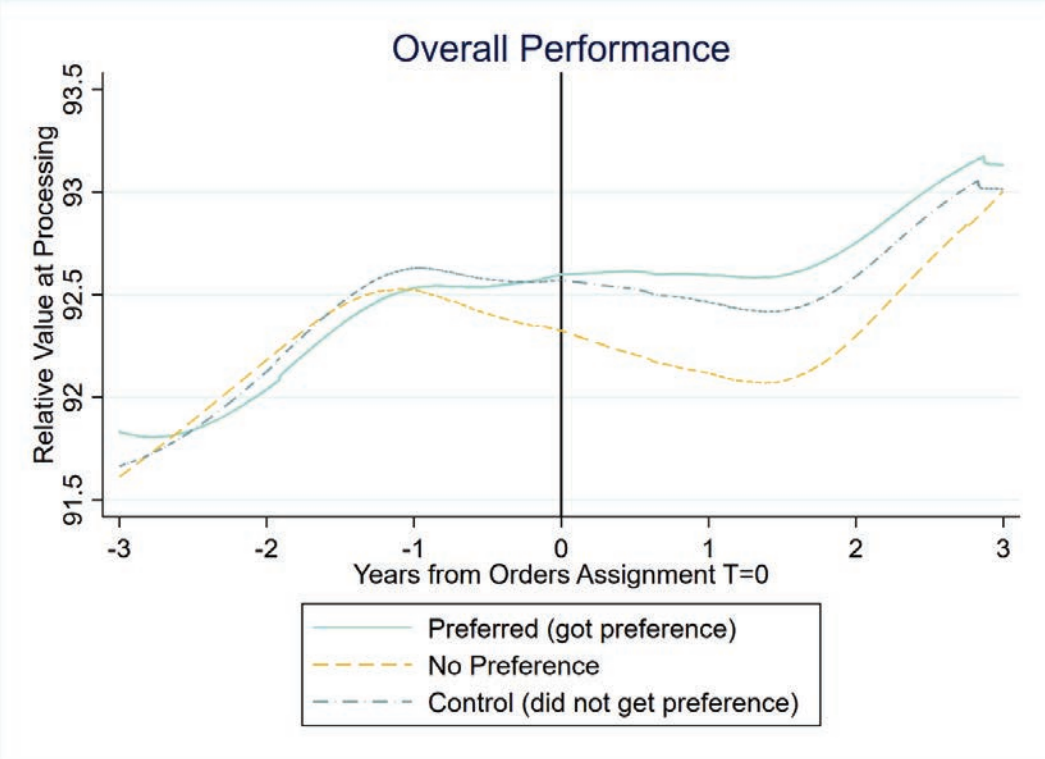

Figure 7. General Performance over Time

As illustrated, preferred individuals tend to perform just slightly below the control group prior to orders assignment and then perform better than the control following assignment. Just before assignment, the previously climbing scores begin to plateau. This is likely due to the fact that RSs have now evaluated more Marines, bringing the relative value at processing toward 90, or the average. All three groups see a drop in performance around the time they arrive to their new unit. This is likely the result of two common-place phenomena in the Marine Corps. First, promotion boards expect to see an improvement in Marines' performance on each subsequent FITREP under each RS who evaluates them. Stagnation or decline in RELVALPROC under the same RS shows a promotion board that a Marine is not improving, and the likelihood of this Marine being selected for promotion is very slim, especially at higher ranks. Because of this, some RSs evaluate new Marines in their profile superficially low so that they have "room to grow" in their profile to show improvement. Second, these Marines likely just left a unit where they worked for the same RS for a substantial amount of time. During this time, each FITREP likely improved upon the previous one. After arriving to a new unit, these Marines now work for a new RS who is just getting to know them, and that RS is comparing them to every other Marine of the same rank—individuals that they have likely known for a greater period of time. After that initial performance dip, Marines' performance scores once again rebound and begin to climb. Marines with no preference do, however, appear to perform significantly worse after assignment compared to the control and preferred groups. Right before assignment, there is a slight decline in the performance of all Marines as well. This is likely due to RSs departing and their replacements demonstrating the evaluation strategies I outlined above.

Figure 8 depicts how preferred enlisted Marines start out on relatively even footing as the control group but pull ahead after assignment and particularly outperform the Marines with no preference. Comparatively, the officer preferred group performs relatively on par with the control group both before and after assignment. Marine officers with no preference see a sharp negative departure from the control and preferred groups right before assignment, though not a statistically significant one, as is illustrated in Table 2. This may indicate that the kind of commissioned Marines who do not take the time to input a

preference on a FITREP may also be the type of Marine to perform to the bare minimum standard in other tasks, and thus obtain lower scores relative to the other two groups.

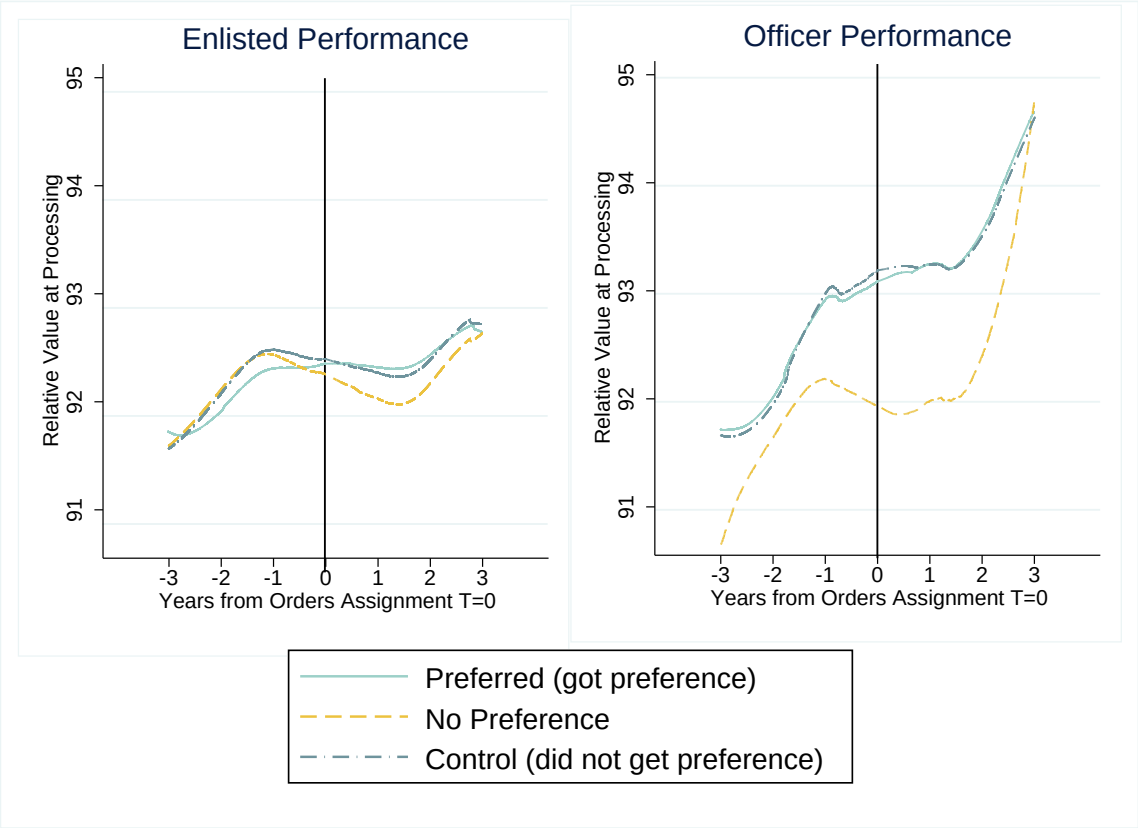

Figure 8. Performance Outcomes for Enlisted and Officers

More formally, Table 2 depicts the results of the estimated difference-in-differences model described in Equation 1 of Chapter IV. The coefficient estimates in Table 1 are the average increase or decrease in RELVALPROC in the three years after assignment relative to the control group—those Marines who did not receive a desired duty station assignment. Column (1) illustrates the results of an OLS regression run without controls; Column (2) illustrates the results of an OLS regression that includes controls such as race, gender, and enlisted status; and Column (3) is the person and time-fixed fixed effects model that holds constant all observable and unobservable individual phenomena (such as motivation, risk-aversion, interpersonal skills, etc.) across every Marine in my sample.

Table 2. General Difference-in-Differences in Performance by Assignment

	OLS	OLS+	FE	Enlisted FE	Officer FE
	(1)	(2)	(3)	(4)	(5)
After Assignment	-0.063	-0.035	-0.052	-0.167**	0.513***
	(0.045)	(0.044)	(0.049)	(0.055)	(0.113)
GotPref After Assignment	0.149**	0.123*	0.213**	0.232**	0.141
	(0.058)	(0.057)	(0.067)	(0.074)	(0.154)
NoPref After Assignment	-0.270**	-0.274**	-0.260*	-0.223+	-0.233
	(0.089)	(0.089)	(0.108)	(0.117)	(0.350)
Observations	206318	206318	206318	164974	41344
R^2	0.000	0.005	0.000	0.000	0.003

Notes: Robust standard errors are clustered by EDIPI in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The outcome variable for all models is the difference-in-differences of the average RELVALPROC scores obtained 3 years after assignment. The coefficients represent relative changes to the baseline RELVALPROC that encompasses the average of the scores obtained 3 years before assignment. All coefficients are relative to the control group, which is represented by Marines who did not receive a desired duty station. Model (1) is an OLS model with no controls; Model (2) is an OLS model with controls to include gender, race, and enlisted status. Model (3) is the fixed effects model described in Equation 1 with time-fixed effects; Model (4) is the fixed effects model described in Equation 1 with time-fixed effects for enlisted Marines; and Model (5) is the fixed effects model described in Equation 1 with time-fixed effects for Marine officers. All five models include the variable "preferred_after_dontcare," which encompasses Marines who did not input a first duty station preference but did enter a second and/or third and were subsequently assigned to one of those second two preferences. It is not illustrated as it does not stand to inform policy and presents conflicting information. Data source: USMC Total Force Data Warehouse.

All of the first three models indicate a statistically significant increase in performance for those who got their preference, relative to those who did not. Models (1) and (2) are broadly similar, but there is a fairly large increase in the coefficient for those who got their preference from Model (2) to Model (3). This highlights the importance of the fixed effects model: there are differences in who gets their preference and who does not, and these differences are above and beyond what is captured by observable characteristics such as AFQT scores and gender. Thus, the best model compares how people change relative to their own prior scores. Column (3) depicts a statistically significant increase of 0.213 in RELVALPROC after assignment for all preferred Marines relative to the control. Columns (4) and (5) separate the analysis by enlisted and officers. Column (4) indicates a 0.232 post-assignment increase specifically for preferred enlisted

Marines relative to the control. Officers overall appear to score 0.515 better on RELVALPROC after assignment, regardless of whether they received a preferred duty station, though the preferred group return no statistically significant changes above and beyond that experiences by the control officers.

There is a statistically significant 0.260 decline in performance for the overall NoPref population and a 0.223 decline at the 10% level for NoPref enlisted Marines specifically after assignment, relative to the control. The NoPref drop is the exact same coefficient for the officers as it is for the enlisted, but it cannot statistically be differentiated from zero given the larger standard errors on the smaller sample of officers. These results indicate that there is a statistically significant increase in performance relative to the control for Marines who obtain a desired duty station, specifically for enlisted Marines. Though these results are statistically significant, they are only marginally practically significant. Though an increase of 0.2 in RELVALPROC is unlikely to change a Marine's overall ranking in an RS's profile, there is no way to quantify these returns in terms of a Marine's actual output and contribution to the Marine Corps. My hypothesis is that we would see far more practically significant results if Marines believed their preferences played a role in their assignment. In the following section, I examine the general retention trends related to duty assignment.

3. General Retention Trends

Figure 9 illustrates the general retention trends of enlisted and officer personnel as survival curves. Figure 9 depicts that enlisted Marines have a higher survival rate than officers until approximately 15 years of service, at which point enlisted personnel separate at a far greater rate than officers for the next five years. As indicated in Table 2, there appears to be only a minimal positive difference in years of service between those who obtain a desired duty station and those who do not. With these curves, drops in survival rates can also be seen at the end of each year as well as a sharp decline at the 20-year mark, which makes sense due to the fact that Marines can retire with benefits after 20 years of service. These results indicate only a marginal correlation between obtaining a desired duty station and length of service in the Marine Corps. I recommend further research to control

for observable variation within the preferred and control groups as well as specific analysis of retention after assignment, such as at the five- and ten-year marks. In the following section, I examine preference, assignment, performance, and assignment trends by performance tertile.

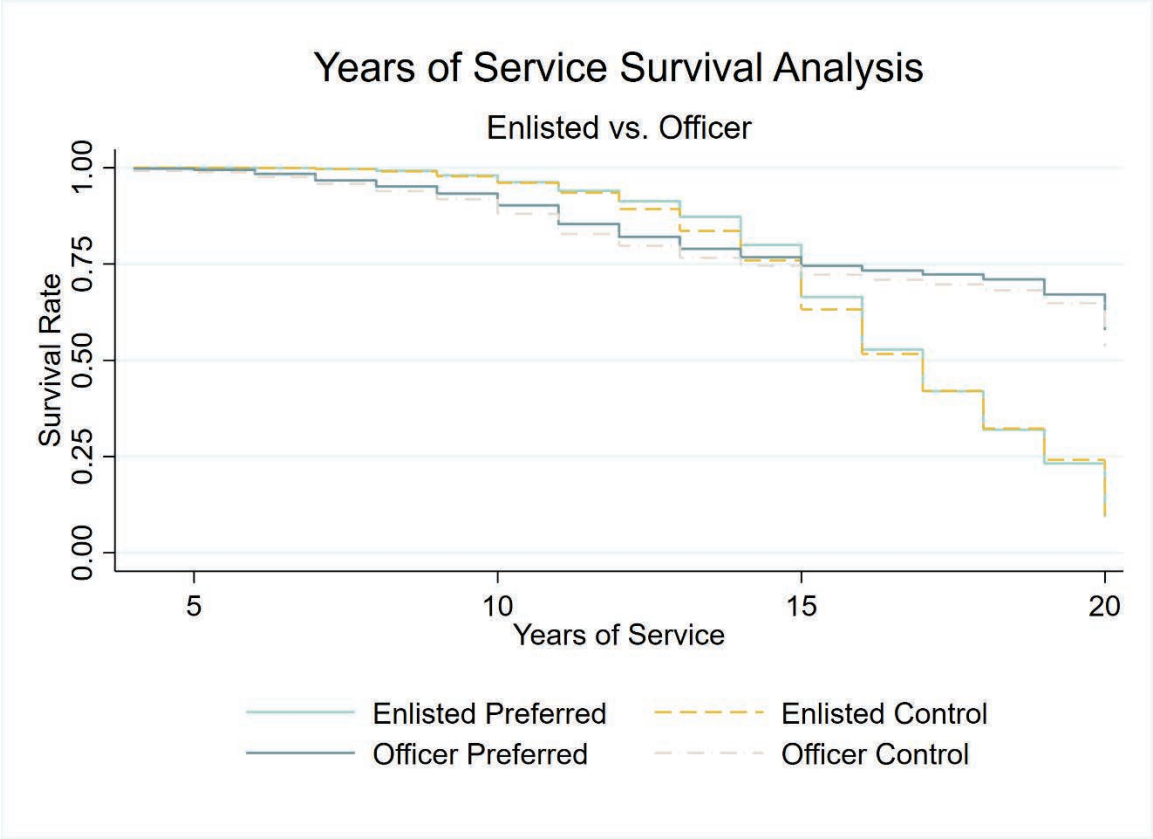

Figure 9. Officer Versus Enlisted Survival Curves

Table 3 reports the general retention trends as hazard ratios based on the Cox Proportional Hazard model for survival analysis as described in Equation 2. This model enabled me to analyze how assignment to a desired duty station influenced Marines' rate of separation, known as the hazard, at a given point in time. This model suggests there is a correlation between obtaining a desired duty station and years of service, specifically for the officer corps. The hazard ratio depicted in Column (1) is statistically significant at the 5% level and indicates that Marines who obtain a desired duty station preference may have

a 4.3% lower hazard of separating from the Marine Corps compared to the control. Officers have a 12.3% lower hazard of separation that is significant at the 1% level.

Table 3. General Hazard Separation Ratios

	Total	Enlisted	Officer
	(1)	(2)	(3)
Preferred	0.957**	0.981	0.877***
	(0.013)	(0.014)	(0.033)
Observations	27860	21616	6244

Notes: Robust standard are errors in parentheses. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. For all Cox Proportional Hazard models in this table, the "failure" variable is the binary variable "separated," the duration variable is years of service, and the outputs represent the hazard ratio for separation from the Marine Corps. Hazard ratios are all relative to the control and can be interpreted as follows: Hazard ratio = 1: No effect on the hazard of separation; hazard ratio < 1: decrease in the hazard of separation; hazard ratio > 1: increase in the hazard of separation. Model (1) is the Cox Proportional Hazard model for all preferred Marines; Model (2) is the Cox Proportional Hazard model for preferred enlisted; and Model (3) is the Cox Proportional Hazard model for preferred officers. There are no controls applied to these models; no conclusions of causation should be drawn based on correlation in between assignment and years of service. Data source: USMC Total Force Data Warehouse.

In the following section, I analyze the preference, assignment, performance, and retention trends by performance tertile to determine whether there are significantly different impacts based on Marines' prior RELVALPROC scores.

B. PREFERENCES, PERFORMANCE, AND RETENTION BY TERTILE

1. Preference and Assignment Trends by Tertile

In this section, I examine the varying preferences, assignment trends, performance impacts, and retention effects of three categories of pre-assignment performers. I divide Marines into tertiles that reflect Marines in the bottom, middle, and top thirds of RELVALPROC before assignment to determine if preferential duty assignment impacts one performance group more than the others. As depicted in Figures 10 and 11, preferences are relatively similar across the tertiles and thus mirror the overall results examined in Figures 4 and 5. The top third is most likely to hand-enter the specific MCC code for their preferred duty station whereas the bottom third is more likely to select an FMF-Type

preference. This may be due to the fact that the FMF-Type preferences, as previously mentioned, are the first preference categories listed on the pre-populated menu after the "no preference" option and are, thus, the second-most path of least resistance. In the next section, however, I describe how future performance is impacted by assignment to a desired duty station relative to baseline performance.

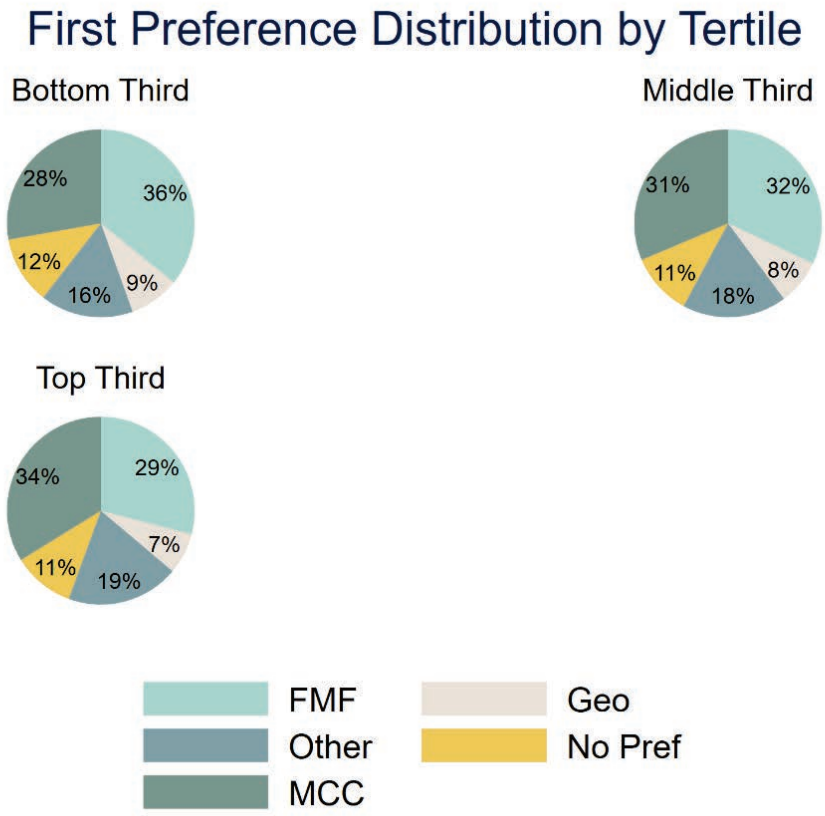

Figure 10. First Preference Distribution by Tertile

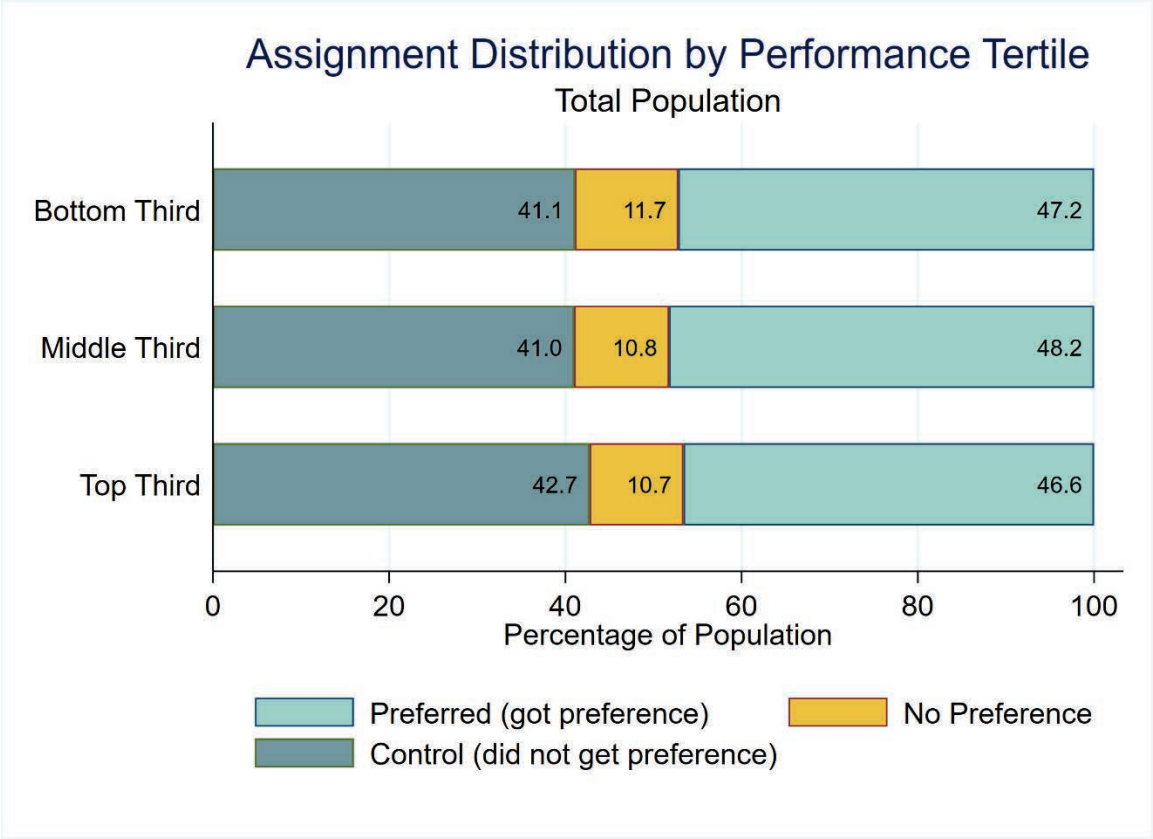

Figure 11. Assignment Distribution by Tertile

2. Impacts to Performance by Tertile

Figure 12 captures changes in performance by tertile over time. There is a significant decline of middle-third Marines with no preference relative to the control as well as a relative improvement in performance of preferred Marines in the top third in the three years following assignment.

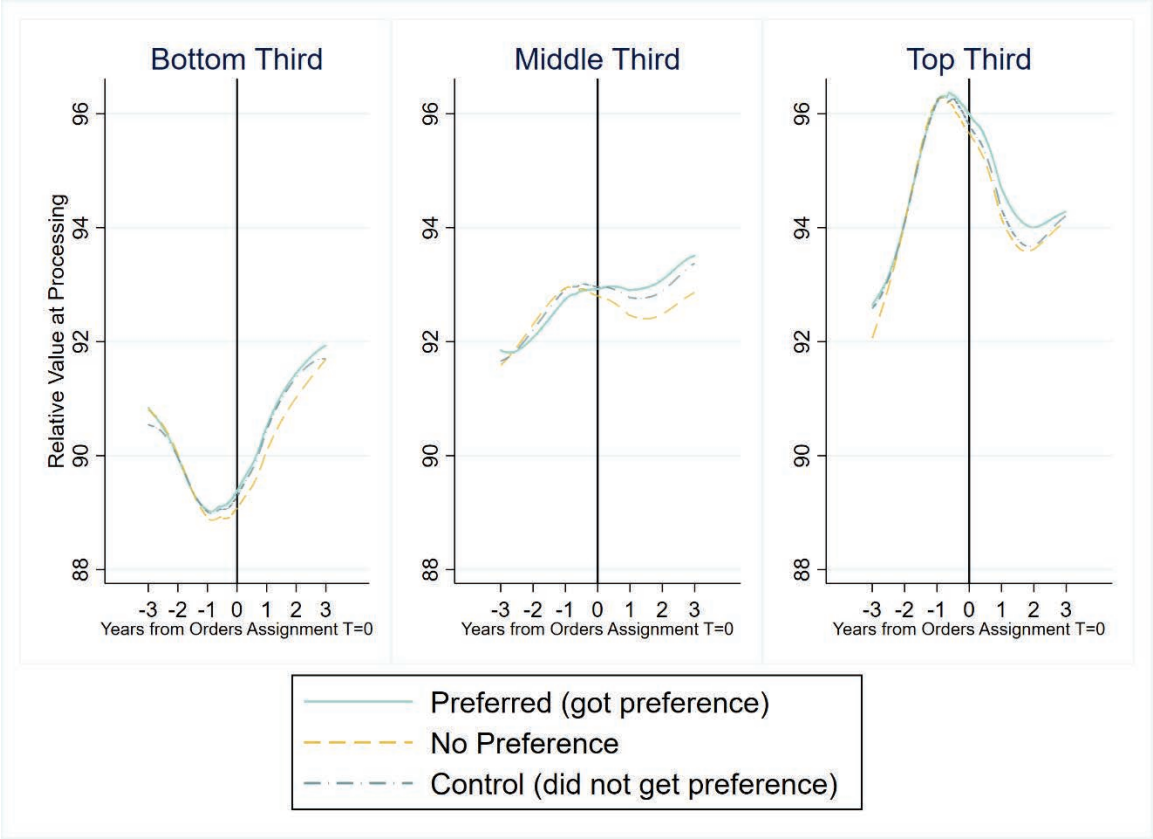

Figure 12. Performance Outcome by Tertile

Table 4 illustrates the difference-in-differences in performance after assignment by tertile numerically. There is no statistically significant impact to the bottom or middle third preferred Marines, but it can be observed in Column (3) that preferred top performers perform 0.336 better than their control counterparts post-assignment. This stands out in particular because top third Marines, in general, tend to perform 7.129 worse after assignment compared to before. These findings imply that using duty station assignment as an NMI to target top-tier Marines may be an effective tool for improving performance post-assignment. Column (1) indicates that bottom-third Marines, in general, tend to perform 3.075 higher after assignment, which may be due to these relatively "low performers" having an opportunity for a fresh start with a new RS. Conversely, middle-third Marines overall have a statistically significant 2.77 decline in performance in the three years after assignment.

Table 4. Difference-in-Differences in Performance by Tertile

	Bottom Third (1)	Middle Third (2)	Top Third (3)
After Assignment	3.075***	-2.077***	-7.129***
	(0.116)	(0.104)	(0.109)
GotPref After Assignment	-0.011	0.148	0.336**
	(0.118)	(0.107)	(0.114)
NoPref After Assignment	-0.250	-0.503**	0.081
	(0.195)	(0.174)	(0.179)
Observations	62462	65106	62027
R^2	0.048	0.021	0.148

Notes: Robust standard errors are clustered by EDIPI in parentheses. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The outcome variable for all models is the difference-in-differences of the average RELVALPROC scores obtained 3 years after assignment. The coefficients represent relative changes to the baseline RELVALPROC that encompass the average of the scores obtained 3 years before assignment. All coefficients are relative to the control group which is represented by Marines who did not receive a desired duty station. Model (1) is the fixed effects model described in Equation 1 with time-fixed effects for the bottom third of performers; Model (2) is the fixed effects model described in Equation 1 with time-fixed effects for the middle third of performers; Model (3) is the fixed effects model described in Equation 1 with time-fixed effects for the top third of performers. All three models include the variable "preferred_after_dontcare" which encompasses Marines who did not input a first duty station preference but did enter a second and/or third and were subsequently assigned to one of those second two preferences. It is not illustrated as it does not stand to inform policy and presents conflicting information. Data source: USMC Total Force Data Warehouse.

Though an increase of 0.3 in RELVALPROC is relatively small on a scale from 80-100, these results indicate that top-performing Marines have a far more positive response to obtaining a desired duty station than their average and low performing counterparts. This may suggest that the Marine Corps may be able to take a more targeted approach to duty station assignment as a means of talent management than its Army counterparts did with its officer-wide ATAP rollout. Instead of trying to match all officers or all Marines with their top choice, the more economical choice may be for the Marine Corps to use duty station preference matching as an NMI for only the top-performing Marines. In the following section, I examine how duty station assignment is correlated with retention at the tertile level.

3. Impacts to Retention by Tertile

Figure 13 illustrates the correlation between assignment to a desired duty station and survival rates between the top and bottom performers. The difference between these two tiers widens as years of service approach the 20-year retirement cut off. This makes sense, as top performers are likely to be retained at higher rates especially as the density of personnel at each subsequent rank declines. Assignment to a preferred duty station negatively impacts the performance of bottom-tier Marines whereas it positively impacts the performance of preferred top-tier Marines in the three years following assignment. Thus, bottom-tier preferred Marines' performance either stagnates or declines, whereas top-tier Marines are more likely to improve, which makes top-tier preferred Marines relatively more eligible for promotion and thus retention.

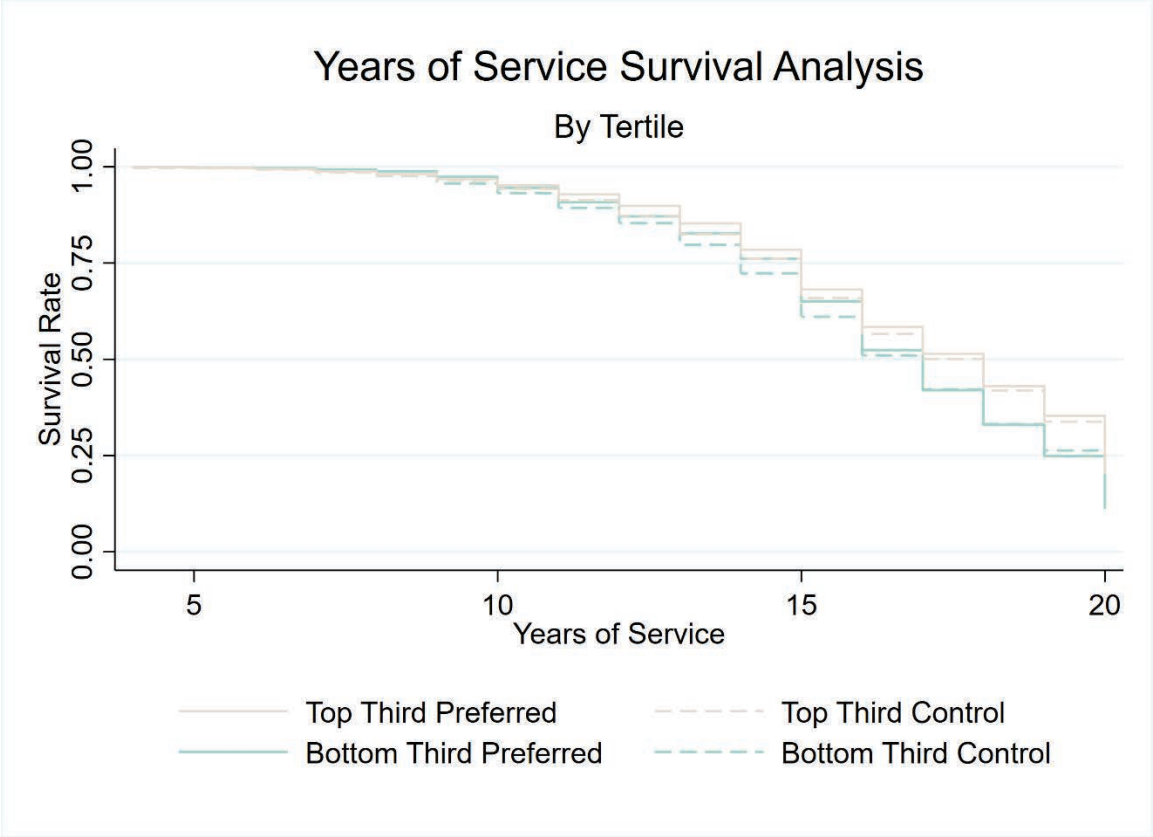

Figure 13. Top Versus Bottom Tertile Survival Curves

Table 5 illustrates retention outcomes as separation hazard ratios for preferred Marines by tertile relative to the control. We see in Columns (2) and (4) that the statistically significant results occur within the top and bottom thirds. Preferred bottom third Marines have a 5.5% lower hazard of separating and preferred top third Marines have a 9% lower hazard of separating relative to the control group. The correlation between years of service and preferred top-tier Marines indicates that further research into causal effects related to duty assignment and retention may be warranted. Similar to the performance results, it appears that top performers may be more responsive to obtaining a desired duty station than the middle and bottom performers. The survival rates are also depicted in Figure 13.

Table 5. Hazard Separation Ratios by Tertile

	Total	Bottom Third	Middle Third	Top Third
	(1)	(2)	(3)	(4)
Preferred	0.957**	0.945*	0.962	0.910***
	(0.013)	(0.022)	(0.023)	(0.023)
Observations	27860	8183	8291	8182

Notes: Robust standard errors are in parentheses. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. For all Cox Proportional Hazard models in this table, the "failure" variable is the binary variable "separated," the duration variable is years of service, and the outputs represent the hazard ratio for separation from the Marine Corps. Hazard ratios are all relative to the control and can be interpreted as follows: Hazard ratio = 1: No effect on the hazard of separation; hazard ratio < 1: decrease in the hazard of separation; hazard ratio > 1: increase in the hazard of separation . Model (1) is the Cox Proportional Hazard model for all preferred Marines; Model (2) is the Cox Proportional Hazard model for preferred bottom third performers; Model (3) is the Cox Proportional Hazard model for preferred middle third performers; and Model (4) is the Cox Proportional Hazard model for preferred top third Marines. There are no controls applied to these models; no conclusions of causation should be drawn based on correlation in between assignment and years of service. Data source: USMC Total Force Data Warehouse.

Next, I examine the assignment, performance, and retention trends of preferred Marines by their categorical preferences in the following section.

C. PERFORMANCE AND RETENTION BY PREFERENCE CATEGORY

1. Assignment Trends by Preference Category

To assess the differences in assignment, performance, and retention trends among Marines with different categories of duty station preferences, I began with the 49 pre-populated Y-categories listed in the Appendix. I grouped these 49 preferences into nine more manageable and related categories: FMF, Geographic, Security Forces, Command/ Staff Duty Afloat, School, I-I duty, Recruiting/OSO, Joint Staff, and No Preference. I then created another category that includes all entries that were not pre-populated or blank and grouped them into an "MCC" category. After looking at the frequencies of selection for each category, I decided to condense the categories even further into the final five categories: FMF, Geographic, Other, No Preference, and MCC. Figure 14 shows the frequency with which Marines of each type of preference receive their first-choice duty station.

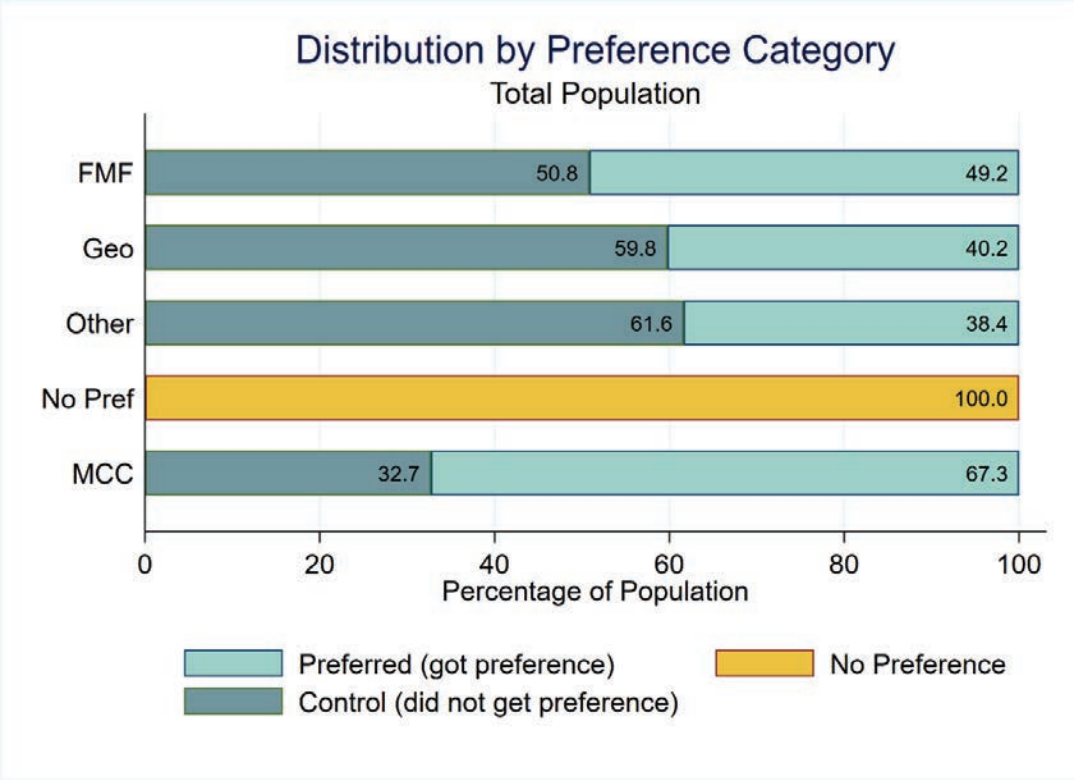

Figure 14. First Preference Distribution by Preference Category

Despite the far broader net that the Y-categories cast, Marines with specific MCC preferences are assigned their first-choice duty station at far greater rates than their counterparts, despite there being only three geographic locations to choose from (i.e., East Coast, West Coast, or overseas). For example, only 40.2% of Marines are assigned to their first-choice if that choice is based on geographic location compared to the 67.3% of Marines who are assigned to the exact MCC they list in Section 9 of their FITREP. This may indicate that the Marine, the Marine's staff non-commissioned officer in charge, or the Marine's RS is working directly with other entities such as the monitor or representative from the desired unit to facilitate follow-on orders to specific units. Another possible explanation is that Marines are entering the MCC of units they have already unofficially or "verbally" been assigned to. A Marine officer I interviewed who entered the vetting process for assignment to Marine Forces Special Operations Command (MARSOC) was instructed by her interviewer to list MARSOC as her first-choice duty station on her next FITREP after being told her assignment to MARSOC was "all but pending" (A. Sawyer, personal communication, June 5, 2020). These types of external forces, though infrequent, may explain the significant share of Marines with MCC-Type preferences who receive a desired duty station. It makes sense that the Other-Type preference has the lowest rate of preferences matched due to the fact that many of the assignments listed in this section require additional vetting prior to assessment, such as through the SDA and commandant's career-level education board screening processes. In the following section, I analyze the effects of duty assignment on performance by preference type.

2. Impacts to Performance by Preference Category

Figure 15 illustrates the difference-in-differences of performance trends between preferred and control Marines with FMF-Type preferences, as these subgroups display the greatest statistical and magnitudinous differentiation in performance. Preferred Marines with FMF-Type preferences perform about on par with the control FMF-Type Marines beginning approximately 1.5 years prior to assignment but then slowly exhibit greater and greater relative performance in the three years following. This depiction of FMF-Type performance trends over time align with the findings displayed in Table 6.

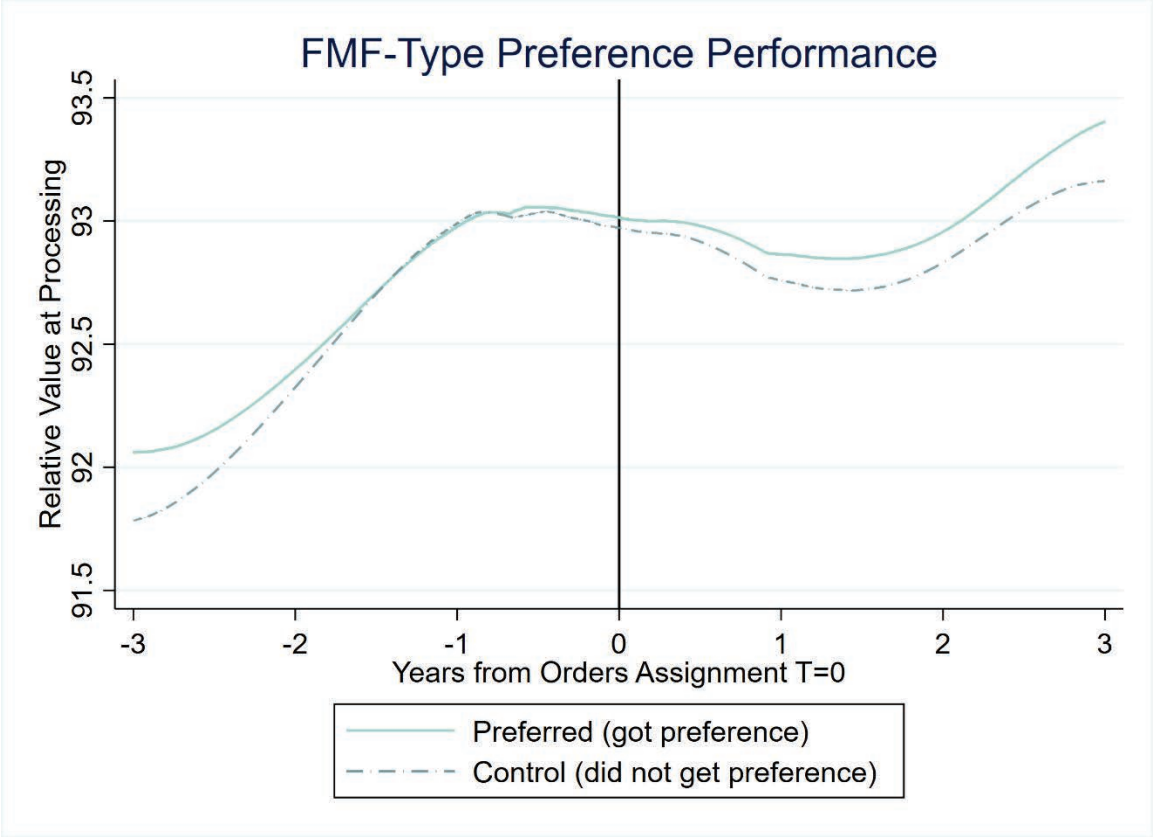

Figure 15. FMF-Type Performance Outcome

Table 6 summarizes the fixed effects difference-in-differences of performance between Marines with different categories of preferences. Table 6 illustrates that the RELVALPROC of preferred Marines with FMF-Type preferences perform 0.537 better relative to Marines who do not obtain a desired duty station in the three years after assignment. This finding is statistically significant at the 1% level as is the 1.893 average drop in performance of Marines with FMF-Type preferences in general after assignment relative to before. Preferred Marines with Other-Type preferences perform 0.277 worse than the control group after assignment at the 10% significance level. As mentioned in previous sections, there is statistical significance in the overall drop in performance of Marines in the immediate three years after assignment presumably due to developing new relationships with RSs and often artificially low initial scores.

Table 6. Difference-in-Differences by Preference Category

	FMF	GEO	Other	MCC
	(1)	(2)	(3)	(4)
After Assignment	-1.893***	-1.661***	-2.401***	-2.238***
	(0.117)	(0.228)	(0.152)	(0.129)
GotPref After Assignment	0.537***	0.095	-0.277+	0.144
	(0.111)	(0.228)	(0.155)	(0.116)
Observations	66,294	16,276	35,292	65,008
R^2	0.015	0.012	0.018	0.017

Notes: Robust standard errors are clustered by EDIPI in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The outcome variable for all models is the within-group difference-in-differences of the average RELVALPROC scores obtained 3 years after assignment. The coefficients represent relative changes to the baseline RELVALPROC that encompasses the average of the scores obtained 3 years before assignment. All coefficients are relative to the control group which is represented by Marines who did not receive a desired duty station. Model (1) is the within-group fixed effects model described in Equation 1 with time-fixed effects for Marines with an FMF-Type preference category; Model (2) is the within-group fixed effects model described in Equation 1 with time-fixed effects for Marines with a GEO-Type preference category; Model (3) is the within-group fixed effects model described in Equation 1 with time-fixed effects for Marines with an Other-Type preference category; and Model (4) is the within-group fixed effects model described in Equation 1 with time-fixed effects for Marines with an MCC-Type preference category. All four models include a variable "preferred_after_dontcare" which encompasses Marines who did not input a first duty station preference but did enter a second and/or third and were assigned to one of those preferences. It is not illustrated as it does not stand to inform policy and presents conflicting information. The "NoPref After Assignment" was removed from this model due to the fact that those with "NoPref" would not have indicated one of the four preference categories mentioned above. Data source: USMC Total Force Data Warehouse.

Despite an over representation in the preferred category, Marines with MCC-Type preferences do not perform in a statistically significantly different manner than the control. This phenomenon may be related to the unreliable nature of MCC preferences, or possibly due to lack of fulfillment of expectations. A Marine in any category of preference may discover that a new duty station, even if it is a duty station that matches their stated preferences, does not bring them the level of fulfillment or motivation to succeed that they expected. This disillusionment may be particularly prominent among MCC-Type Marines who are not simply choosing assignment to a broad location or non-deploying unit but are in fact interested in a specific unit for likely very specific reasons. If MCC-Type Marines have a strong enough preference for a unit to go through the steps to look up the MCC, they may be setting their expectations for that unit too high. This could result in particularly

acute disappointment if the unit does not meet those expectations. These are simply theories but theories that might be more directly addressed with further research. Finally, I examine the correlation between duty assignment, preference category, and retention in the following section.

3. Impacts to Retention by Preference Category

Table 7 illustrates retention outcomes as separation hazard ratios for preferred Marines by the five different preference types. It indicates that there is no statistically significant difference in the hazard of separation from the Marine Corps between the preferred and control groups based on my model. It does appear that Marines with MCC and GEO-Type preferences may have higher rates of separation, relative to the control, though not statistically significant ones. Though further analysis utilizing a different model may return slightly different results, these findings suggest that controlling for the differences between the type of Marine who wants to stay in the operating forces and the type of Marine who prefers one duty station location to another may not be significant enough to impact the years of service each spends in the Marine Corps.

Table 7. Hazard Separation Ratios by Preference Category

	Total	FMF	GEO	Other	MCC
	(1)	(2)	(3)	(4)	(5)
Preferred	0.957**	0.985	1.040	0.954	1.037
	(0.013)	(0.023)	(0.050)	(0.033)	(0.027)
Observations	27860	8986	2195	4888	8409

Notes: Robust standard errors are in parentheses. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. For all Cox Proportional Hazard models in this table, the "failure" variable is the binary variable "separated," the duration variable is years of service, and the outputs represent the hazard ratio for separation from the Marine Corps. Hazard ratios are all relative to the control and can be interpreted as follows: Hazard ratio = 1: No effect on the hazard of separation; hazard ratio < 1: decrease in the hazard of separation; hazard ratio > 1: increase in the hazard of separation. Model (1) is the Cox Proportional Hazard model for all preferred Marines; Model (2) is the Cox Proportional Hazard model for preferred Marines with FMF-Type preferences; Model (3) is the Cox Proportional Hazard model for preferred Marines with GEO-Type preferences; Model (4) is the Cox Proportional Hazard model for preferred Marines with Other-Type preferences; and Model (5) is the Cox Proportional Hazard model for preferred Marines with MCC-Type preferences. There are no controls applied to these models; no conclusions of causation should be drawn based on correlation in between assignment and years of service. Data source: USMC Total Force Data Warehouse.

D. SUMMARY

Incentive-based models are only effective when they elicit desired behavior from a given population. All too often, organizations offer uniform incentives to large groups of individuals with vastly differing needs and motivations. Speaking about the Marine Corps' talent management system, General Berger states, "currently, we target people via a mass fires approach, instead of more selective targeting" (USMC, 2019a). Blanket talent management strategies can waste resources on the wrong individuals, causing these methods to be both ineffective and costly.

My use of within-group analysis presents a clearer picture of which Marines might respond most positively to the use of preferential duty assignment as an incentive. In summary, my key statistical findings are outlined below:

- Enlisted Marines who are assigned to desired duty stations outperform their counterparts.
- The top third of Marines who are assigned to desired duty stations outperform their top-performing counterparts.
- Marines who prefer to serve in the FMF and are subsequently assigned to operational units outperform Marines with similar desires who are assigned elsewhere.
- Officers who receive desired duty assignments remain in the Marine Corps longer relative to those who do not.
- Top performers assigned to preferred duty stations serve in the Marine Corps longer than their peers.

As the results indicate, the three subgroups whose performance is most impacted by assignment to a preferred duty station are enlisted Marines, top-third performers, and those Marines with FMF-Type preferences. Improved retention is most highly correlated with top performers and officers. Consequently, these groups also represent the key demographics the Marine Corps is most interested in retaining. If the Marine Corps truly

wants to “use money like a focused weapon, and aim it at the exact individual we need” then the Marine Corps has found its target (USMC, 2019a, p. 7).

In the final chapter, I propose options for further research, outline my recommendations for policy change, and conclude this report with a synopsis of my research.

VI. FURTHER RESEARCH, RECOMMENDATIONS, CONCLUSION

A. FURTHER RESEARCH

As with most research, I am only able to conduct and capture a fraction of the analysis I am interested in within the confines of a single study. I believe there is a significant body of research into preference matching, performance, and retention in the Marine Corps that is waiting to be unpacked and examined. Below, I highlight my primary recommendations for expanding subgroup analysis of my findings, examining these same research questions through different lenses, and pursuing further related but differentiated research.

I recommend further sub-group analysis into my findings by PMOS, gender, dependent-status, rank, race, and ethnicity. Research into whether there are statistically significant differences in outcomes for Marines who obtained a first versus second versus third duty station preference could also contribute notably to this area of study. I also recommend grouping specific MCCs into other relevant categories such as likelihood of deployment, staffing precedence levels per MCO 5320.12H, and the four elements of the Marine Air-Ground Task Force. Due to the topical nature of talent management, follow-on research could expand the body of data to span 2000-2020 but could focus on only the top 10% or 20% of Marines to more closely examine the policy implications of utilizing duty assignment as an incentive for top performers.

There are certainly other relevant metrics for measuring performance and retention in the Marine Corps. Instead of conducting survival analysis utilizing YOS, for example, follow-on researchers should consider using separation rates at 5 and 10 years of service. I specifically recommend a more robust survival analysis be conducted that controls for observable variation between observations. Other metrics of performance to consider are rate of promotion, rate of disciplinary action, RELVALCUM, or ATR. These post-assignment measures of performance can also encompass five or ten years of FITREPs versus the three that I included. I recommend that further research be conducted into who is most frequently obtaining desired duty station preferences by PMOS, rank, gender,

ethnicity, and race and, inversely, which MCCs are most frequently being matched with Marines who prefer them.

I also recommend that further research be conducted into the feasibility of an automated duty-preference matching system, similar to the GOAT model designed by Alger (2019), or the viability of more market-based approaches such as that of the Army's recently employed ATAP system. The MMOA and MMEA also send out annual preference surveys to Marines who are due to PCS to determine their preferences. When I inquired about obtaining access to these surveys, I was informed that they are not retained. These surveys could provide more accurate depictions of the effects of obtaining a desired duty station than the FITREP duty station preferences do, because Marines know that their monitor is likely to actually consider the preferences listed on the survey when assigning orders, though this may in turn negatively impact random assignment. These MMEA/ MMOA surveys also pose an opportunity to solicit more qualitative feedback from Marines related to duty station preferences and assignment, such as whether or not they view choosing their follow-on duty station as an effective incentive.

B. RECOMMENDATIONS

1. Primary Recommendation

Based on the related literature, my analysis, and my key findings, my primary recommendation is that the Marine Corps begin collecting, retaining, and utilizing Marines' duty station preferences as it evaluates and refines its talent management and duty assignment processes. Though there is more research to be conducted, I believe that there is evidence to suggest that preferential assignment can be used to incentivize top-tier Marines to stay in and perform in the Marine Corps. To facilitate further analysis, I recommend that preference data be solicited and maintained separately from FITREPs to ensure the fidelity of responses. MMEA and MMOA monitors already collect assignment preference surveys from Marines who are due to move, and I recommend that these surveys be equitably distributed, standardized, maintained, and synthesized for further analysis. I believe that this is the best course of action if the Marine Corps is serious about talent

management. My recommendations to address interim or short-term shortfalls in terms of duty assignment preference collection can be found in the following sections.

2. Update FITREP Guidance and Form

The guidance related to Section 9, Duty Station Preferences, of a USMC FITREP is limited to six bullet points in the PES manual, two of which apply only to reservists. These bullet points leave a great deal of room for interpretation and subsequent errors in both perceived intent and data entry (USMC, 2018). I recommend that the Marine Corps publish clarifying guidance in the PES manual that specifies exactly how to fill out Section 9 so as to prevent errors in transcription. I also believe that the Marine Online module that is used for filling out FITREPs should be updated such that Marines may not enter a second or third duty station preference if they do not enter a first, as this is not an infrequent occurrence that creates interesting conundrums for promotion boards and analysts alike. I recommend that the Marine Corps publish an annual MARADMIN that defines each pre-populated Y-category and outlines which MCCs fall under each of these Y-categories. I also recommend that the Marine Corps routinely update these Y-categories to come into compliance with commonly accepted vernacular and relevant clusters of preferences. For example, Y13 "Command Duty Afloat (East)" is not a term that I or any of my peers that I polled are familiar with, nor is it a term defined by any Marine Corps publication I could find. I do believe, however, that there should be a Y-category for a Marine Expeditionary Unit command category and that that category should be defined either in the pre-populated menu or in a separate publication. These steps will alleviate a great deal of confusion surrounding the process for entering duty station preferences and improve the efficacy of the outputted data. However, these steps alone do not address the underlying issues related to the accuracy of duty station preferences on FITREPs.

3. Track and Maintain Marines' Preferences

Long term, I do not believe that the FITREP is the proper vehicle for collecting and applying duty station preferences. However, until the collection process is updated, I recommend that the Marine Corps clarify in the PES manual and via MARADMIN why it is collecting duty station preferences via FITREPs and how these preferences will be used.

As discussed previously, the duty preference section of the FITREP is optional and widely—as well as accurately—believed to be unrelated to the duty assignment process. Because these preferences are not considered for assignment but are being examined during an evaluation process, Marines have a stronger incentive to fill out Section 9 in accordance with the perceived preferences of their evaluators as opposed to their own desires. This hinders not only the fidelity of the preference data, but also the impetus to submit duty preferences at all. As such, I recommend that the Marine Corps clearly communicates the intent behind any collection of duty station related data and conducts, via independent survey, further research into the feasibility and likely reception of preference matching.

C. CONCLUSION

The results outlined in Chapter V indicate that duty assignment plays a role in the performance and retention of Marines. Preferential duty assignment may also prove to be a less costly incentive model for inspiring the Marines the nation needs to not only stay but continue to perform. Marine Corps policy makers should pay particular attention to the effect that preferred duty station assignment has on the performance of enlisted Marines, top-performers, and the Marines who want to serve in the operating forces. These are the Marines we need and want to fight our nation's wars, and the results indicate that preferential duty assignment has a particularly positive impact on their performance. Assignment to desired duty stations is also highly correlated with the retention of officers and top performers—the leaders that the nation needs to be making the difficult decisions both on the ground and at the strategic level. In the 2019 CPG, the Commandant states that "an incentives-based model would offer the ability to target incentives to specific individuals the Service wants to retain" (USMC, 2019a, p. 7). The results of this research indicate that preferential duty station assignment has potential to do just that.

APPENDIX: FITREP PRE-POPULATED DUTY STATION PREFERENCES

Y00	No Preference / As Directed
Y01	FMF Overseas
Y02	FMF Conus
Y03	FMF Hawaii
Y04	FMF West Coast
Y05	FMF East Coast
Y08	Post or Station East Coast
Y09	Post or Station West Coast
Y10	Post or Station Overseas
Y11	Security Forces - Atlantic
Y12	Security Forces - Pacific
Y13	Command Duty Afloat(East)
Y14	Command Duty Afloat(West)
Y15	Staff Duty Afloat(East)
Y16	Staff Duty Afloat(West)
Y21	Appropriate Level School
Y22	Top Level School
Y23	Intermediate Level School
Y24	Career Level School
Y26	Overseas with Dependents
Y27	Overseas without Dependents
Y33	I-I Duty
Y34	I-I Duty - 1st District
Y35	I-I Duty - 4th District
Y36	I-I Duty - 6th District
Y37	I-I Duty - 8th District
Y38	I-I Duty - 9th District
Y39	I-I Duty - 12th District
Y40	Recruiting Duty
Y41	Recruiting Duty - 1st District
Y42	Recruiting Duty - 4th District
Y43	Recruiting Duty - 6th District
Y44	Recruiting Duty - 8th District
Y45	Recruiting Duty - 9th District
Y46	Recruiting Duty - 12th District
Y47	OSO Duty
Y48	OSO Duty - 1st District
Y49	OSO Duty - 4th District
Y50	OSO Duty - 6th District
Y51	OSO Duty - 8th District
Y52	OSO Duty - 9th District

Y53 OSO Duty - 12th District
Y75 Joint Staff
Y76 Joint Staff - CONUS
Y77 Joint Staff - Overseas
Y78 Joint Staff - Asia
Y79 Joint Staff - Europe

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