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We don't need no Education: Effects of Degree Masking on Air Force Officer Promotion Outcomes

March 2022

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Prepared for the Naval Postgraduate School, Monterey, CA 93943

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ABSTRACT

The United States Air Force (USAF) implemented an Advanced Academic Degree (AAD) masking policy for officer promotion boards at the end of 2014. This policy prevented promotion boards from viewing degree information in Officer Selection Records (OSRs) as part of an initiative to focus board members on assessing job performance. This research analyzed how this policy affected promotion outcomes for different subgroups of officers. Using data for active duty USAF officers from 2007 to 2019, we leveraged descriptive techniques and linear probability models to determine how promotion rates changed over time for officers meeting O-4 and O-5 promotion boards while in-the-zone for promotion. We determined that the promotion premium of an AAD reduced about 50 percent across O-4 and O-5 promotion boards. Additionally, we found that non-AAD holding rated officers became significantly more likely to promote to O-4 following policy implementation, relative to their counterparts in support career fields. These findings suggest that the AAD masking policy potentially affected the type and quality of officers promoted by the USAF after 2014.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAD	advanced academic degree
AF/A1XD	Headquarters Air Force Human Resources Data Analytics and Decision Support Division
AFI	Air Force instruction
AFSC	Air Force specialty code
APZ	above-the-zone
BPZ	below-the-zone
CSAF	Chief of Staff of the Air Force
CSB	central selection board
DC	dental corps
DOPMA	Defense Officer Personnel Management Act
DOR	date of rank
DNP	do not promote
DP	definitely promote
HQ AFPC/DP2SPP	Air Force Officer Promotions Management Branch
IDE	intermediate developmental education
IPZ	in-the-zone
LAF	line of the Air Force
LPM	linear probability model
MBA	master of business administration
MOI	memorandum of instruction
OPR	officer performance report
OSB	officer selection brief
OSR	officer selection record
PRF	promotion recommendation form
RIF	reduction in force
SECAF	Secretary of the Air Force
SR	senior rater
TA	tuition assistance
TIG	time in grade

TIS	time in service
TR	training report
USAF	United States Air Force

I. INTRODUCTION

Do graduate degrees matter? The United States Air Force (USAF) has struggled with this question, at times masking advanced academic degrees (AADs) from officer promotion boards, while other times leaving them viewable for consideration. On the one hand, the USAF values education and spends millions each year sponsoring degree programs in everything from aeronautics to zoology—masking AADs in promotion decisions may reduce the incentive to pursue those graduate-level degrees. On the other hand, the USAF's promotion system is intended to advance high performers with "the highest potential to serve" (Cohen, 2021, para. 27). Masking AADs may focus reviewing officials on relevant job performance-based metrics, rather than distracting them with potentially unrelated credentials.

The USAF follows a closed, "up-or-out" system of talent management. Officers enter the force at low ranks and progress to higher grades through a tournament promotion process. Promotions are determined via promotion boards: panels of senior-ranking officials charged with reviewing Officer Selection Records (OSR) for eligible members and selecting the best qualified individuals. Promotion policies have progressed over time to reduce biasing information contained in the OSR, particularly with respect to race and gender. The USAF eliminated photographs from promotion consideration in 1995 and masked race and gender in 2002 (Military Leadership Diversity Commission, 2010). While demographic masking policies have remained unchanged, USAF leadership has vacillated several times on whether to include AAD information in the OSR.

Beginning in 1996, the USAF masked AAD information for officers eligible to promote to O-3 and O-4 AADs. At the time, leaders reasoned that this would reduce any misconception that AADs were unofficially required in order to promote. In doing so, they believed this would enable officers to complete an advanced degree "at the right time, for the right reasons" ("Policy Change Masks Degrees," 1996, para. 5). The USAF further extended AAD masking to those meeting O-5 and O-6 promotion boards in 2006 based on senior leaders' concern that leaving that information viewable to promotion boards merely incentivized "square-filling," a frivolous degree-chasing mentality, as opposed to

encouraging officers to pursue career-relevant degree programs ("Promotion Boards Will Not See Degree Info," 2005, para. 1). This policy reversed in 2008 as part of a renewed focus on encouraging human capital acquisition in the officer corps before reinstitution in 2014 (Moseley, 2006).

The AAD policy seesawing in the USAF relates to a broader debate about the returns to advanced education. Under one view, pursuing higher levels of education develops human capital. The more education one receives, the more they enhance their knowledge, skills, and abilities, which should make them more productive workers. Conversely, signal theory proposes that degrees help to distinguish high- and low-productivity individuals since more talented people will find it easier to complete degrees. However, the education itself provides no inherent benefit. Hiring or promotion officials may then use degrees as a proxy for productivity levels when they may be unable to directly observe productivity. Returns to education under this view are consequently based upon the signal provided to employers, as opposed to actual enhanced productivity levels.

This paper seeks to explore how AAD masking policies influence promotion outcomes. The USAF adjusts its policies in order to affect officer behavior in certain ways. During periods when AAD information has been unmasked on promotion boards, leadership highlights the value of developing intellectual capital. Over periods of masking, policy tends to revolve around providing officers more flexibility to pursue a degree at a time of their choosing. Less attention, however, has been paid to how these masking policy changes affect how promotion board members perceive and grade records. Under periods of unmasking, were board members relying on AAD information as a signal for assumed productivity? And, when masked, did the lack of degree information result in changes to the types of individuals selected for promotion as board members relied more closely upon performance-based metrics within the OSR?

A. PROBLEM STATEMENT

Upon announcing AAD-masking in 2014, then-Chief of Staff of the Air Force (CSAF) General Mark Welsh framed his underlying motivation behind the pivot in masking policy, stating his desire to "set clear expectations and ensure that, where possible,

[the USAF] give time back to our officers" (*Air Force Magazine*, 2014a, para. 1). The USAF asserts that sustained job performance is the most important criteria for promotion; however, ambiguous AAD policies drove a perception that tertiary characteristics, such as completing an AAD, could serve as critical differentiators within the OSR. While the USAF has consistently stressed the importance of continuous education for officers, leadership became concerned that leaving AADs unmasked on the OSR incentivized the pursuit of "square-filling" degrees, which have minimal overlap with the USAF mission ("Promotion Boards Will Not See Degree Info," 2005, para. 1). Welsh summarized this sentiment in stating "everybody's free time was taken and families were being dramatically impacted…[and] I'm not sure that job performance was getting any better," (*Air Force Magazine*, 2014b, para. 1).

Welsh's 2014 policy successfully communicated expectations to the officer corps, while supplying officers with additional time and flexibility to earn a master's degree if they needed it. However, it remains unclear how this information affects the types of officers the USAF promotes. Are the same caliber officers being advanced through the ranks regardless of masking status? Has the 2014 policy change affected certain types of officers, differentiated by gender, race, or AFSC, more so than others? Simply put, analysis is required to understand how changes to AAD policies affect promotion outcomes across the officer corps.

B. RESEARCH QUESTIONS

How has the 2014 AAD-masking policy affected officer promotion outcomes for AAD holding officers? To what extent have promotion outcomes differentially varied by different subgroups across the USAF (AFSC, gender, fully-funded degree holders, etc.) as a result of the 2014 AAD-masking policy?

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II. BACKGROUND

The following section outlines the USAF officer promotions process. We begin by describing the USAF officer management process, as outlined by the Defense Officer Personnel Management Act (DOPMA). We then outline the determinants of eligibility for promotion to the next highest grade in the USAF. Finally, we detail how the USAF staffs and regulates formally convened promotion boards, before discussing the history of data masking on the Officer Selection Record (OSR).

A. OFFICER MANAGEMENT AND AFSC OVERVIEW

Established in 1980, the Defense Officer Personnel Management Act (DOPMA) prescribes core guidelines governing officer career management across all services. Five core features of DOPMA were detailed in a Center for Naval Analyses report, and are summarized below (Parcell & Kraus, 2010):

1. Closed System: Apart from specialized career fields (medical, chaplain, legal), new officers are accessed into the military at low grades. Higher grades are filled through an internal promotion process.
2. Personnel Pyramid: Officer ranks follow a pyramid-shaped structure: there are fewer billets at higher ranks and more billets at lower ranks.
3. Up-or-Out Career Flow: Promotion systems are designed such that if an officer is not selected for promotion during a prescribed eligibility window, they must eventually separate from the military.
4. Seniority-Based Promotion: Eligibility for promotion is primarily determined by minimum time in grade (TIG) requirements.
5. Service Uniformity: DOPMA regulations apply to all military services, though each service has the discretion to implement their promotion systems within these prescribed boundaries as they see fit.

B. USAF PROMOTIONS OVERVIEW

Like its sister services, the USAF follows a tournament promotion system, in line with the theory outlined by Lazear and Rosen. Lazear and Rosen's 1981 research described a hierarchical promotion system in which positions are largely fixed, and in which pay is based upon position or rank. Similarly, the USAF promotes its officers into limited funded vacancies in line with DOPMA. Additionally, all officers of a specific rank earn the same base pay. While certain career fields may earn special pay and incentives due to dangers inherent to their position, officers must promote to higher grades if they hope to earn a higher salary. Asch and Warner (1994) expand on this point, arguing that pay spreads between rank in the military serve as the primary incentive for military personnel to work hard, while inducing the best people to be retained.

Until 2020, all LAF career fields competed for promotion against one another. As an example, this implies that eligible F-16 pilots may have competed against civil engineers for the same limited promotion opportunities. The USAF overhauled the LAF category in 2020, breaking it into six distinct promotion categories: air operations and special warfare, space operations, nuclear and missile operations, information warfare, combat support, and force modernization (Losey, 2019b). This adjustment intends to pivot the USAF away from a "one-size-fits-all" mentality of officer development, enabling career fields to specialize how they develop, grow, and promote their officers.

For LAF-designated career fields, promotion eligibility is determined by time-in-grade (TIG), in line with DOPMA guidance. Promotion from the rank of Second Lieutenant (O-1) to First Lieutenant (O-1) typically occurs following two years TIG as an O-1, and promotion from O-2 to Captain (O-3) occurs following two years TIG as an O-2. Neither of these promotion opportunities require a formally convened promotion board; rather, eligible officer records receive an administrative review. Barring significant disciplinary issues, promotion occurs so long as an officer meets the TIG criteria. Formally convened promotion boards staffed by high-ranking officers traditionally begin once eligible to promote to Major (O-4), which generally occurs after reaching four years TIG as an O-3 and continue in a similar pattern for all remaining promotion opportunities over the career of an officer.

Historically, the USAF designated promotion eligibility windows for officers in which they pass through a series of zone designations each year they meet a board: "below-the-zone," (BPZ) "in-the-zone," (IPZ) and "above-the-zone," (APZ). Officers were generally given two years of BPZ eligibility, and approximately two percent of officers selected for promotion were allowed to be selected from the BPZ pool at each promotion board (Naegele, 2019). Due to the competitiveness and limitations placed on BPZ advancement, BPZ records were scored separately from IPZ and APZ records which competed directly against each other. While the USAF eliminated the BPZ designation in 2020, the officers analyzed as part of this study all required formal zone designations for boarded promotion opportunities.

C. PROMOTION BOARD PROCEDURES

Membership on a Central Selection Board (CSB) is intended to reflect the demographics of the promotion eligible population (AFI 36-2501, 2020). In other words, board membership should proportionally mirror the number of eligible females and minorities while adequately representing the AFSCs competing at the board. CSB members receive on-site training prior to the physical commencement of a promotion board. This training includes AFSC-specific briefings regarding what qualities or career progression-based milestones are valued or required by each respective AFSC. Furthermore, CSB members receive a Memorandum of Instruction (MOI) written by the Secretary of the Air Force (SECAF). This MOI contains specific instructions from senior USAF leadership detailing any qualities of particular importance to be heavily weighted within records, or whether certain personnel information should be disregarded in the record scoring process.

Per AFI 36-2501, promotion records are scored on "a best-qualified basis unless otherwise directed by SECAF" (2020, p. 18). Furthermore, eligible officers only compete against others within the same competitive category as them. For example, officers within the Dental Corps (DC) only compete against other DC-officers, not against LAF-designated officers. Board members score records through an electronic, secret ballot process using the following scale:

Table 1. USAF Promotion Scoring Scale. Source: AFI 36-2501 (2020).

Score	Potential
10.0	Absolutely superior
9.5	Outstanding
9.0	Few could be better
8.5	Strong
8.0	Slightly above average
7.5	Average
7.0	Slightly below average
6.5	Well below average
6.0	Lowest

Board members only discuss specific records if a significant disagreement has been identified through the "split" process. Splits refer to a difference in scoring over the same record by two or more board members in which a gap of two or more points exists in the numeric score. When a split occurs, board members verbally discuss the related record until the split is resolved or when one of the members with a split score adjusts their score to eliminate the two-point gap.

Following completion of the scoring process, records are arranged by aggregate score into an order of merit. Based on the promotion quota for the board, a "cut line" is established on the order of merit. Officers with scores above the cut line are recommended for promotion, while those below are passed over. Unlike typical promotion practices observed in the private sector, the effective date of promotion for a selected officer is not the same as the date of promotion notification. Prior to 2020, officers selected for promotion were assigned a line number which was determined by seniority in service. Over the following year, line numbers promote in staggered increments each month. In 2020, the USAF established "merit-based reordering" and eliminated the seniority-based line number system (Losey, 2019a). Merit-based reordering enables officers who scored higher in the board-determined order of merit to promote sooner in the promotion cycle. This update to the process is intended to incentivize performance on the part of officers, as this means top performers have improved opportunities to promote sooner.

D. OFFICER SELECTION RECORDS

Promotion board members review an Officer Selection Record (OSR) for each eligible officer, which contains all Officer Performance Reports (OPRs) and Training Reports (TRs), decoration citations, and adverse information. Eligible officers may also submit personal letters to the board in the event that relevant information is needed to augment the OSR. Furthermore, each promotion package includes a Promotion Recommendation Form (PRF), a cover sheet written by the eligible officer's Senior Rater (SR) and an Officer Selection Brief (OSB). The OSB serves as a one-page summary of an eligible officer's career, listing the member's decorations, duty history, development education background, and education information, among other basic service information. An example OSB is included in Appendix C. The PRF contains messaging from the SR directly to the promotion board which reflects "performance-based differentiation and characterization of the eligible officers' potential to serve in the next higher grade," (*Air Force Introduces Two-Line PRF*, 2019, para. 5). Widely considered to carry significant weight in promotion boards, PRFs require SRs to assign each eligible officer a rating of "Do Not Promote," "Promote," and "Definitely Promote," the latter of which is a competitive rating assigned to a limited number of eligible officers at each base.

Each officer typically only has one year of IPZ-eligibility, and if they are passed over for promotion continue to meet the board as an APZ-designated officer each year thereafter until they are selected for promotion, voluntary separate, or are directed to leave the service. A 2020 update to the officer promotions process eliminated the BPZ-category to reduce harmful "fast-tracking," a result which lent itself to lessened development opportunities for more senior officers. This move was one of several planned out by USAF leaders in an effort to eventually transition to a "zone-agnostic" promotions process, in which officers will be provided with a five-year promotion eligibility window without any zone-related designation (Naegele, 2019). This update intends to eliminate stigmas associated with BPZ or APZ labels, thereby enabling greater opportunities for "late bloomers" while ensuring that officers are given more time to professionally develop.

E. DATA MASKING POLICIES

In an effort to standardize the information made available for each eligible officer and to reduce any potential bias among board members grading the packages, military services often employ "masking" mechanisms on promotion records. Masked elements are typically applied to demographic qualities within the OSR determined to be irrelevant in assessing sustained job performance that may otherwise draw unconscious bias in the overall package grade. Each service differs slightly in what they choose to mask or make unavailable within the OSR. The Army, Marine Corps, and Navy, for example, required the inclusion of photographs for officer promotion boards through 2020, while the USAF eliminated photographs from records in 1995 (Military Leadership Diversity Commission, 2010). The USAF also eliminated the use of explicitly reporting race or ethnicity in 2002 (Military Leadership Diversity Commission, 2010). Additionally, elements such as marital status, number of dependents, or raw scores from physical fitness tests have been removed from. Of note, however—an officer's outright failure of a physical fitness test is grounds for inclusion within the promotion record, as maintaining fitness standards is considered to be a critical element of officership.

F. ADVANCED ACADEMIC DEGREES

Advanced Academic Degrees (AADs) include postgraduate- or doctoral-level degrees as well as certain professional certifications. Officers have several pathways through which they can pursue graduate-level education. The military subsidizes advanced education for military members primarily through Tuition Assistance (TA). Degrees pursued using TA require the officer to maintain their typical full-time military duties, completing coursework in their personal time. TA provides military members up to $250 per credit hour, up to a maximum of $4,500 total per fiscal year (Air Force Personnel Center, 2021). Many civilian institutions provide additional military discounts to their degree programs, which further reduces the potential cost of a degree to a military member. TA incurs a service commitment requirement of two years following completion of courses funded through TA (Air Force Personnel Center, 2021). This service obligation runs concurrent to any existing service obligations that the servicemember already holds.

Alternative to subsidized opportunities such as TA, each military service offers a limited number of fully funded degree programs (Air Force Institute of Technology, 2021). If selected for a fully funded program, officers are administratively assigned to an academic institution and attend classes as their full-time job, forgoing their typical military duties. Officers selected for these types of programs receive a vectored outplacement following graduation, and also incur additional years of service commitment.

Pursuing AADs by way of graduate-level education has long been assumed to improve the capabilities of the officer corps through enhanced critical thinking abilities, technical competence, and continued educational broadening. The relevance of AADs in considering metrics of performance, however, has long been a contentious issue. While the other military services include AAD-completion information within their version of the OSB, the USAF has historically waffled on its inclusion.

AADs were first masked from records meeting O-3 or O-4 promotion boards in 1996, an effort that then-Chief of Staff General Ronald Fogleman stated would "level the playing field" for officers in career fields which "do not enjoy the same opportunity for off-duty education that others do," ("Policy Change Masks Degrees," 1996, para. 4). In 2006, this policy was extended to officer records meeting O-5 and O-6 boards by General John Jumper. Announced in 2005, General Jumper's policy stemmed from a concern over the pursuit of "square-filling degrees," or a supposition that officers were "chasing a degree just to get promoted," even if that degree carried little relevance to the technical USAF mission set ("Promotion Boards Will Not See Degree Info," 2005, para. 5).

General Jumper's policy was short lived, however; his successor, General Michael Moseley, reinstated the inclusion of AADs for all boarded promotion opportunities beginning in 2008. General Moseley acknowledged the risk related to encouraging "square-filling" degrees but argued that masking them on the OSB had an unintended consequence of reducing the aggregate pursuit of advanced education. In other words, General Moseley believed the "intellectual throw weight" earned from furthered advanced education outweighed any negative aspects associated with square-filling (Moseley, 2006, para. 5).

General Moseley's policy endured longer than his predecessor's version but was reversed again in 2014 by General Mark Welsh. In this latest iteration of AAD-related promotion policies, AADs have again been masked from promotion records meeting all boards below O-6. While General Welsh noted the importance of advanced academic degrees in officer development, this policy change intended to allow officers greater time to earn a degree while enabling them to prioritize job performance and work-life balance at ranks lower than O-6 (*Air Force News*, 2014). This report attempts to analyze differentials in outcomes based upon this latest round of masking AADs in USAF promotion boards.

G. CONCLUSION

Officer promotion policies are intended to reduce subjectivity employed by board members so that the highest quality performers have the greatest likelihood of selection. Policy design is a difficult and imperfect task, as evidenced by the consistent tweaking of data masking procedures employed by the USAF. AAD-masking has arguably been the most contentious of data-masking policies, as the USAF has reversed its stance on the matter multiple times over the last three decades.

The 2014 AAD-masking policy has endured since its implementation and appears to have been largely successful in meeting the communicated intent of providing officers greater time and flexibility to earn an AAD. However, the USAF has yet to consider the potential unintended consequences of this policy. How did the removal of AAD information from the OSR affect the selection decisions of promotion board members? Furthermore, did the masking policy cause any changes in separation behavior on the part of certain officers? This study attempts to explore these questions, and in doing so, supply policymakers with improved information about the ramifications associated with implementing data-masking policies, for better or for worse.

III. LITERATURE REVIEW

While limited research specific to the USAF's 2014 AAD-masking policy exists, economists have long debated the potential returns to advanced education. The following chapter provides a summary of relevant research whose conclusions lay the framework for this study. We begin by describing foundational papers that defined theories of human capital and signaling. Next, we outline the findings of more recent civilian research focused on the effects of data-masking on decision making. Finally, we summarize the key findings from military research related to data-masking and the predictive nature of AADs on performance metrics.

A. HUMAN CAPITAL DEVELOPMENT AND SIGNALING THEORY

As the USAF has grappled with the relevance of AADs in the OSR, economic research has similarly attempted to determine the returns to college and graduate levels of education. On the one hand, firms should encourage the development of human capital in the interest of making employers more efficient and effective. From an economic perspective, human capital can develop in many ways, whether that be through on-the-job training, earning technical certifications, or as is explored in this paper, seeking formal education opportunities.

In perhaps the most seminal work on the subject, Becker (1993) breaks down forms of human capital development into two categories: specific human capital, in which knowledge acquired relates directly to the firm at which they work and is not transferable, and general human capital, in which skills are transferable outside of the firm. Furthermore, he linked heightened development of human capital, particularly that of formal education, with increased income, concluding that college graduates earn significantly more. While acknowledging the risk of "credentialism," he posited that the increased income related predominately to higher ability levels on the part of college graduates (Becker, 1993).

While Becker established the link between earnings and higher education levels, recent research increasingly points to tradeoffs associated with credentialism, or signaling and screening qualities. Initially popularized by economists such as Spence (1973) and

Stiglitz (1975), employees are motivated to invest in human capital such as AADs as a direct result of asymmetric information between them and employers. In simpler terms, signaling arises in employment schemes in which employers may be unable to directly observe the productivity of employees, leading to easily observed attributes or characteristics about employees carrying greater weight in hiring or promotion. Altonji and Pierret (2001) found evidence that firms use easily observable information about job applicants to form assumptions about their productivity, and then continuously revise the initial assumptions formed as actual productivity is directly observed. In other words, pay levels may eventually reflect observed productivity levels, but are initially heavily dependent on easily observable characteristics which employers actively screen for.

Education has commonly been cited as one such easily observed characteristic, as employers use information related to the education level of an employee as a proxy for productivity, competence, or potential. From the perspective of an employer, screening for such information enables them to efficiently distinguish between human capital levels of a pool of applicants. Higher education levels may then be assumed to translate to higher on-the-job productivity. In an analysis of pre and post wages in MBA programs, Hussey (2012) attempted to separate the degree to which wage levels are influenced by screening versus enhanced human capital. He hypothesized that if wages were more strongly related to screening vice human capital, pre-degree experience would negatively predict post-degree wages. Although wage data were only available up to six months post degree, the results pointed toward a consistently large negative relationship between pre-MBA work experience and returns to the degree, suggesting that screening plays a larger role in returns to MBA programs than enhanced human capital. This implies that much of the observed monetary benefit from earning degrees relates to how employers use them as a screening mechanism for ability.

Knowing that employers are screening for higher education levels, employees have greater incentive to seek advanced degrees to serve as a positive discriminator or signal on their record. In the case of military promotion boards, this theory lends itself to the risk of "box-filling" as officers may seek degrees that may not directly relate to their operational

job or may explore the path of least resistance by choosing to earn a degree from institutions with lesser reputations or lower rigor than others.

This paper aims to empirically explore how promotion board members change their decisions based on AAD masking policy changes. Theoretically, if board members base their selection decisions upon the quality of performance observed in eligible records, promotion rates for those with or without AADs should remain relatively constant, regardless of masking. If, however, board members are treating AAD-completion as a signal for productivity, we would expect to observe comparatively higher promotion rates for those with AADs when this information is made available to the board.

B. CIVILIAN MASKING STUDIES

Masking attributes of employees in an effort to reduce bias or focus hiring authorities on the most relevant performance information has long been practiced in the private sector. In recent years, researchers have paid greater attention toward analyzing how potential statistical discrimination affects outcomes such as the likelihood of being hired, probability of promotion, and wage differentials. In the context of hiring and promotions, statistical discrimination refers to how the availability, or lack thereof, of demographic characteristics causes the selecting authority to draw certain conclusions about an applicant which may in turn affect their propensity to be selected. In particular, demographic information such as race and gender have been heavily researched as potential statistical discriminators which, when masked, cause drastically different outcomes as opposed to if that data were made available.

In a particularly famous study, Goldin and Rouse (2000) compared the selection results of traditional auditions to blind auditions within orchestras to test for gender discrimination. They found that women increased their probability of advancing in successive rounds of orchestra auditions when their identity was screened in the blind audition process. Though several of their estimates lacked statistical significance, the raw magnitude of the effect led them to conclude that traditional orchestra audition processes had not been impartial and suggested that further instituting blind auditions may help eliminate gender-based hiring practices.

More recent studies have evaluated the effects and unintended consequences related to "ban the box" policies. These policies prohibit employers from asking job applicants about their criminal history with the intention of improving legal pathways to employment for ex-convicts. Though positive in intentions, research suggests this leads to the opposite result, as employers appear to become more likely to statistically discriminate based on race as a proxy for criminal history. Agan and Starr (2018) used a difference-in-difference design to test this in New Jersey and New York City before and after the institution of ban-the-box policies. While they determined that, prior to the institution of such policies, applicants with criminal histories were significantly less likely to get hired, their analysis more importantly revealed disproportionate hiring effects between white and black applicants after the policies went into place. Specifically, following the introduction of ban-the-box policies, white applicants were 43 percent more likely than black applicants to receive application callbacks, suggesting that masking criminal histories caused employers to rely on racially-based stereotypes and assumptions in hiring decisions.

This study intends to exploit a similar design in order to assess the effects of masking AAD information for USAF officers. As the aforementioned studies indicate, limiting the information made to hiring officials drastically affects selection outcomes, for better or for worse. While masking degree-related information may not lend itself directly to the idea of statistical discrimination on the grounds of racial or gender stereotypes, these studies clearly demonstrate the potential consequences inherent in establishing masking policies. Furthermore, these conclusions raise questions related to how certain groups broken out by gender, race, or career field may differentially experience effects related to these policy changes.

C. OFFICER PROMOTION BOARD STUDIES

The impact of the USAF's 2014 masking policy has not been extensively researched to date. However, other military research has attempted to explore the impact of other forms of data masking employed at officer promotion boards. Additionally, prior research has looked at the predictive impact of graduate education on performance and promotion outcomes, providing valuable conclusions in support of this study.

A study conducted by Ahn, Niven, and Veilleux (2021) assessed a recent example of data masking in U.S. Navy promotion boards. Their research analyzed the impact of the Navy's elimination of promotion zones on the grounds of determining if prior inclusion of below (BPZ), in (IPZ), or above (APZ) zone designators swayed promotion decisions by board members. They found that the masking of zone designators led to increased probability of promotion for both BPZ and APZ zone candidates, while simultaneously reducing promotion probability for those IPZ. These findings suggest that, in years when zone was unmasked, board members discriminated between records on the basis of past promotion board results (APZ) and future board eligibility (BPZ).

This is suggestive of the importance and potential weight of irrelevant information in military promotion boards. Zone designators are not indicative of past performance, the quality which board members are expected to base their scoring decisions on. However, when the information is made available to board members, their assessment of the individual changes, subsequently impacting overall promotion decisions. While theories of human capital lend themselves in support of AADs enhancing the capabilities and subsequent performance of an individual, the signaling tradeoff of such degrees could cause similar statistical discrimination on the part of USAF board members.

Bowman and Mehay (1999) considered the relationship between graduate education and on-the-job performance within the Navy by exploring quantitative supervisor ratings as well as promotion results for the first boarded rank of O-4. Their initial results indicated that AAD holders' promotion probabilities were 10 to 15 points higher than those without. Furthermore, if the officer earned their AAD through the Navy's fully funded program, their promotion probabilities increased even more, by 15 to 17 points. In spite of the initial conclusion that AADs have a strong positive relationship with promotion probabilities, the authors attempted to quantify the degree to which this relationship is related to AADs themselves, versus the degree to which this relationship is affected by unobservable qualities of an officer which causes them to be more likely to promote in the first place. In this stage of their analysis, the "selection-corrected" estimate reduced by up to 50 percent.

These findings connect to two critical implications in the analysis conducted within this paper. First, though the results of Bowman and Mehay's work is Navy-centric and slightly dated, we should expect to see their broad findings directly translate to the USAF. Their findings suggest graduate education positively predicts probability of promotion for USAF officers. Additionally, they raise an important point regarding unobserved qualities of officers: an officer who is motivated enough to acquire an AAD is likely to have inherent unobserved qualities which may in turn make them more promotable in the first place. This paper attempts to address this by exploiting the 2014 policy change on masking as an opportunity to isolate the causal nature of AADs in promotion, utilizing assumptions that the USAF boards a demographically similar pool of officers each year.

Noting that AAD-masking policy in the USAF saw one of its reversals in 2006 in which AADs again became viewable on records, a 2007 study attempted to assess how AADs impact retention and promotion outcomes for LAF officers at the ranks of O-3 and O-4 (Pearson, 2007). Although the results were not statistically significant, the study concluded that possession of an AAD increased retention probability for officers. At both the rank of O-3 and O-4, however, the differential estimate observed did not hold practical significance. Similar to this study, the following report analyzes the impact of the 2014 policy change on promotion and retention outcomes, which should be a more robust design given the number of years of data available before and after this change. This design further extends the analysis by including the more competitive O-5 promotion boards, which should allow for greater variation to be exploited in analysis.

Switzer (2011) pursued a similar research question regarding tradeoffs between human capital augmentation and signaling. He hypothesized that, under the basic theory of human capital development, officers holding AADs should be more productive than those without AADs and would therefore promote at consistent and higher rates whether or not degree information is masked. His research considered promotion data before and after the 2008 policy which unmasked degree information. Analysis of raw promotion outcomes broken out into the groups of AAD-holders and non AAD-holders before and after the policy change suggested the opposite result. Specifically, when AADs were masked from 2005 through 2007, promotion rates to O-5 for those lacking a master's degree increased

from an average of 15.7 percent to 48.6 percent. Although only two years' worth of data was available between the 2008 unmasking of AADs and the writing of Switzer's report, a subsequent drop off in promotion rates for those lacking AADs occurred. In 2008, the first year in which AAD information was made available to board members again, selection rates for those without AADs dropped back down to 17.2 percent. This raw selection comparison led Switzer to argue that board members clearly discriminated in selecting officers for promotion on the basis of AAD status. Though a compelling argument, his conclusions were predicated upon raw outcomes and lacked robust controls. The following analysis attempts to incorporate these stricter controls to better isolate the effects of the 2014 policy change, while expanding the analysis by comparing how subgroups such as career field and gender are differentially affected.

D. CONCLUSION

Previous civilian and military promotion and hiring studies are clearly suggestive of the weight certain information carries in selection decisions. For example, masking zone designations in the Navy was shown to significantly improve the rates of promotion for those who would have traditionally been labeled as BPZ and APZ (Ahn et al., 2021). Considering that zone designators do not directly relate to an officer's job performance, the inclusion of such labels was likely irrelevant, albeit influential, information for board members. This paper does not attempt to argue if higher levels of education directly tie to job performance; rather, we attempt to focus on how promotion board members may or may not have been influenced by information not directly tied to job performance as a differentiator in selection decisions.

Switzer's paper (2011) provides the most relevant conclusions with respect to the purpose of this study. In the case of the USAF's 2005 AAD-masking policy and subsequent 2008 policy reversal, AAD information was clearly used as a discriminating factor in promotion board decisions as those without AADs observed significantly lower rates of promotion when AAD information was disclosed to the board. We expect to see a similar impact in evaluating the more recent 2014 policy.

USAF promotion polices are intended to provide measures of objectivity within the board process, while ensuring that the OSRs of eligible officers are appropriately scoped to highlight qualities most valued by the USAF. Since the design of data-masking policies directly impacts the information considered by promotion board members, it is critical for policymakers to understand how promotion outcomes have potentially changed as a result of policy adjustments. Furthermore, data-masking policies communicate to the officer corps at large what qualities are most valued by the service, which may, by extension, affect retention. This study attempts to build off of the conclusions of past research to determine if the 2014 AAD-masking policy significantly affected promotion outcomes.

IV. DATA AND METHODOLOGY

In this chapter, we first describe the data source and analytic sample. Next, we detail how we constructed promotion-specific variables for analysis. Finally, we specify the methodology and quantitative models we will estimate in the subsequent chapter.

A. DATA

We sourced data from the Headquarters Air Force Human Resources Data Analytics and Decision Support Division (AF/A1XD). The dataset included quarterly snapshots of all active duty USAF officers from 2007 to 2020, spanning demographic characteristics (gender, race/ethnicity, age, marital status, number of dependents), education (level of education completed, date of earning degree, institution attended, program of study), and career information (rank, AFSC, date of rank, commissioning source, duty title and location) for each officer. The sample contained observations for a total of 99,363 unique USAF officers. Table 2 details a breakdown for officers observed in the dataset from March 2015, the first quarter in which the AAD masking policy announced in 2014 would have taken effect.

Table 2. Descriptive Statistics by AAD Status, March 2015

	All	Has AAD	No AAD
Male	0.859	0.875	0.838
	(0.002)	(0.002)	(0.003)
White/Caucasian	0.791	0.806	0.771
	(0.002)	(0.002)	(0.003)
Black	0.050	0.052	0.047
	(0.001)	(0.001)	(0.002)
Asian	0.037	0.030	0.047
	(0.001)	(0.001)	(0.002)
Hispanic	0.064	0.057	0.074
	(0.001)	(0.001)	(0.002)
Age	33.278	37.284	27.749
	(0.033)	(0.037)	(0.031)
Married	0.702	0.849	0.498
	(0.002)	(0.002)	(0.004)
Mil-to-Mil Marriage	0.108	0.115	0.100
	(0.001)	(0.002)	(0.002)
Number of Children	1.058	1.526	0.412
	(0.006)	(0.008)	(0.006)
Service Academy Graduate	0.282	0.264	0.307
	(0.002)	(0.003)	(0.003)
Rated AFSC	0.411	0.433	0.381
	(0.002)	(0.003)	(0.003)
Time in Service (years)	10.808	14.853	5.225
	(0.033)	(0.037)	(0.030)
Master's Degree	0.580	1.000	
	(0.002)		
Engineering Masters	0.074	0.128	
	(0.001)	(0.002)	
Business Masters	0.162	0.280	
	(0.002)	(0.003)	
Observations	46877	27181	19696

Averages are a cross-section of the dataset taken in March 2015, the first set of observations following implementation of the 2014 AAD policy. Rated AFSCs include Pilots, Navigators, Air Battle Managers, and Remotely Piloted Aircraft Pilots.

Of particular note, AAD-holders tend to, on average, be ten years older than their non-AAD holding counterparts. Based upon the time investment required in order to earn an AAD, this is an expected finding. The older age associated with AAD-holders also contributes to observed higher rates of marriage (85 percent for AAD-holders compared to 50 percent for non-AAD holders), number of children (1.53 for AAD-holders compared to 0.412 for non-AAD holders), and time in service (15 years for AAD-holders compared to 5 years for non-AAD holders). Additionally, 13 percent of AAD-holders earned their master's degree in an engineering program, and 28 percent of AAD-holders earned a business-related master's degree.

B. PROMOTION VARIABLES

The dataset included each officer's rank at the time of observation, their current grade (DOR), and the zone designation they were in when they promoted to their current grade. We were able to infer promotion if an officer's rank changed from one quarter to the next. The sample, however, did not include specific board information, such as which boards an officer met throughout their career, or board outcomes (select/non-select). As a result, we used a combination of resources and assumptions to manually calculate specific board eligibility, zone designation, and selection status for each calendar year.

The Air Force Officer Promotions Management Branch (HQ AFPC/DP2SPP) provided DOR eligibility charts for 2015 through 2020. An example of one such chart is included in Appendix A. Developed each year by the USAF, these charts indicate which officers are eligible to meet a promotion board that year, driven by their current grade DOR. The charts further break this information out by each promotion zone. For example, O-4s who pinned on their rank between 1 January 2011 and 31 December 2011 were considered IPZ eligible for the CY16 O-5 promotion board (Air Force Officer Promotions Management Branch, 2016). This chart, paired with the current grade DOR variable in the dataset, enabled determination of O-4 and O-5 promotion board eligibility from 2015 through 2020.

Having determined the eligibility windows for each board from 2015 through 2020, we then tied observed promotions in the sample to specific boards. HQ AFPC/DP2SPP

supplied annual rank pin-on windows covering the sample date range, detailed in Appendix B. As discussed in Chapter II, officers selected for promotion typically experience a gap between notification of selection and pinning on their new rank. In some instances, a promotion board may meet in March, announce selects and line numbers in June, and stagger the official pin-on of selects over a twelve-month period beginning in August. Therefore, if an officer was both eligible for a specific board and was observed to have promoted over the related pin-on window, we identified that individual as a select from that board. If, however, an officer had been eligible but was not observed to have promoted over the designated pin-on window, we identified that member as a non-select. The process of identifying eligibility and applying the pin-on windows enabled identification of selects and non-selects, classified further into the appropriate promotion zone, for all boards from 2015 through 2020.

Due to the unavailability of DOR charts for the years preceding 2015, we made assumptions regarding eligibility to identify non-selects for the earlier boards. Once selected officers were matched to the appropriate board using the pin-on window charts, we constructed an approximate IPZ eligibility window for each unique board utilizing the current grade DOR of the selects. Officers who did not promote over a board's pin-on window and whose current grade DOR fell within the minimum and maximum date range of the selected IPZ officers' current grade DOR were classified as non-selected IPZ candidates for that board. APZ eligibility for O-4 and O-5 boards was assumed to encompass any current grade DOR dated more recent than the identified IPZ range, whereas BPZ eligibility for O-5 boards was assumed to span the two years before the IPZ range.

Due to the assumptions made in order to form these windows, some error exists within our estimated promotion outcomes. Appendix C provides context regarding how our calculated number of eligibles and selects compared to actual USAF statistics for years in which data were made publicly available through press releases. As seen in Figures 3 and 4, the number of approximated selects across all zones closely mirrors the number of selects historically announced by the USAF. Eligibility estimates for IPZ designations, depicted in Figures 5 and 6, also closely matched USAF statistics which is suggestive of

relative accuracy in identifying IPZ non-selects. APZ and BPZ eligibility estimates, however, saw greater deviation from USAF statistics, indicating a higher degree of error in our identification of BPZ and APZ non-selects. Although we see some variation, the relative accuracy in comparing our estimates to USAF statistics provides confidence in our analysis, particularly with respect to IPZ designations.

C. METHODOLOGY

We used a two-period difference-in-difference within a Linear Probability Model (LPM) in order to assess the impact of the 2014 AAD-masking policy on officers meeting promotion boards from 2008 to 2019. The LPM enables us to predict how the predictor variables impacts the probability of promotion. Under this set-up, our outcome variable is a binary variable, "Selected for Promotion," which equals to one if an officer is selected for promotion and zero if they are passed over for promotion. We also incorporated a binary variable equal to one if the promotion board took place between 2015 to 2019 (after policy implementation) or zero if the board took place between 2008 to 2014 (before policy implementation). Our model specification for this design is shown below:

$$Y_{it} = \beta_0 + \beta_1 Master_i + \beta_2 Mask_i + \beta_3 Master_i * Mask_i + \varepsilon_{it}$$

where Y_{it} equals the probability of promotion for officer *i* at time *t*, $Master_i$ equals one if *i* has a master's degree, and $Mask_i$ equals one if *i* met a promotion board after the masking policy went into place. The pre-policy master's degree premium is represented by β_1, and the post-policy master's degree premium is represented by $\beta_1 + \beta_3$.

An important caveat is that this framework does not necessarily satisfy the typical assumptions in a difference-in-difference approach. In a traditional set-up, changes are compared between a treatment group which is affected by a policy, and a control group which is not affected by the policy. In the case of our dataset, we lacked a pure control group that was not affected by the policy: all officers experienced masking of AAD status, whether or not they held an AAD. For example, prior to the policy implementation, the Academic Information section of the Officer Selection Brief (OSB) would show that an AAD-holding officer completed a master's degree, the institution the degree was earned from, and the year the degree was conferred. An officer without an AAD would still show

the Academic Information section during periods of unmasking; however, only their bachelor's degree would be shown. Following implementation of the policy, this section would appear blank for both groups of officers. Our use of non-AAD holders as a counterfactual may inflate the estimated effects, a possibility we explore later.

Another potential threat to the design is that the types of officers going up for promotion changed after the policy. To check this, we produce a descriptive table, Table 3, which shows the means of key variables within the dataset for officers who met O-4 and O-5 promotion boards before and after implementation of the 2014 AAD policy. Column (1) shows the means for officers who met promotion boards when AAD information was unmasked, or visible, while column (2) shows the means for officers who met promotion boards when AAD information was masked.

Table 3. Balance Table of IPZ Officers Meeting O-4 and O-5 Boards

Variable	(1) 2008 to 2014	(2) 2015 to 2019	(3) Difference
Male	0.888	0.871	-0.017***
	(0.316)	(0.336)	(0.000)
White/Caucasian	0.799	0.784	-0.014***
	(0.401)	(0.411)	(0.000)
Black	0.059	0.047	-0.012***
	(0.236)	(0.211)	(0.000)
Asian	0.022	0.040	0.018***
	(0.147)	(0.197)	(0.000)
Hispanic	0.059	0.065	0.006***
	(0.235)	(0.246)	(0.008)
Age	35.528	34.429	-1.098***
	(4.143)	(3.935)	(0.000)
Married	0.831	0.813	-0.018***
	(0.375)	(0.390)	(0.000)
Mil-to-Mil Marriage	0.122	0.130	0.009***
	(0.327)	(0.337)	(0.005)
Number of Children	1.427	1.252	-0.175***
	(1.340)	(1.336)	(0.000)
Service Academy Graduate	0.227	0.262	0.035***
	(0.419)	(0.440)	(0.000)
Rated AFSC	0.454	0.493	0.039***
	(0.498)	(0.500)	(0.000)
Master's Degree	0.731	0.753	0.023***
	(0.444)	(0.431)	(0.000)
PhD / Doctorate	0.015	0.015	0.000
	(0.122)	(0.123)	(0.839)
Engineering Master's Degree	0.076	0.098	0.022***
	(0.265)	(0.297)	(0.000)
Business Master's Degree	0.211	0.209	-0.002
	(0.408)	(0.406)	(0.506)
Observations	24,863	23,197	48,060

Note: Columns (1) and (2) show the averages and standard deviations (in parentheses) of the indicated variables for the periods before and after implementation of the 2014 AAD-masking policy, respectively. Column (3) shows the difference between Columns (1) and (2), with the p-value in parentheses. Only IPZ officers meeting O-4 and O-5 promotion boards are included in this table. See the rest of Chapter IV for more on the data sources.

Nearly all of the means shown in Table 3 have a statistically significant difference across the two time periods, with the exception of the average share of PhD-holders and

the average share of business-related master's degrees. The differences are practically small in magnitude, suggesting that similar types of officers met officers before and after implementation of the AAD-masking policy. For example, 89 percent of officers meeting boards between 2008 and 2014 were male, which slightly reduces to 87 percent between 2015 and 2019. However, the statistically significant differences indicates that the majority of these attributes should be controlled for within our model specification.

V. RESULTS AND CONCLUSIONS

The following section details our results and conclusions from analysis. We begin by addressing our first research question, determining if the 2014 AAD masking policy changed promotion outcomes for AAD holders and non-AAD holders. We then explore how promotion outcomes changed for various subgroups of USAF officers: fully funded degree holders, rated officers, females, and engineering degree holders. We conclude this chapter by providing our interpretation of our results, which are expanded upon in Chapter VI.

A. MASKING POLICY IMPACT ON AAD HOLDERS

1. Descriptive Results

Figure 1 shows the difference in IPZ promotion rates to the rank of Major (O-4) between AAD-holders and non-AAD holders, depicted as the share of eligible officers selected for promotion.

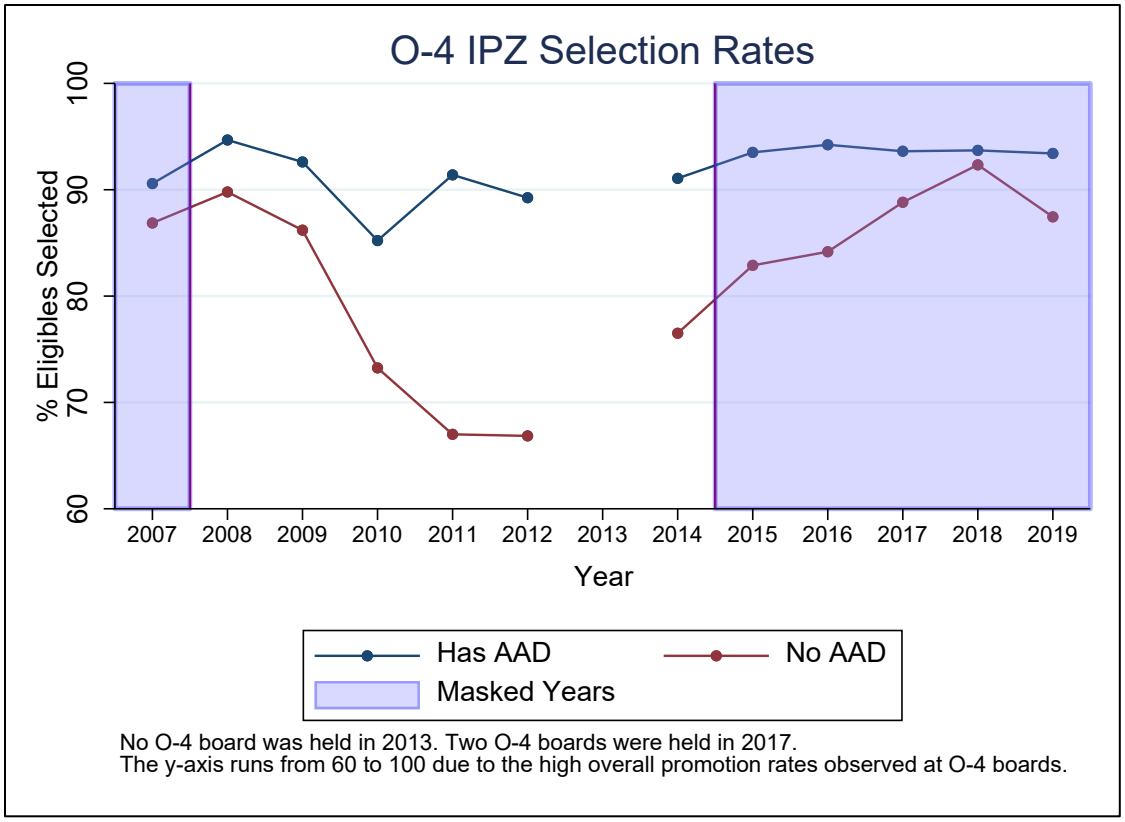


Figure 1. O-4 IPZ Selection Rates, AAD-Holders

AAD-holding officers consistently observe higher selection rates than their non-AAD-holding counterparts. Unmasking AADs, however, appears to widen the selection gap. Prior to implementation of the 2008 unmasking policy, those with AADs observed a promotion rate 5 percentage points higher than those without AADs. Following implementation, the selection rate gap widened to 22 percentage points in 2012. This gap immediately began to close once the 2014 masking policy went into effect, reducing to approximately 6 percentage points in 2019.

Overall, officers with AADs had an average selection rate of 91 percent from 2008 to 2012, while those without AADs had a rate of 77 percent over the same period. The average selection rates from 2014 to 2019 are 93 percent and 85 percent for the two groups, respectively. Across the two periods, non-AAD holders experience a simple difference of (85 – 77 =) 8 percentage points. If this were the causal effect of the 2014 AAD-masking policy, we then might estimate that masking increases the selection rate by (8 / 77 =) 10.4 percent.

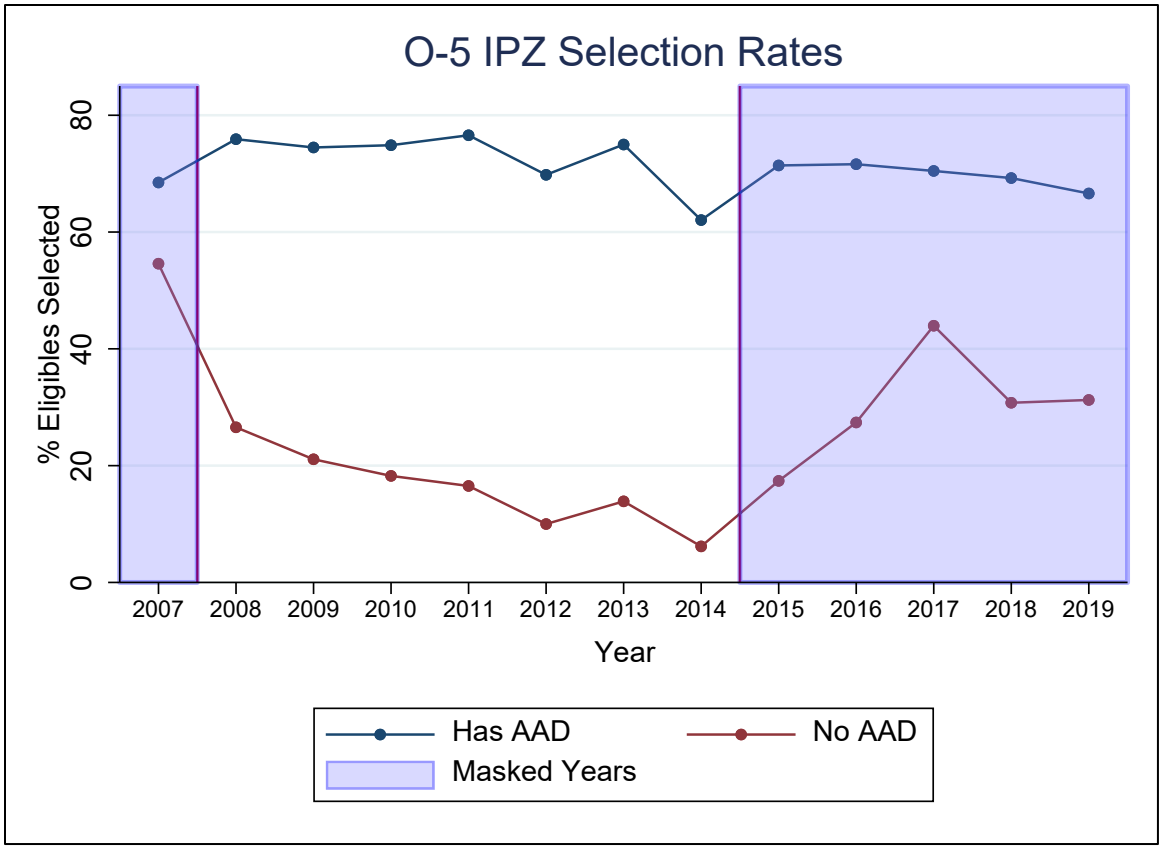


Figure 2. O-5 IPZ Selection Rates, AAD-Holders

Similar differences are observed in the O-5 promotion boards at Figure 2. Following the implementation of the 2008 policy that masked AAD information, leaving them viewable to promotion board members, IPZ promotion rates to O-5 for those with an AAD appear to observe a mostly stable trend, promoting approximately 75 percent of the eligible officers. Those without AADs, however, observe a noticeable downward trajectory between 2008 and 2014, beginning with a promotion rate of approximately 27 percent and steadily decreasing to approximately 6.2 percent.

Following the announcement of the decision to mask AADs beginning with 2015 boards, trends appear to reverse for both IPZ groups. Those holding AADs observe a small but consistent downward reduction in the promotion rate of approximately 5 percentage points across the period of 2015 to 2019. Those without AADs clearly fare better when this

information is masked: promotion rates jump to approximately 31 percent in 2019, a 406 percent increase, or an increase of more than 25 percentage points.

Overall, AAD-holding officers experienced an average selection rate of 74 percent for the O-5 boards held from 2008 to 2013, whereas their non-AAD-holding counterparts had a selection rate of 18 percent. From 2014 to 2019, the average selection rates shifted to 69 percent and 26 percent for the two groups, respectively. The simple difference across the two periods for non-AAD holders is 26 percent - 18 percent, or an increase of 8 percentage points. If this were the causal effect of the 2014 AAD-masking policy, we then might estimate that masking increases the O-5 selection rate for non-AAD-holding officers by 8 percentage points or a 48 percent increase from their pre-masking selection rate.

The raw descriptive results for IPZ-eligible officers meeting O-4 and O-5 promotion boards from 2007 to 2019 provide suggestive evidence that AADs are used as discriminators when viewable on promotion boards. In general, non-AAD holding officers consistently improved their promotion results when AAD information is masked on the OSR. One concern with this conclusion, however, is that there may have been a shift in the ratio of available promotion slots to eligible officers. If, for whatever reason, this increased substantially during the masking period, promotion boards may have been more likely to promote from the non-AAD holding pool for reasons unrelated to the policy change. We explored this possibility in Figures 3 and 4, which show the raw number of promotion slots (represented by the number of officers the USAF selected for each board) compared to the raw number of eligibles.

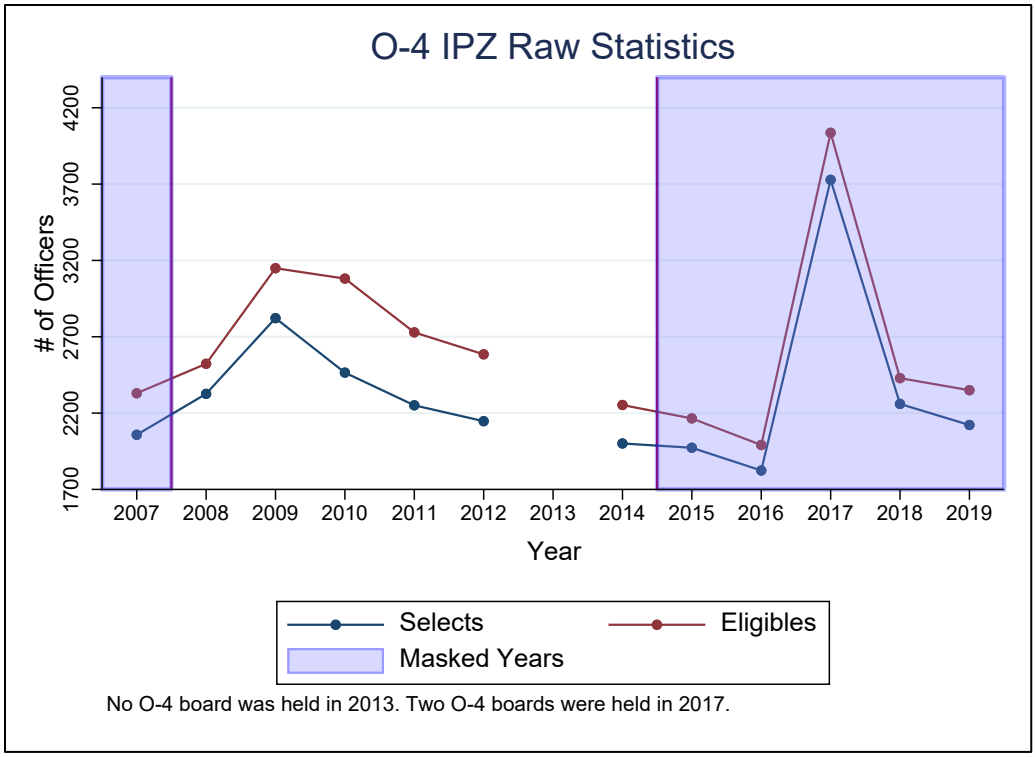


Figure 3. O-4 IPZ Raw Statistics

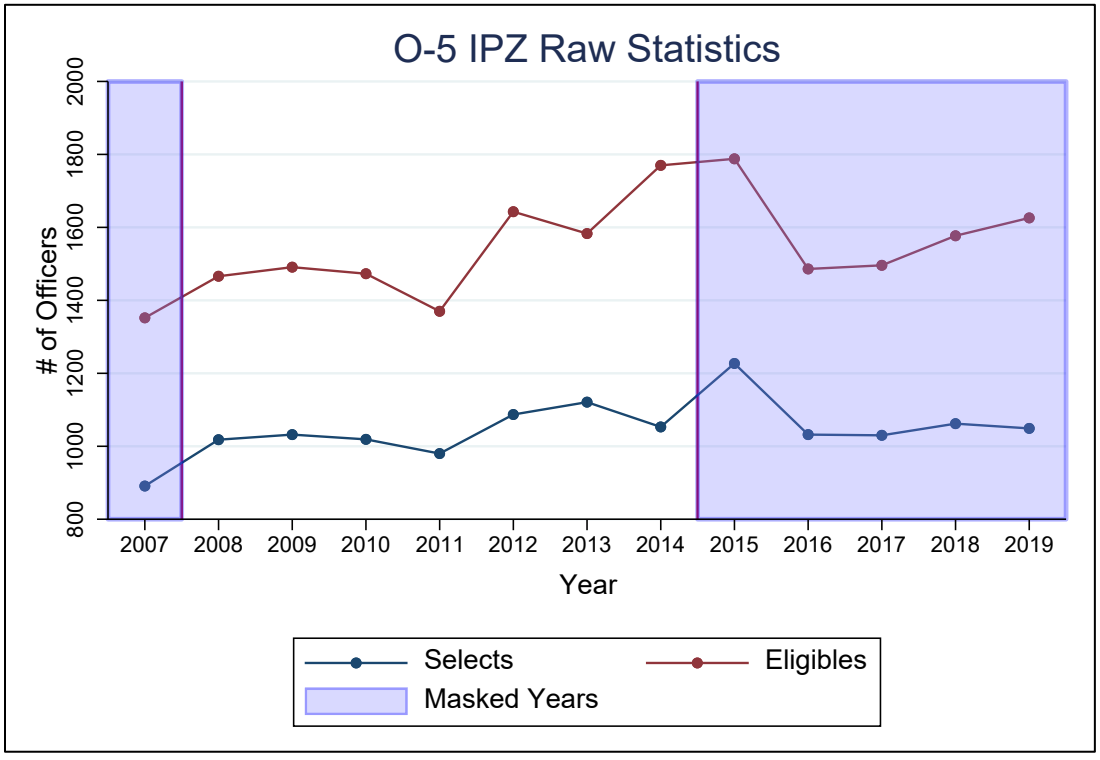


Figure 4. O-5 IPZ Raw Statistics

Figures 3 and 4 show stable and parallel trends in terms of the number of selects (available promotion slots) and eligibles (number of officers competing for those slots). While there are fluctuations for both O-4 and O-5 boards, we can see that the raw number of selects and eligibles moves with each other such that the ratio of selects to eligibles remains stable. Because selection decisions were not confounded by numbers of eligibles available to select, this supports our hypothesis that masking AADs affected promotion outcomes for non-AAD holders relative to AAD holders.

Other external factors may have influenced our descriptive results. For example, the USAF conducted a Reduction In Force (RIF) in 2013 due to sequestration-related budgetary cuts (JBSA-Fort Sam Houston Public Affairs, 2013). RIF-related actions included a combination of voluntary and involuntary separation initiatives, which may have affected the composition of individuals who remained in the military in the years immediately following. Furthermore, the USAF converted O-4 boards to a 100 percent opportunity in 2017 in an effort to close manning gaps observed across field-grade officer ranks (Air Force Public Affairs, 2017). Under this measure, eligible officers were effectively guaranteed promotion to O-4 so long as their record was clear of disciplinary information. While the increased promotion rates for non-AAD-holding officers meeting O-4 boards from 2017 to 2019 appears related to AAD-masking, this effect may be confounded by the changes in opportunity and competition. We explore this issue below in the regression analysis.

2. Model Results

We began with a simple regression with a binary outcome variable equal to one if an officer was selected for promotion, and zero if they were passed over. Our independent variables included an indicator for holding a master's degree, an interaction term between the master's degree indicator, an indicator for post-policy promotion board, and fixed effects for each promotion board. The results of this model are shown in Table 4.

Table 4. Regression 1 – Master's Degree Selection Rates, No Controls

	(1) Overall Selection	(2) O-5 Selection	(3) O-4 Selection
Master's Degree	0.217***	0.559***	0.133***
	(0.006)	(0.013)	(0.006)
Master's x Masked	-0.116***	-0.163***	-0.070***
	(0.008)	(0.026)	(0.008)
Selection Rate: No Master's	0.764	0.218	0.829
Observations	48059	18768	29291
R-Squared	0.106	0.082	0.044

Standard errors are clustered by officer ID and are in parentheses. All models absorb fixed effects for each promotion board ID. A binary variable for post-policy is omitted as part of the fixed effects. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In this simple model in Column (1), the premium of a master's degree for all promotion boards prior to implementation of masking was 0.217, meaning that officers holding a master's degree were 22 percentage points more likely to be selected for promotion than officers without a master's degree. After the policy was implemented, the premium of a master's degree was (0.217 – 0.116 =) 0.101 – or officers holding a master's degree were 10 percentage points more likely to promote than those without a master's degree. This suggests that the overall premium of a master's degree reduced by (0.217 – 0.101 =) 12 percentage points, or 53 percent.

When considering the overall selection rate for officers without a master's degree, we similarly observe that before the policy, AAD-holders were (0.217 / 0.764 =) 28 percent more likely to be selected. After masking implementation, AAD-holders were (0.217 – 0.116 / 0.764 =) 13 percent more likely to be selected. This is an overall reduction in premium of 15 percentage points, or 54 percent.

We observe similar differences when the regression outcome is adjusted to strictly O-4 boards or O-5 boards. Officers with a master's degree prior to masking were 13 percentage points more likely to promote than those without in O-4 boards and 56 percentage points more likely to promote than those without in O-5 boards. After masking

occurred, that premium fell by 7 percentage points in O-4 boards and 0.163 percentage points in O-5 boards – a reduction of 53 percent and 29 percent, respectively.

Our simple regression results support the hypothesis that the masking policy affected promotion rates for AAD holding and non-AAD holding officers. However, it is also possible that higher performing, non-AAD holding officers happened to meet promotion boards after the policy changed. To address this possibility, we next included a variety of demographic and career-based controls.

Table 5. Regression 2 – Master's Degree Selection Rates, With Controls

	(1) Overall Selection	(2) O-5 Selection	(3) O-4 Selection
Master's Degree	0.193***	0.400***	0.131***
	(0.006)	(0.013)	(0.006)
Masters x Masked	-0.102***	-0.069**	-0.068***
	(0.008)	(0.026)	(0.008)
Service Academy Graduate	0.002	0.013	-0.005
	(0.006)	(0.011)	(0.007)
ROTC Graduate	-0.013*	-0.010	-0.004
	(0.005)	(0.009)	(0.006)
Rated AFSC	-0.027***	-0.043***	-0.013*
	(0.006)	(0.010)	(0.006)
Pilot	0.047***	0.020	0.061***
	(0.006)	(0.011)	(0.006)
IDE Resident		0.145***	
		(0.007)	
Disciplinary Info	-0.713***	-0.539***	-0.773***
	(0.014)	(0.022)	(0.019)
Commissioning Year Group	0.028***	0.042***	-0.011
	(0.005)	(0.006)	(0.006)
Male	0.004	-0.030**	0.023***
	(0.006)	(0.011)	(0.006)
Age	-0.012***	-0.018***	-0.005***
	(0.001)	(0.001)	(0.001)
Minority	-0.037***	-0.042***	-0.026***
	(0.005)	(0.009)	(0.005)
Number of Children	0.003	0.001	0.001
	(0.002)	(0.003)	(0.002)
Married	0.062***	0.091***	0.047***
	(0.005)	(0.011)	(0.005)
Mil-to-Mil Marriage	0.010	0.019	0.005
	(0.005)	(0.011)	(0.005)
Selection Rate: No Master's	0.770	0.270	0.833
Observations	51741	20120	31621
R-Squared	0.142	0.123	0.100

Standard errors are clustered by officer ID and are in parentheses. All models absorb fixed effects for each promotion board ID. A binary variable for post-policy is omitted as part of the fixed effects. Officers meeting O-4 boards have not completed IDE; omitted this covariate in Columns (1) and (3). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We find that the original measured effect of the masking policy on AAD holders is relatively stable. When controls are added, officers holding AADs before implementation of the masking policy observe a 19 percentage point higher probability of promoting overall, a 13 percentage point higher probability of promoting to O-4, and a 40 percentage point higher likelihood of promoting to O-5 than their non-AAD holding counterparts. AAD-holding officers had a reduced promotion premium post-policy: their master's degrees provided a 9 percentage point premium overall, a 6 percentage point premium for O-4 boards, and a 33 percentage point premium for O-5 boards.

When we consider the overall selection rate for non-AAD holders (77 percent), we find that AAD holders were (0.193 / 0.77 =) 25 percent more likely to be selected prior to policy implementation. After masking occurred, this reduced to (0.193 – 0.102 / 0.77 =) 12 percent. This is an overall reduction of (25.1 – 11.8 =) 13 percentage points, or a (13.3 / 25.1 =) 53 percent reduced premium.

If we isolate this process to O-4 and O-5 boards individually, we find that AAD holders meeting O-4 boards were more negatively impacted than in O-5 boards. In O-5 boards, the overall selection rate for non-AAD holders was 27 percent from 2007 to 2019. During the unmasked window, this means that AAD holders were (0.4 / 0.27 =) 148 percent more likely to be selected. After masking, this dropped to (0.4 – 0.069 / 0.27 =) 123 percent premium, or (148.1 – 122.6 / 148.1 =) by 18 percent. In O-4 boards, non-AAD holders averaged a promotion rate of 83 percent overall. This means that, during masking, AAD holders were (0.131 / 0.833 =) 16 percent more likely to promote. Following policy implementation, their advantage fell to (0.131 – 0.068 / 0.833 =) 8 percent—an overall reduction of (15.7 – 7.6 / 15.7 =) 52 percent. Given that there is greater variation in AAD holding status at O-4 boards, earlier in officers' careers, this is a result that makes sense.

Other covariates used as controls within the model behaved as expected. For example, officers meeting O-5 boards who also attended their Intermediate Developmental Education (IDE) in-residence were 15 percentage points more likely to promote than their counterparts who completed IDE in-correspondence. Selection to attend IDE in-residence is a highly competitive designation, and we therefore expected this to be a positive predictor of promotion. Disciplinary information within a promotion record, however,

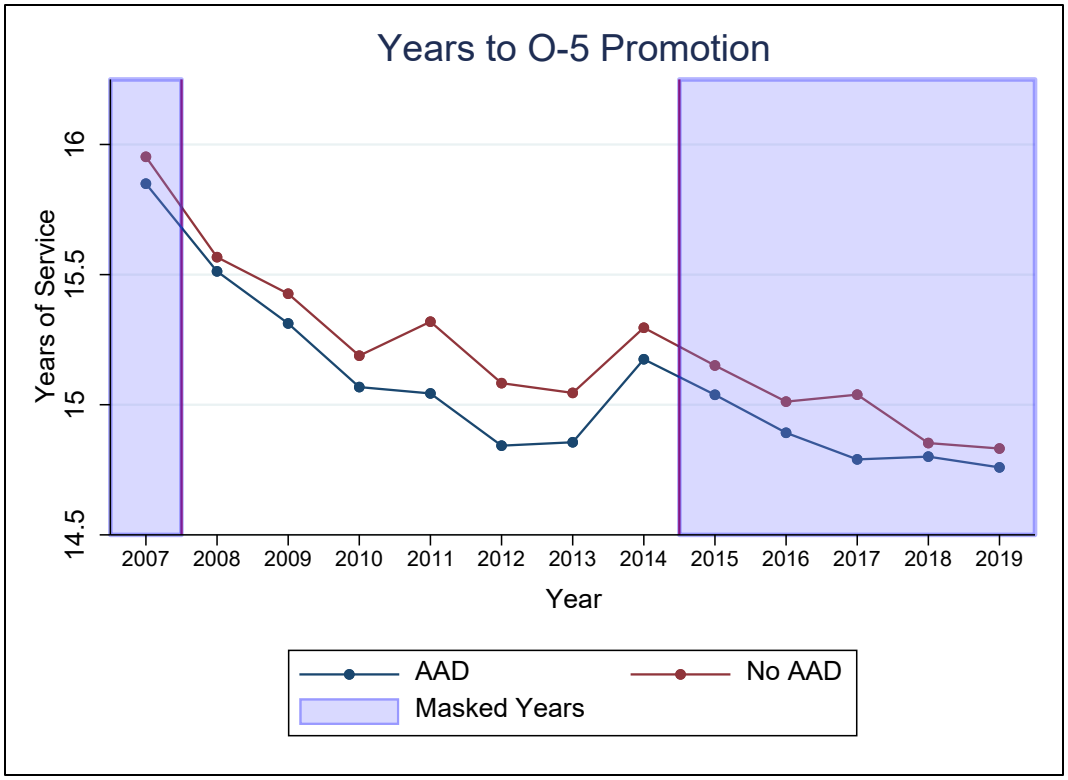
unsurprisingly negatively impacted the probability of promotion. When considering both O-4 and O-5 promotion boards, the inclusion of disciplinary information within the promotion record reduced the probability of promotion by 70 percentage points.

The estimates for the difference-in-difference premium remained stable and relatively consistent in magnitude both with and without controls. Coupled with the descriptive results discussed in part A, this leads us to conclude that the masking policy did affect the types of officers that the USAF promoted. Whether or not it was the intended effect, officers who held AADs experienced a significantly reduced return on their education in terms of promotion rates.

3. Alternate Outcome: Time to O-5 Promotion

To assess how the masking policy affected AAD holders, we first considered an outcome of "selection likelihood." In doing so, we restricted our analysis to only consider IPZ candidates, since we were most accurately able to align individuals within our sample to specific boards under IPZ eligibility. In order to try and capture how the masking policy affected eligible officers across all zones, we considered an outcome variable of "time to O-5 promotion." This outcome looks at how many years it took an officer to promote to O-5, calculated as the difference between the date the officer pinned on O-5 and the date the officer commissioned. We also adjusted our AAD holder indicator variable to reflect if the officer earned their AAD prior to 12 years TIS. Assuming that an officer promotes on time through O-4, their two-year BPZ eligibility year should take place after approximately 12 years TIS. This adjustment therefore enabled us to better capture if AAD holders gained BPZ promotion premiums.

If AADs provide a promotion benefit to officers, we would expect AAD holders to have fewer years of service when pinning on O-5. Based on our earlier conclusion that the premium of holding an AAD was reduced after masking implementation, we would similarly expect that this premium in terms of years of service would be reduced—that they would require more years of service to promote to O-5 in periods of masking. Our descriptive result is seen in Figure 5.



AAD holders indicate officers who earned a master's degree or above before reaching 12 years of service, the approximate length of time necessary to meet an O-5 promotion board two years BPZ.

Figure 5. Years to O-5 Promotion, AAD-Holders

This result broadly confirms our hypothesis: AAD holders, overall, require fewer years of service to promote to O-5 than non-AAD holders. During the unmasked window, their premium widens; however, after masking, the benefit decreases. This provides us with additional confidence in our original outcome variable of selection likelihood. The masking policy negatively affected AAD holders' promotion-related outcomes.

The outcome of "time to O-5 promotion" has its limits, however. As discussed in Chapter II, promotion-selects officially pin on their rank in monthly batches over the course of the year after board results are announced. Before 2020, the order in which officers promote was based on seniority of service. In other words, officers who had served for longer promoted ahead of others, regardless of if they had scored higher in terms of merit at the board. Because our outcome variable is determined by the date the officer pinned on

their rank and has an average range of approximately one and a half years, our result could be muddled by this seniority-based process.

B. MASKING POLICY IMPACT ON FULLY FUNDED DEGREE HOLDERS

As discussed in Chapter II, the USAF sends several hundred officers per year to various institutions to earn a graduate degree as their full-time job. Because officers are administratively assigned these academic institutions, their duty history reflects having been stationed at a university and they also earn a Training Report (TR) detailing what degree program they completed. Although the academic portion of their OSB would mask degree information, their duty history and TR would still be viewable within their record.

Because these types of degrees cannot be fully masked, we wanted to know if the AAD-masking policy affected fully funded degree holders the same way that it affected other AAD holders. To answer this question, we first looked at the raw descriptive selection results to see if we could detect any clear differences before and after policy implementation, seen in Figures 6 and 7.

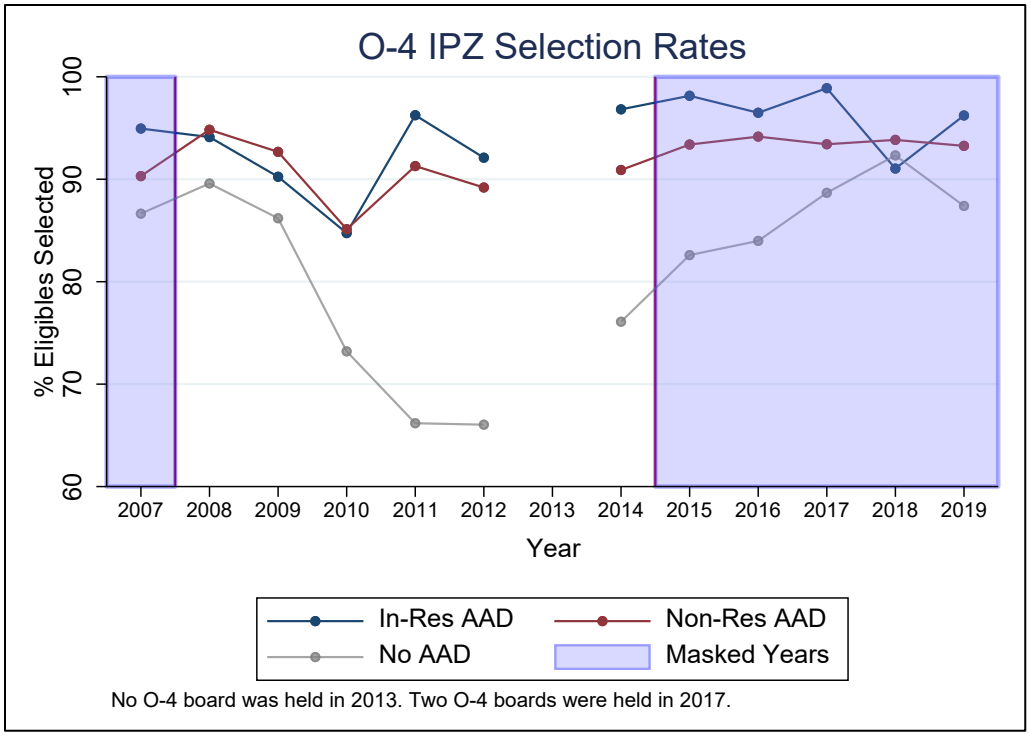


Figure 6. O-4 IPZ Selection Rates, Fully Funded Degree Holders

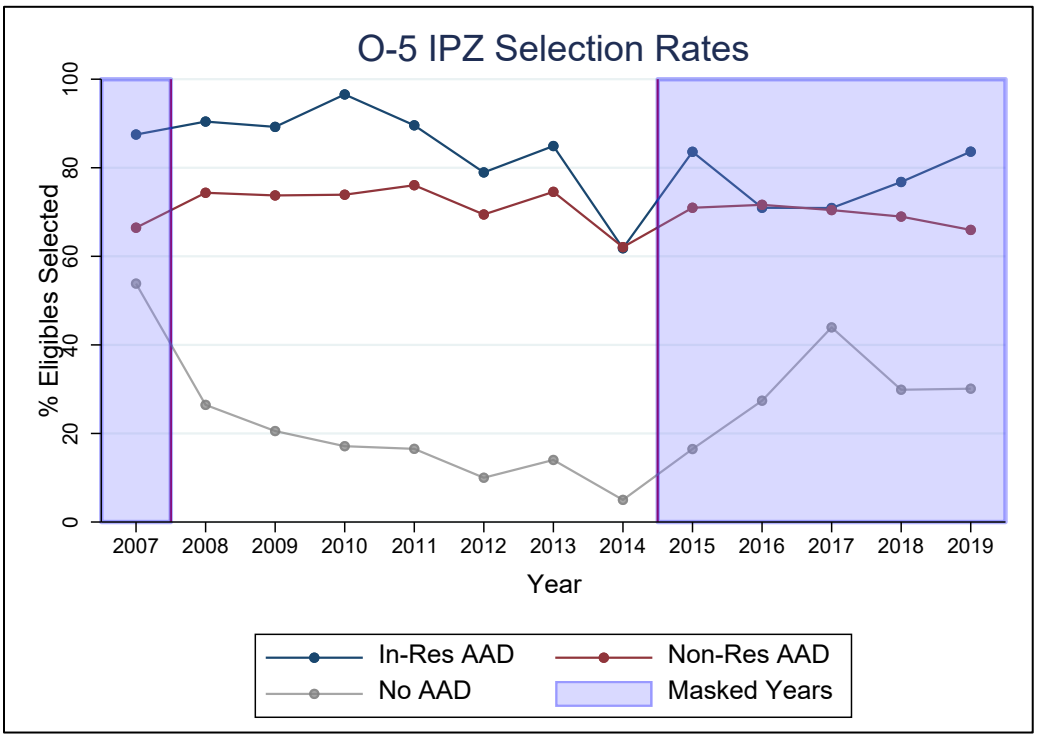


Figure 7. O-5 IPZ Selection Rates, Fully Funded Degree Holders

In the O-4 boards, fully funded degree holders' promotion rates track very closely to non-residence AAD holders prior to the masking period. After masking, fully funded degree holders promote at a marginally higher rate, but both groups continue to promote at a greater than 90 percent rate. For O-5 boards, fully funded AAD holders tend to promote at higher rates during the unmasked year; however, this advantage appears to reduce following the 2014 masking. Overall, the descriptive results do not show a compelling difference indicating that fully funded, in-residence AAD holders promoted at significantly higher rates than their non-residence AAD holding counterparts following masking.

C. MASKING POLICY IMPACT ON RATED OFFICERS

We next considered if rated career fields (pilots, navigators, air battle managers) experienced differential promotion rates when compared to support career fields. Both rated and support career fields constituted a single "Line of the Air Force" (LAF) promotion category until 2020 (Losey, 2019b). In other words, all LAF officers competed against each other for the same promotion opportunity, ranging from fighter pilots to contracting specialists. Masking of AADs was initially employed for O-3 and O-4 promotion boards in 1996, when then-Chief of Staff General Ronald Fogleman suggested that masking would "level the playing field" for officers in career fields "which do not enjoy the same opportunity for off-duty education that others do," ("Policy Change Masks Degrees," 1996, para. 4).

Fogleman was specifically pointing to the demands of rated aircrew, as their daily schedule may make it difficult to make time for earning an AAD. Indeed, when we consider our raw sample of officers meeting O-4 promotion boards in Table 6, we clearly see that rated officers make up the majority of the "No AAD" category. More specifically, while only 28 percent of support officers lacked an AAD when meeting their O-4 board, over 51 percent of rated officers had yet to earn an AAD. In light of the potential roadblocks to pilots earning an AAD, we predicted that promotion outcomes for non-AAD holding rated officers would increase in masking periods.

Table 6. O-4 Board AAD Statistics, by AFSC Type

	No AAD	AAD	Total
Support AFSC	4,513	11,543	16,056
Rated AFSC	8,001	7,564	15,565
Total	12,514	19,107	31,621

Note: Statistics relate to officers meeting O-4 promotion boards held from 2007 to 2019.

Table 7. O-5 Board AAD Statistics, by AFSC Type

	No AAD	AAD	Total
Support AFSC	674	10,641	11,315
Rated AFSC	898	7,908	8,806
Total	1,572	18,549	20,121

Note: Statistics relate to officers meeting O-5 promotion boards held from 2007 to 2019.

Figures 8 and 9 show the raw descriptive plot of selection rate outcomes for O-4 and O-5 promotion boards from 2007 through 2019. Of the two plots, the O-4 boards at Figure 8 provides the most evidence that rated officers without AADs were the most impacted by masking policies, particularly when compared to support officers who also lacked AADs. This effect becomes more negligible in the O-5 boards seen at Figure 8. One possible reason for the heightened effect seen for O-4 boards is that rated officers appear to close the gap in earning an AAD before meeting their O-5 boards. While Table 6 indicates that 51.4 percent of rated officers met O-4 boards without an AAD, Table 7 then shows that only 10.2 percent of rated officers still had no AAD before meeting their O-5 board.

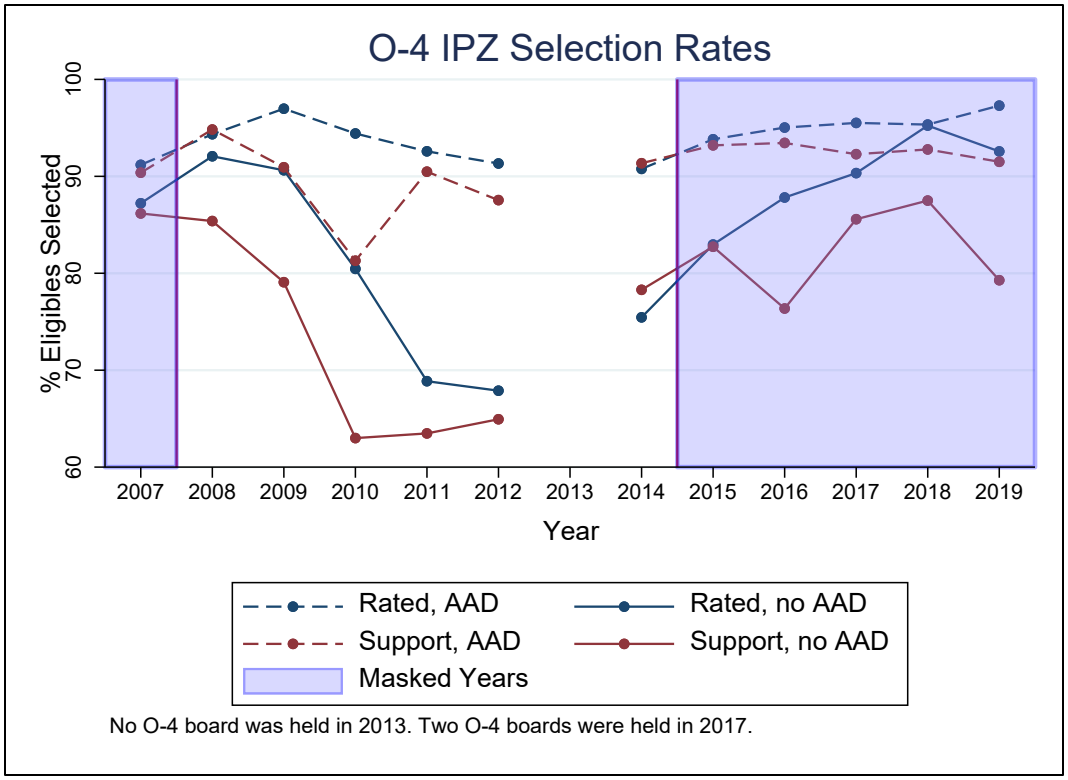


Figure 8. O-4 IPZ Selection Rates, Rated vs. Support AFSCs

Both rated and support officers without AADs experienced a drop in O-4 election rates over the unmasked period between 2008 and 2014. Rated officers without AADs promoted at an average rate of 80 percent, while support officers promoted at an average rate of 74 percent. From 2015 to 2019, however, both groups saw marked increases in promotion: rated officers without AADs promoted at an average rate of 90 percent, and support officers without AADs promoted at an average rate of 82 percent.

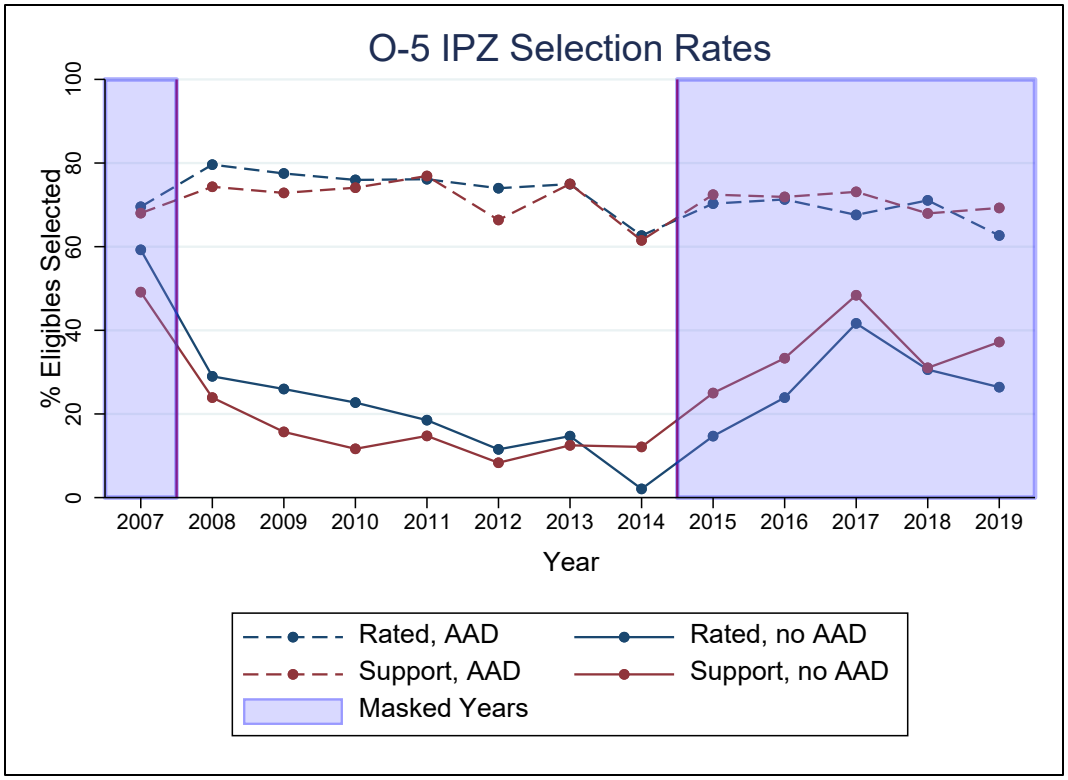


Figure 9. O-5 IPZ Selection Rates, Rated vs. Support AFSCs

The O-5 IPZ selection rates seen at Figure 9 for rated and support AFSCs reflect a much more consistent trend. Both rated and support AAD holders appear to maintain a largely consistent promotion rate regardless of masking status. Non-AAD holders across both career field types behave similarly to the overall trajectory observed for non-AAD holders discussed earlier; neither group appears to gain a marked benefit over the other following implementation of the masking policy.

Our results indicate that non-AAD holding rated officers improved their selection rates once masking was implemented. The higher selection rates seen at the O-4 boards in particular means that more rated officers were given opportunities to promote and stay in the USAF, regardless of their ability or desire to earn an AAD—a success story given the USAF's wider pilot shortage concerns over this period.

D. MASKING POLICY IMPACT ON FEMALES

One possible effect of the masking policy is that certain demographics might be more heavily affected by AAD masking than others. Specifically, if certain groups were more likely to have AADs before the policy, their likelihood of promotion could be negatively impacted by masking if non-AAD holders increased their probability of promotion. For example, Figure 10 shows that females are consistently more likely to hold an AAD than males. We therefore considered if there could be a difference in the effects of masking on females when compared to males.

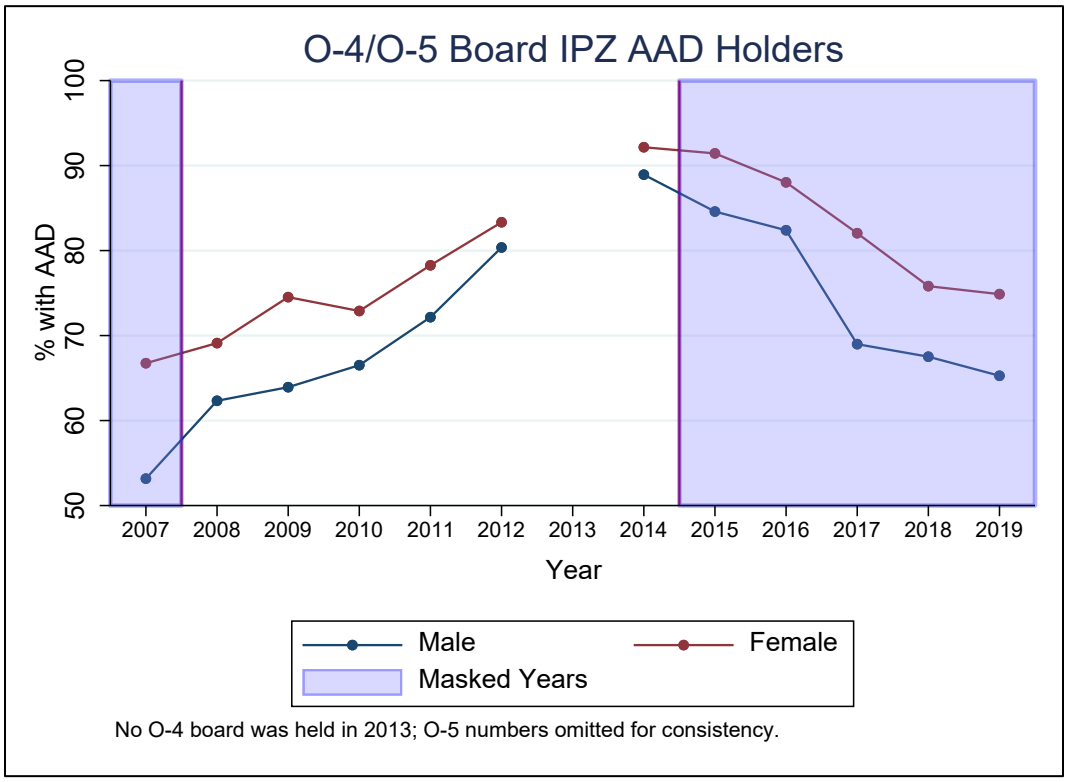


Figure 10. O-4/O-5 Board IPZ AAD Holders, by Gender

As shown in part A, we found that masking decreased the overall IPZ promotion benefit that AAD holders get. We might have been expected this to hurt females' promotion rates more than men's since they are more likely to have AADs. However, Figure 11 shows that females' promotion rates did not significantly change relative to men. Before

implementation of the AAD policy at the end of 2014, males and females promoted at approximately similar rates. After implementation, females performed better than males in certain years by less than three percentage points, but do not consistently maintain an advantage. Despite more females holding AADs, Figure 11 indicates that their promotion rates remained consistent relative to men, regardless of masking status. In other words, females were not disproportionately affected by the AAD masking policy.

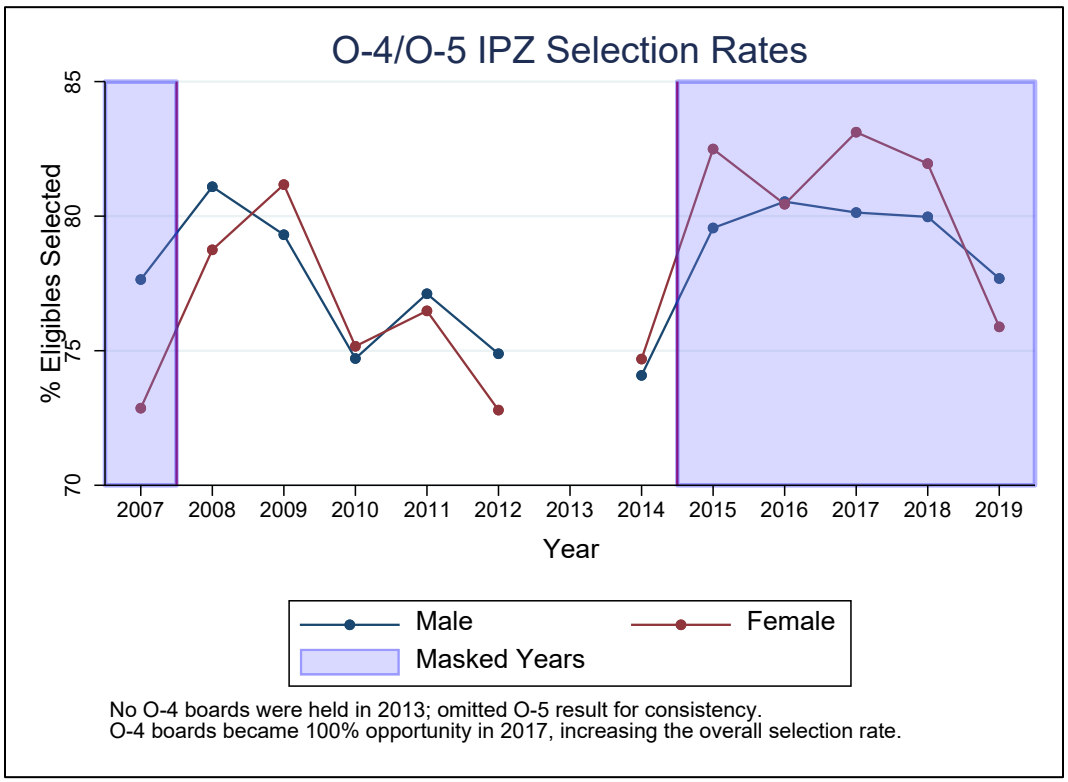


Figure 11. O-4/O-5 IPZ Selection Rates, by Gender

E. ENGINEERING AND BUSINESS DEGREES

We used degree information within our sample to isolate if AAD holding officers earned engineering-related or business-related degrees. The USAF has multiple technical AFSCs, ranging from pilots, developmental engineers, cyber warfare officers, to space operations technicians. Engineering-related degrees could more directly relate to these

technical career fields, which might lead one to suspect that engineering degree holders should, on average, perform and promote better than their peers.

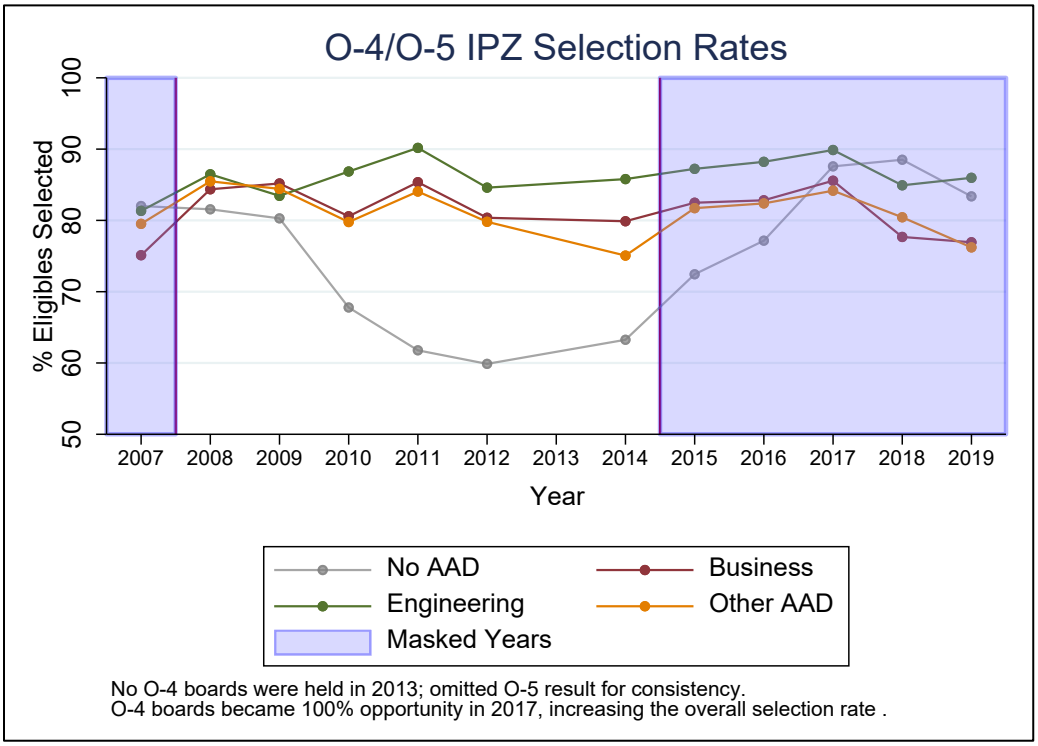


Figure 12. Combined O-4, O-5 Selection Rates, by Degree Type

We explored this possibility with a raw descriptive plot in Figure 12. This plot shows the selection rates for non-AAD holders, engineering master's degree holders, business-related master's degree holders, and other master's degree holders for both O-4 and O-5 boards in aggregate. Overall, our descriptive result is consistent with our earlier findings related to selection rates when comparing AAD holders and non-AAD holders: non-AAD holders, on average, are selected at lower rates than their AAD holding counterparts. We also see that, across both O-4 and O-5 promotion boards, engineering degree holders perform slightly better than officers holding other types of AADs. Furthermore, their selection rate remained higher than other AAD holders regardless of masking status.

For example, we see that engineering degree holders maintained an average selection rate of 86 percent from 2008 through 2014. After 2014 when masking went into place, their average selection rate increased slightly to 87 percent business degree holders promoted at an average rate of 82 percent before 2015 and 81 percent during the masking period. Other degree-types promoted at a rate of 80 percent prior to masking, and 81 percent after masking. This descriptive result leads us to conclude that, on average, engineering degree holders promote at higher rates. During periods of unmasking, promotion boards would have access to the degree type earned by officers within the OSR; they potentially used this information as an additional positive discriminator for officers. However, engineering degree holders maintain a consistently higher promotion premium in masked periods. This may mean that engineering degrees better enhance officer productivity than other degree types, which in turn could lead to better overall job performance in technical AFSCs. If board members are successfully focusing on job performance in their evaluation of officers, these types of human capital-enhancing degrees may improve promotion rates.

F. CONCLUSION

We explored how the 2014 AAD masking policy affected IPZ promotion outcomes for different subgroups throughout the USAF: AAD holders, fully funded degree holders, rated officers, and females. Through descriptive and difference-in-difference techniques, we determined that AAD holders experienced a significantly reduced promotion premium after the policy implementation. Before masking, AAD holders were 25 percent more likely to be selected to O-4 or O-5. After the policy implementation, this reduced to 12 percent. Although AAD holders were still more likely to be selected, their overall premium fell by 53 percent, meaning that the masking policy hurt their odds of promotion. If the USAF intended to improve selection rates for officers who did not earn a degree before meeting a board, then perhaps the masking policy can be viewed as a success. This means, however, that potentially higher educated officers were passed over, reducing their opportunity to stay in and contribute to the USAF due to the up-or-out nature of the promotion system.

Our descriptive analysis of fully funded degree holders did not yield a significant difference in promotion rates for those officers relative to other AAD holding officers. Rated officers without AADs did appear to benefit from the masking policy in O-4 boards, though this benefit diminished in O-5 boards—a result that makes sense given that more than half of rated officers meeting O-4 boards lack an AAD. Female officers, despite being more likely to hold an AAD, were not disproportionately affected by the masking policy relative to their male counterparts. Finally, engineering related AAD holders consistently promote at higher rates than other degree types, regardless of masking status.

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VI. CONCLUSION AND RECOMMENDATIONS

Our research explored how the USAF's 2014 AAD-masking policy affected officer promotion outcomes. Likely implemented as a retention tool by providing officers with an extended timeline to complete a degree, prior research has not considered how the makeup of the types of officers selected for promotion may have changed as a result. Using personnel data on active duty USAF officers from 2007 to 2019, we employed descriptive tools and a difference-in-difference analysis to assess how the policy affected the probability of promotion for different groupings of officers. The following chapter summarizes our findings and provides recommendations for further analysis.

A. CONCLUSIONS

1. Research Question 1

Our primary research question focused on how AAD-masking affected officer promotion outcomes for AAD holding officers. Our descriptive results clearly showed that, when AADs remain viewable on the OSR, AAD holders maintain a significant promotion advantage over non-AAD holding officers in both O-4 and O-5 boards. Following implementation of the masking policy, however, we saw the selection gap close. Our difference-in-difference framework confirmed this descriptive result: although AAD holders were still more likely to be selected, their overall premium fell by 53 percent across both O-4 and O-5 promotion boards. When looking at O-4 and O-5 boards individually, we found that the AAD premium fell 52 percent and 18 percent, respectively. These results lead us to conclude that, in periods of unmasking, promotion board members used AADs as discriminators within officer records. AAD holding officers had a clear advantage over their non-AAD holding counterparts before policy implementation, which may have been irrespective of their job performance. Although they continued to promote at higher rates after the implementation of masking, our findings suggest that it became more difficult for board members to promote on the basis of credentials.

As discussed in Chapters II and V, AAD masking policies have historically been designed to provide certain career fields with more opportunities and time to earn a degree

if they so choose. Pilots, for example, deploy frequently and experience long duty days when they fly, which may impact their ability to pursue a degree in their free time. We showed in Table 6 that rated officers are significantly less likely to hold an AAD when meeting their O-4 board relative to support-oriented AFSCs. The USAF has experienced a pilot shortage for approximately a decade, so masking degrees may be partially motivated by wanting to improve rated officers' odds of promoting and being retained in service. If this is the case, then arguably the policy may be successful: non-AAD holders improved their ability to promote overall.

This also generates a question related to officer quality: are AAD holding officers higher quality or higher performing officers? Human capital theory suggests that additional education enhances productivity; however, if AADs have mostly been pursued by officers motivated to check a box or potentially earn them a leg up in career opportunities, they may not be any more productive anyway.

2. Research Question 2

Given that AAD holders were negatively impacted overall by masking, we next asked how promotion outcomes may have varied across different USAF subgroups. We considered several groupings of officers: rated officers, females, and different AAD types such as fully funded degree holders, engineering degree holders, and business degree holders.

As part of our conclusions for our first research question, we assessed if rated officers in particular benefitted from the masking policy. At O-4 boards in particular, we determined that non-AAD holding rated officers benefitted from masking more so than their non-AAD holding support officers. Both groups improved their O-4 promotion rates overall, but the non-AAD holding rated officers' rates jumped to levels nearly as high as their AAD holding counterparts. This difference is less clear at O-5 boards: both rated and support non-AAD holders improved their promotion rates, but the support non-AAD holders actually held a marginally higher selection rate. As discussed earlier, the increased promotion rates at O-4 boards for rated officers are likely a success story in light of the pilot shortage. Pilots becoming eligible for promotion to O-4 would be approaching at least

12 years' time in service. For pilots, this is a significant milestone: they incur a service commitment of 10 years upon graduating pilot training. Considering that the flying training pipeline can take nearly two years, this means that their first opportunity to separate from the USAF may coincide directly with their IPZ timing for O-4. Providing pilots better promotion odds could be an incentive for them to remain in service.

We also considered if fully funded degree holders promoted at higher rates than other AAD holding officers. While AAD information might be masked from the OSB, fully funded degree holders would have a performance report from their time spent in-residence at school within their OSR, meaning that board members can glean AAD status for these officers. While we anticipated that fully funded degree holders would promote at higher rates than others as a result, our descriptive analysis suggest that this benefit is marginal, if it exists at all. Perhaps masking AADs from the OSB was less critical than ensuring that the board members understood the USAF's shift in how AADs were valued. Communicating how the USAF values degrees to board members through the SECAF's MOI may have successfully minimized bias toward degree holders.

Similarly, we wondered if certain types of AAD programs might be affected differently by masking. Because the USAF is made up of multiple technical AFSCs, we suspected that officers who earn engineering-specific AADs would likely promote at higher rates than others. Our descriptive analysis confirmed this hypothesis: engineering degree holders promote, on average, higher than other AAD holders. This promotion premium over other degree types was maintained regardless in both unmasked and masked periods. This could mean that those who earn engineering degrees actually become more productive on the job given the directly applicable nature of the knowledge gained as part of the degree program.

Finally, we explored if females' promotion rates were differentially affected by the masking policy. We determined that females are consistently more likely to have an AAD than males. Given that masking reduced the overall promotion premium for AAD holders, and that more females hold AADs, we expected their promotion rates to be negatively impacted relative to males. Our descriptive results suggest otherwise: females were not disproportionately affected by the AAD masking policy.

In summary, we began this study with a simple question: did the 2014 AAD masking policy affect the types of officers the USAF promotes at O-4 and O-5 boards? Based on our analysis, we believe the answer is simply, yes. The premium of an AAD clearly reduced after policy implementation, suggesting that board members previously used AAD credentials in order to determine which officers had the highest potential to serve in the next grade. After the policy went into place, AAD holders, despite continuing to promote at or above the average selection rate, experienced less of an advantage relative to their non-AAD holding counterparts. While we lacked job performance-specific measures to assess if the actual quality of officers changed, we clearly identified that the USAF became more willing to promote and retain officers with lower levels of advanced education.

B. LIMITATIONS AND RECOMMENDATIONS

Our analysis relied on several assumptions and estimations which could impact the specificity of our analysis. Our dataset contained quarterly demographic snapshots of officers from 2007 to 2019; however, we lacked board specific statistics for each officer and needed to calculate eligibility and selection status on our own. While we closely mapped IPZ overall eligibility and results to the statistics reported by the USAF, our BPZ and APZ calculations were less precise. While we have confidence in our IPZ board results, assessing BPZ and APZ results for officers may yield even more interesting findings. Were AAD holding officers more likely to promote BPZ, and if so, did this trend continue after AADs were masked? Did non-AAD holding officers who had been passed over while IPZ during the unmasked window end up with better APZ odds of promotion once AADs were masked? We recommend acquiring and incorporating promotion board data into our design, as this data would specify exactly what officers met what board, what zone they were in, and what information actually appeared on their OSR during the board. Furthermore, if numeric board scores can be acquired, this would enable analysis of scores and the exact order of merit to better understand what potential premium AADs provide officers. This additional data would not only add greater specificity to our current design but would also enable analysis of all promotion zones.

Our research questions focused on how promotion outcomes were affected by the policy. We did not, however, determine if retention was impacted by the masking policy. In periods of masking, the USAF telegraphs to the officer corps that they place less value on AADs, particularly if degree holders in turn promote at lower rates. AAD holders may find that they can be better compensated for their higher education levels in the private sector. Lower retention rates of AAD holders would likely be a negative unintended consequence of the masking policy. Future research should analyze if retention of AAD holders was adversely impacted, as this would provide valuable information to policymakers seeking to help the USAF retain their highest performers.

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APPENDIX A. CY16 PROMOTION BOARD ELIGIBILITY CRITERIA

Current Grade Dates of Rank CY16 Eligibility Chart									
Board ID	Date	Corps	Grade	APZ LEQ	IPZ	1~YR BPZ	2~YR BPZ	DOS GEQ	EAD LEQ*
P0616A (COL)	22-Feb-16	CHAP	LT COL	31-Mar-11	1 Apr 11 - 31 Mar 12	N/A	N/A	22-May-16	22-Aug-15
		MSC		28-Feb-10	1 Mar 10 - 31 Dec 10	1 Jan 11 - 30 Sep 11	1 Oct 11 - 31 Dec 12		
P0516A (LT COL)		LAF-J	MAJ	31-Mar-11	1 Apr 11 - 31 May 12	1 Jun 12 - 30 Sep 13	1 Oct 13 - 30 Sep 14		
		NC		30-Sep-09	1 Oct 09 - 30 Sep 10	1 Oct 10 - 31 Aug 11	1 Sep 11 - 31 Jul 12		
P0416A (MAJ)		LAF-J	CAPT	31-Dec-09	1 Jan 10 - 31 Dec 10	N/A	N/A		
		MSC		31-Dec-11	1 Jan 12 - 31 Dec 12	N/A	N/A		
		NC		31-Dec-09	1 Jan 10 - 31 Dec 10	N/A	N/A		
P0616B (COL)	7-Mar-16	BSC	LT COL	31-Dec-09	1 Jan 10 - 30 Sep 10	1 Oct 10 - 30 Jun 11	1 Jul 11 - 31 May 12	5-Jun-16	7-Sep-15
P0516B (LT COL)		LAF	MAJ	31-Dec-11	1 Jan 12 - 30 Nov 12	1 Dec 12 - 31 Dec 13	1 Jan 14 - 31 May 15		
		MSC		31-Dec-11	1 Jan 12 - 31 Mar 13	1 Apr 13 - 31 Dec 13	1 Jan 14 - 31 Jan 15		
		BSC		31-Jul-10	1 Aug 10 - 30 Jun 11	1 Jul 11 - 31 May 12	1 Jun 12 - 31 Jul 13		
P0416B (MAJ)		BSC	CAPT	31-Dec-11	1 Jan 12 - 31 Dec 12	N/A	N/A		
P0416C	11-Jul-16	LAF	CAPT	31-Dec-10	1 Jan 11 - 31 Dec 11	N/A	N/A	9-Oct-16	11-Jan-16
		CHAP		31-Dec-06	1 Jan 07 - 31 Dec 07	N/A	N/A		
M0616A	12-Sep-16	MC/DC	LT COL	31-May-11	1 Jun 11 - 31 May 12	1 Jun 12 - 31 May 13	1 Jun 13 - 31 May 14	11-Dec-16	12-Mar-16
M0516A			MAJ	31-May-11	1 Jun 11 - 31 May 12	1 Jun 12 - 31 May 13	1 Jun 13 - 31 May 14		
M0416A			CAPT	31-May-11	1 Jun 11 - 31 May 12	N/A	N/A		11-Sep-16
P0616C	17-Oct-16	LAF	LT COL	31-Dec-10	1 Jan 11 - 31 Dec 11	1 Jan 12 - 30 Nov 12	1 Dec 12 - 31 Dec 13	15-Jan-17	17-Apr-16
		LAF-J		29-Feb-12	1 Mar 12 - 30 Nov 12	1 Dec 12 - 30 Sep 13	1 Oct 13 - 30 Sep 14		
		NC		31-Oct-12	1 Nov 12 - 31 Oct 13	1 Nov 13 - 31 Oct 14	1 Nov 14 - 28 Feb 16		
		CHAP		31-Mar-12	1 Apr 12 - 31 May 13	1 Jun 13 - 31 May 14	1 Jun 14 - 31 May 15		
P0516C		CHAP	MAJ	31-May-12	1 Jun 12 - 31 May 13	1 Jun 13 - 30 Apr 14	1 May 14 - 31 Jul 15		
		LAF-J		31-May-12	1 Jun 12 - 30 Sep 13	1 Oct 13 - 30 Sep 14	1 Oct 14 - 30 Sep 15		
		NC		30-Sep-10	1 Oct 10 - 31 Aug 11	1 Sep 11 - 31 Jul 12	1 Aug 12 - 31 Oct 13		
P0416D		LAF-J	CAPT	31-Dec-10	1 Jan 11 - 31 Dec 11	N/A	N/A		
		NC		31-Dec-10	1 Jan 11 - 31 Dec 11	N/A	N/A		

*Adapted from AFPC/DP2SPP (Air Force Officer Promotions Management Branch, 2016)

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APPENDIX B. RANK PIN-ON WINDOWS

CURRENT GRADE DATE OF RANK (LINE~A)
6 Jul 21

	TO COLONEL		TO LT COLONEL		TO MAJOR		TO CAPTAIN	
YR GP	CY	DOR	CY	DOR	CY	DOR	FY	DOR
1993	13	1Nov14-31Aug15	07	1Jul08-31Mar09	02B	1Jun03-31Mar04	96	1Jan - 31Dec97
1994	14	1Sep15-30Jun16	**08	1Apr09-31Mar10	03A	1Apr04-30Apr05	97	1Jan - 31Dec98
1995	15	1Jul16-31May17	09	1Apr10-31Dec10	03B	1May05-28Feb06	98	1Jan - 31Dec99
1996	16	1Jun17-31May18	10	1Jan11-31Dec11	04	1Mar06-31Aug06	99	1Jan - 31Dec00
1997	17	1Jun18-31Mar19	11	1Jan12-30Nov12	05	1Sep06-30Jun07	00	1Jan - 31Dec01
1998	18	1Apr19-31Mar20	12	1Dec12-31Dec13	06	1Jul07-31Jul08	01	1Jan - 31Dec02
1999	19	1Apr20-31Mar21	13	1Jan14-28Feb15	07	1Aug08-31Aug09	02	1Jan - 31Dec03
2000	20D	6 DevCat 14Oct20	14	1Mar15-31Jan16	08	1Sep09-30Sep10	03	1Jan - 31Dec04
2001	21		15	1Feb16-31Dec16	09	1Oct10-31Dec11	04	1Jan - 31Dec05
2002	22		16	1Jan17-30Nov17	10	1Jan12-30Nov12	05	1Jan - 31Dec06
2003	23		17	1Dec17-31Oct18	11	1Dec12-31Dec13	06	1Jan - 31Dec07
2004	24		18**	1Nov18-31Oct19	12	1Jan14-31May15	07	1Jan - 31Dec08
2005	25		19	1Nov19-31Oct20	14	1Jun15-31Mar16	08	1Jan - 31Dec09
2006	26		20	6 DevCat 4May20	15	1Apr16-31Dec16	09	1Jan - 31Dec10
2007	27		21		16	1Jan17-30Sep17	10	1Jan – 31Dec11
2008	28		22		17B	1Oct17-31Aug18	11	1Jan – 31Dec12
2009	29		23		17D	1Sep18-31Aug19	12	1Jan – 31Dec13
2010	30		24		18	1Sep19-31Aug20	13	1Jan – 31Dec14
2011	31		25		19E	1Sep20-31Aug21	14	1Jan – 31Dec15
2012	32		26		20D	6 DevCat 1Dec20	15	1Jan – 31Dec16
2013	33		27		21		16	1Jan – 31Dec17
2014	34		28		22		17	1Jan – 31Dec18
2015	35		29		23		18	1Jan – 31Dec19
2016	36		30		24		19	1Jan – 31Dec20
2017	37		31		25		20	1Jan – 31Dec21

*Adapted from AFPC/DP2SPP (Air Force Officer Promotions Management Branch, 2021)

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APPENDIX C. SAMPLE OFFICER SELECTION BRIEF

AIR FORCE OFFICER SELECTION BRIEF

PREPARED: 30 MAY 1996 ACTIVE DUTY SEQUENCE NBR 100054
FOR: SELECTION BOARD P0694A

PERSONAL DATA

NAME: JOHN H. DOE SEX: M RACE: CAU
SSAN: 112233445 ETHNIC: NONE

GRADE DATA

CUR GR	DOR	EFF DATE
LTC	01 JUL 1990	01 JUL 1990

SERVICE DATA

EAD: 11 MAR 1974
TAFMSD: 10 DEC 1973
TAFCSD: 11 MAR 1974
DOS: 31 MAR 2002 REASON:
SOURCE OF COMMISSION:

PROFESSIONAL MILITARY EDUCATION

SCHOOL	METHOD	YR
AIR WAR COL	CORRESPONDENCE	1995
AC & STAFF	RES/SEMINAR	1989
SQ OFF SCH	CORRESPONDENCE	1977

ACADEMIC EDUCATION

LVL	SPECIALTY / SCHOOL	YR
MAS	BUS ADM AND MANAGEMENT CENTRAL MI U MI	1981
BAC	POLITICAL SCIENCE ELON COL NC NC	

DECORATIONS

DECORATION	YR	NR AWD
MERIT SVC MED	1992	02
DMS MDL	1993	01
AF COMM MED	1985	03
J SVC COMM MD	1995	01

AERONAUTICAL / FLYING DATA

AERONAUTICAL RATING: CMD PILOT/NAVIGATOR
AERO RTG CURR CAT DT: OCT 1978
FLYING STATUS: JINACT RESTRICTED
TOTAL FLYING HOURS: 1648

	ACFT	YR	HOURS
MOST RECENT:	F-16C	1991	0294
2ND:	T-41	1988	0214
3RD:	F-4A	1985	1084
4TH:			
5TH:			

BOARD CERTIFIED

EXPIRES:

ACQUISITION CORPS

JOINT REPORTING CATEGORY

OTHER JDA

JOINT DUTY HISTORY

ORGANIZATION	FROM	TO
US PACIFIC COMMAND	1992	1993

OVERSEAS DUTY HISTORY

INCLUSIVE DATES		LOCATION
14 SEP 1992	SEP 1993	KORES
25 JUN 1984	21 MAY 1985	ICELD

ASSIGNMENT HISTORY

DUTY STATUS CODE: EFFECTIVE:

EFFECTIVE DATE	DAFSC	DUTY TITLE	CMD LVL	MAJ COM	ORGANIZATION		
22 AUG 1994	11F4Y	FLIGHT COMMANDER	NAF	ACC	COMBAT PLANS	SQ	SHAW
22 MAY 1994	11F4Y	FLIGHT COMMANDER	NAF	ACC	COMBAT PLANS	SQ	SHAW
01 DEC 1993	11F4Y	CHIEF, CAMPAIGN PLANS	NAF	ACC	COMBAT OPERATIONS	SQ	SHAW
17 SEP 1993	11F4Y	CONTINGENCY PLANS OFFICER	NAF	ACC	COMBAT OPERATIONS	SQ	SHAW
15 SEP 1992	11F4Y	CONTINGENCY PLANS OFFICER	DD/J	ZPA	AFELM HQ ROKUS CFC	PAC	YONG SAN
15 JUN 1992	1455Z	CHIEF, SWA OPLAN DIV	NAF	ACC	AIR OPERATIONS	GP	SHAW
10 APR 1992	1455Z	CHIEF, SWA OPLAN DIV	NAF	TAC	NAFCOS (9 AF)	STF	SHAW
08 AUG 1991	1455Z	SWA EXERCISE PLANS OFFICER	NAF	TAC	NAFCOS (9 AF)	STF	SHAW
01 FEB 1990	1115Q	CHIEF, BLOCK 42 CONV TEAM	W/B	TAC	TACTICAL FIGHTER	SQ	SHAW
25 SEP 1989	1111Q	F16 FTR PILOT	W/B	TAC	TACTICAL FIGHTER	SQ	SHAW
06 JUN 1989	1115Q	F-16 PILOT	W/B	TAC	TACTICAL FIGHTER	SQ	SHAW
17 AUG 1988	0003	ACSC STUDENT	STU	AUN	AIR CMD/STAFF	COLL	MAXWELL
15 JUL 1988	0003	ACSC STUDENT	STU	AUN	AIR CMD/STAFF	COLL	MAXWELL
12 JUN 1985	A 0900	COMMANDER, CADET SQUADRON 19	AFA	ACD	USAF ACADEMY	DRU	USAF ACADEMY
17 FEB 1985	M 1115F	CHIEF, STAN-EVAL DIVISION	W/B	TAC	FIGHTER INTERCEPT	SQ	KEFLAVIK
22 OCT 1984	M 1115F	CHIEF, STAN-EVAL DIVISION	W/B	TAC	DATA MASKED		DATA MASKED
26 JUN 1984	K 1115F	F-4E INSTRUCTOR PILOT	W/B	TAC	DATA MASKED		DATA MASKED
28 FEB 1983	X 1115F	INSTRUCTOR PILOT F4	UNIT	TAC	TAC FTR TNG	SQ	HOMESTEAD
08 OCT 1982	K 1115F	INSTRUCTOR PILOT F4	W/B	TAC	TAC FTR TNG	SQ	HOMESTEAD
02 APR 1982	K 1115F	INSTRUCTOR PILOT TAC FTR4	UNIT	TAC	TAC FTR TNG	SQ	HOMESTEAD
30 NOV 1981	K 1115F	STU INSTR PILOT TRAINING	UNIT	TAC	TAC FTR TNG	SQ	HOMESTEAD
31 AUG 1979	1115F	ACFT COMMANDER F4E	UNIT	TAC	TACTICAL FIGHTER	SQ	SEYMOUR JO
09 FEB 1979	1115F	STU CRS F4000BOOAG	UNIT	TAC	TACTICAL FIGHTER	WING	GEORGE
27 OCT 1977	0006	UPT STUDENT PILOT CLASS 79 01	STU	ATC	STUDENT	SQ	COLUMBUS

*Source: AFPAM 36-2506 (1997)

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APPENDIX D. SELECTION AND ELIGIBILITY COMPARISONS

USAF promotion raw eligibility and selection statistics were sourced from the Statistical Analysis & Retrieval System + Retrieval Applications Website's Demographic Applications (STARS DEMOG), a USAF-maintained system which provides "a wide variety of information about the Air Force, past and present" (AFPC Reports and Retrievals Branch, personal communication, 2022). This database contained aggregated promotion statistics for 2012 through 2019. Statistics from before 2012, if available, were found through publicly available promotion announcements archived on the Air Force Personnel Center's website (https://www.afpc.af.mil/News/).

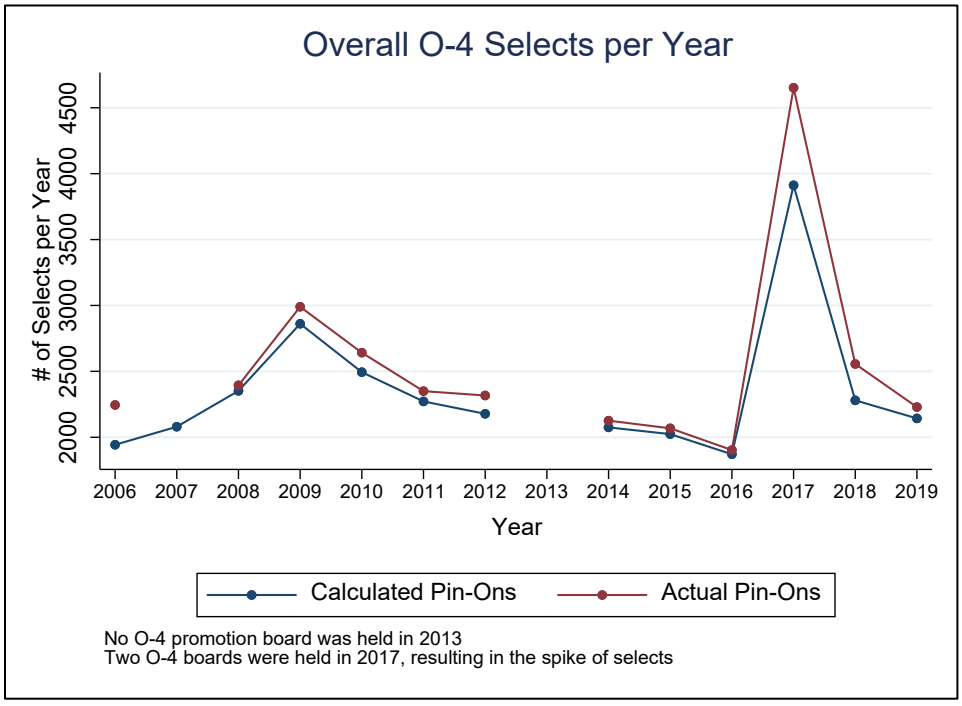

Figure 13. O-4 Calculated vs. Actual Yearly Pin-Ons

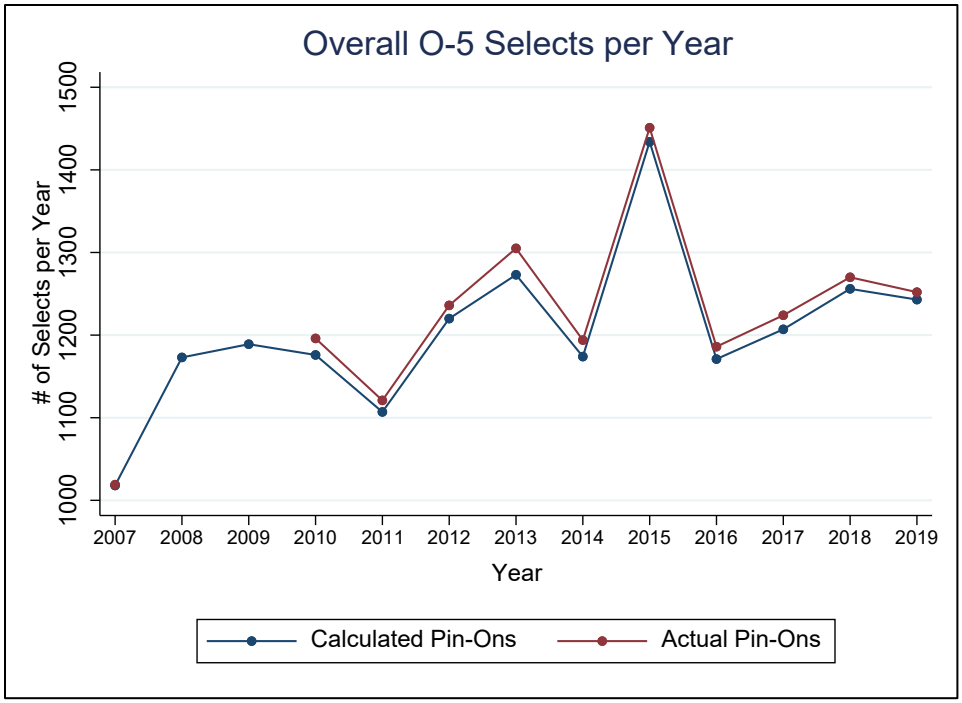

Figure 14. O-5 Calculated vs. Actual Yearly Pin-Ons

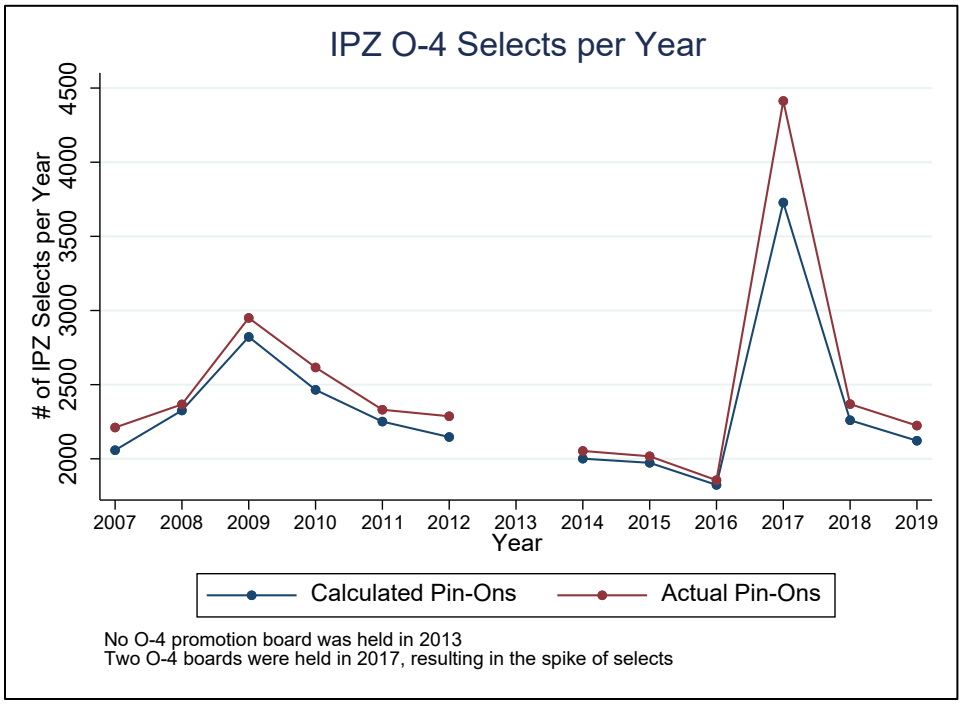

Figure 15. O-4 IPZ Calculated vs. Actual Yearly Pin-Ons

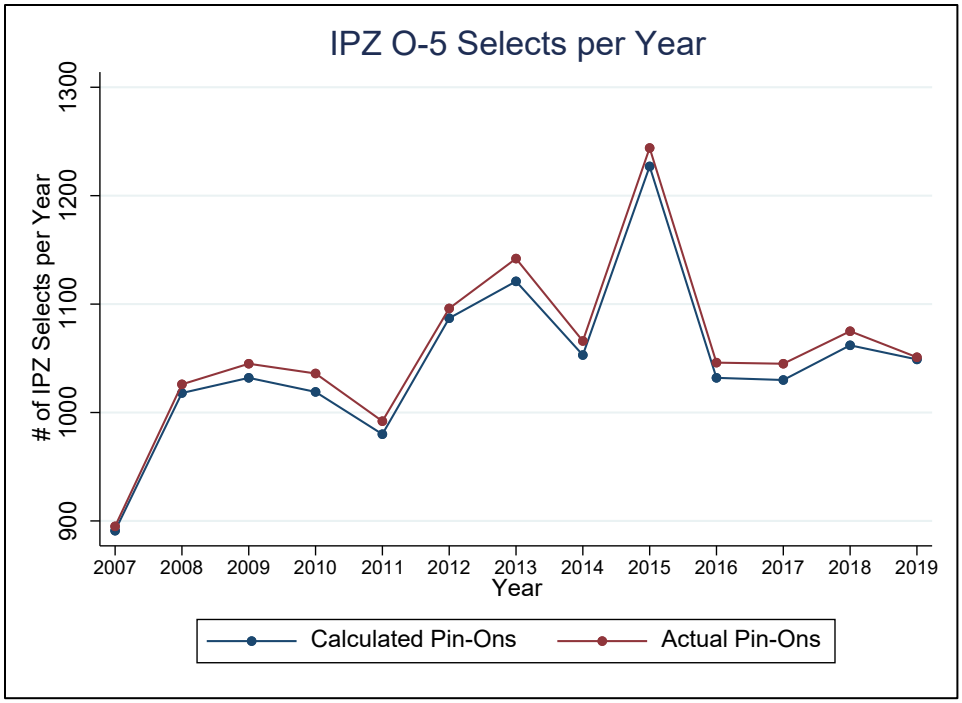

Figure 16. O-5 IPZ Calculated vs. Actual Yearly Pin-Ons

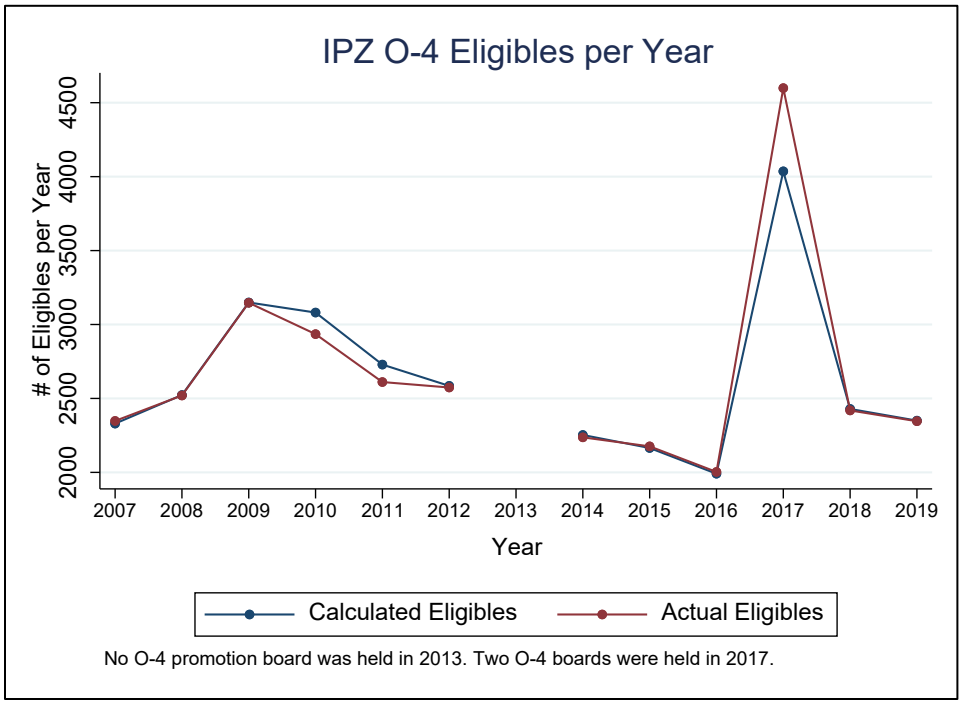

Figure 17. O-4 IPZ Calculated vs. Actual Number of Eligibles

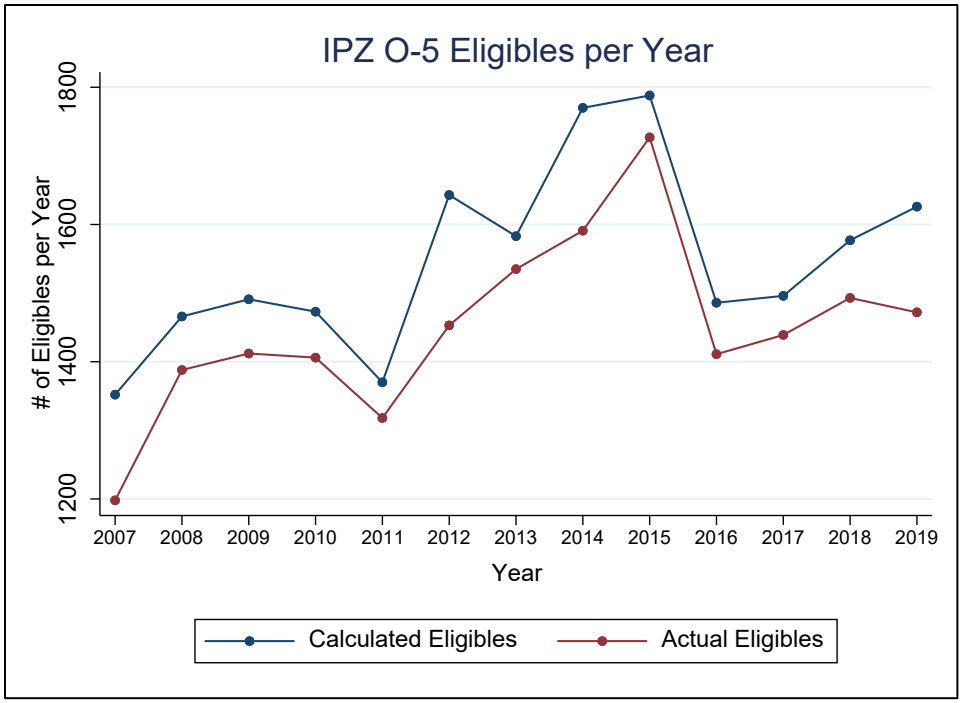

Figure 18. O-5 IPZ Calculated vs. Actual Number Eligibles

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