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CASUALTIES AND COMBAT PAY: EXAMINING COMBAT FATALITY RISK FOR NAVY SPECIAL WARFARE SEAL OPERATORS IN IRAQ AND AFGHANISTAN

by

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This research examined the effect of U.S. Navy Special Warfare Sea, Air, and Land (SEAL) combat deployments to Iraq and Afghanistan on casualties and combat-specific compensation. Data was collected from restricted SEAL personnel records obtained from the Defense Manpower Data Center and Social Security Administration to identify and profile all U.S. active duty enlisted Navy Special Warfare operators having served in Iraq or Afghanistan from 2007–2012. During those years, SEAL operators sustained a fatality rate in Iraq and Afghanistan that was nearly 9 times greater than that of the overall U.S. military. Additionally, the SEAL operators who deployed to Iraq or Afghanistan from 2007–2012 had a total likelihood of death of 800 per 100,000—250 times that of the national workplace average in 2012. Furthermore, deployed SEAL operators to Iraq or Afghanistan from 2007–2012 experienced an increased chance of death of 530 per 100,000 compared to the SEAL operators remaining stateside. This level of additional risk is 11 times greater than the additional risk all U.S. military service members sustained while deployed to Iraq or Afghanistan from 2001–2012. Finally, this thesis uses the incremental risk incurred by SEAL operators deployed to Iraq or Afghanistan to estimate an appropriate ex ante compensation level of $14,442 per month in comparison to the current level of combat pay equal to $225 per month for Imminent Danger Pay/Hostile Fire Pay.

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LIST OF ACRONYMS AND ABBREVIATIONS

CZTE	Combat Zone Tax Exclusion
DMDC	Defense Manpower Data Center
DOD	Department of Defense
HDIP	Hazardous Duty Incentive Pay
HDP-L	Hazardous Duty Pay-Location
HFP	Hostile Fire Pay
IDP	Imminent Danger Pay
NAVSOF	Navy Special Operations Forces
NCDU	Navy Combat Demolition Unit
NDAA	National Defense Authorization Act
QRMC	*Quadrennial Review of Military Compensation*
SEAL	Sea, Air, and Land
SOCOM	Special Operations Command
SOF	Special Operations Forces
UDT	Underwater Demolition Team
USSOF	U.S. Special Operations Forces
VSL	Value of a Statistical Life

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I. INTRODUCTION

U.S. Navy Special Warfare Sea, Air, and Land (SEAL) operators are tasked with the most dangerous missions to defend the United States against foreign enemies. Since 1962, Navy SEALs have fought in every major conflict, providing crucial special warfare capabilities in maritime and land domains. Although not uncharacteristic of other U.S. Special Operations Forces (USSOF), Navy SEALs incur tremendous amounts of risk in the execution of these critical, but dangerous operations. This can be easily observed from the fatality rates of the recent wars in Iraq and Afghanistan. Of the combined total of 6,902 U.S. military deaths as of October 2020 (Department of Defense [DOD], 2020b), 57 were Navy SEALs (Defense Manpower Data Center [DMDC], n.d.). For a force size of approximately 2,500 (Mann & Burton, 2019), the fatality to force size ratio is 4.5 times higher than across the entire DOD with 1.38 million active duty service members in 2020.[1] High fatality rates are to be expected from Special Operations Forces (SOF) due to the greater probability of engaging in combat and other high-risk activities compared to conventional forces. For example, just over half of all SEAL fatalities since 2001 occurred while flying inside a helicopter, a critical but vulnerable insertion method often used by SOF.[2] This research examines U.S. Navy SEAL combat deployments to Iraq and Afghanistan and their effect on casualties for the purpose of proposing an effective and equitable ex ante compensation for deployment-based fatality risk of Navy Special Operations Forces (NAVSOF) and other USSOF units.

This examination is a continuation of the research completed by Armey et al. in the 2018 working paper *Combat, Casualties, and Compensation: Evidence from Iraq and Afghanistan*. Where Armey et al. analyzed the effect of deployment on casualties for all military personnel deployed to Iraq and Afghanistan, this research specifically focuses on Navy SEAL deployments to Iraq and Afghanistan. Data were collected from restricted enlisted SEAL personnel records from the Defense Manpower Data Center and Social

[1] DOD active duty military force size found from the Defense Manpower Data Center (DMDC), 2020.

[2] Open source research revealed approximately 51% of all SEAL combat fatalities from 2001 to present were helicopter related.

Security Administration (SSA) for the years 2007 to 2012. The data show Navy SEAL casualty figures for Iraq and Afghanistan distributed across race, education, age, and marital status. In a methodology consistent with that of Armey et al. (2018), the effect of combat deployments on casualties for Navy SEALs was calculated using stateside SEAL operators as the control group and deployed SEAL operators in Iraq or Afghanistan as the treatment group. Lastly, this thesis proposes an appropriate risk-based combat pay for deployed NAVSOF and other USSOF personnel.

This thesis further extends the large body of literature that has researched the effects of combat deployments on a number of consequential outcomes. Many such studies focused on the effects of a combat deployment on mental and physical health issues (Cesur et al., 2013, 2015; Cunha et al., 2016). Other studies focused on the relationship between combat deployments and negative familial matters such as domestic violence, substance use, homelessness, and divorces (Cesur & Sabia, 2016; Cesur et al., 2016; Ackerman et al., 2020; Negrusa et al., 2014). Lastly, further studies explored the effects of combat deployments on educational outcomes (Armey & Lipow, 2016; Engel et al., 2010). As in previous studies, this thesis utilizes combat deployments to Iraq or Afghanistan as the independent variable.

The results show that from 2007–2012, Navy Special Warfare (SEAL) operators sustained an overall fatality rate of 0.31% with 0.07% being attributed to stateside deaths. This incidence of stateside deaths is 20% greater than that of the entire active duty military force from 2001–2012[3] and is likely the result of high-risk training activities. Additionally, from 2007–2012, SEAL operators sustained a fatality rate in Iraq and Afghanistan of 0.24%—nearly nine times greater than that of the entire active duty military force from 2001–2012.[4] Moreover, the data reveal that SEAL operators who deployed to Iraq or Afghanistan in a single year were subject to a total likelihood of death of 800 per 100,000

[3] The fatality rate for U.S. military service members stateside from 2001–2012 was found to be 0.0582% (Armey et al., 2018).

[4] The fatality rate for all active duty military from 2001–2012 was calculated at 0.027% (Armey et al., 2018).

which is 250 times greater than the national work place average.[5] Furthermore, the data show that the SEAL operators who deployed to Iraq or Afghanistan in a single year had an increased chance of death of 530 per 100,000 compared to non-deployed SEAL operators stateside—over 11 times greater than the increased likelihood of death experienced by all U.S. military personnel deployed to Iraq or Afghanistan.[6] To compensate for that level of additional risk, this analysis uses a $10.9 million Value of a Statistical Life (VSL) to suggest a compensation amount of $14,442/month compared to the current $225/month in combat pay provided to U.S. military personnel deployed within combat zones.

[5] The national civilian workplace average in 2012 was 3.2 per 100,000 Full Time Equivalent (FTE) workers (U.S. Department of Labor, 2012).

[6] U.S. military service members deployed to Iraq or Afghanistan from 2001–2012 sustained an increase of 48 per 100,000 in the likelihood of death as a result of the deployment (Armey et al., 2018).

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II. LITERATURE REVIEW

A. HISTORY OF THE SEAL TEAMS

In every major conflict beginning with World War II, the U.S. Navy Sea, Air, and Land (SEAL) Teams and their predecessors have sustained incredible amounts of personnel risk while completing strategically important operations. Although exceedingly dangerous, these special operations were critical to U.S. war efforts by providing strategic effects at the tactical and operational levels.

Though the first two SEAL Teams were not commissioned until 1962, their predecessors—the Scouts and Raiders, Navy Combat Demolition Units (NCDUs), and Underwater Demolition Teams (UDTs)—began operating at the beginning of the U.S. involvement in World War II. First to be established, the Scouts and Raiders, formed in 1942 from a joint group of sailors, marines, and soldiers, were responsible for locating and reconnoitering enemy-held beaches. Then, once a landing assault was underway, the Scouts and Raiders would maintain reconnaissance positions on the beach and guide the amphibious assault to the correct landing beach (Dockery, 2004). This mission was executed numerous times to support Allied landings on the coastline of North Africa, Italy, and southern France. In the Pacific theater, the Scouts and Raiders, also known as the Special Service Units, participated in over 40 amphibious operations while broadening their mission to include guerilla warfare with the Chinese (Naval Special Warfare Command [NSWC], n.d.).

In 1943, the Navy Combat Demolition Units were formed in preparation for Operation OVERLORD, the allied invasion of Normandy. Similar to the Scouts and Raiders, the NCDUs were trained to reconnoiter enemy-held beaches. However, unlike the Scouts and Raiders, the NCDUs would also locate and destroy any underwater obstacles in preparation for an amphibious assault. During Operation OVERLORD, commonly referred to as “D-Day,” a total of 34 NCDU teams succeeded in creating several openings within the German defenses on Omaha Beach and Utah Beach (NSWC, n.d.). Despite being under constant fire, the NCDUs cleared gaps amounting to over 1600 yards of unobstructed

lateral beach to facilitate the Allied landing at Normandy (NSWC, n.d.). However, in opening Europe to the Allies, the 16 NCDU teams tasked to Omaha Beach paid a terrible price. Of the 175 NCDU personnel assigned to Omaha Beach, 31 were killed in action (KIA) and 60 were wounded in action (WIA), incurring a 52% casualty rate in a single day (Couch & Doyle, 2014). An additional 6 KIA and 11 WIA were sustained on Utah Beach (Couch & Doyle, 2014).

In the Pacific Theater, the Navy Underwater Demolition Teams were formed following the calamitous amphibious assault of Tarawa Atoll (November 20–23, 1943), in which nearly 1,000 Marines were killed and 2,000 more were wounded before reaching the beach (Couch & Doyle, 2014). Coral reefs that were shallower than expected prevented the landing crafts from reaching the beach and forced many Marines to wade ashore under heavy enemy fire (Couch & Doyle, 2014). To prevent another unnecessarily tragic amphibious assault, Admiral Chester Nimitz established UDT-1 and UDT-2 to provide hydrographic reconnaissance and obstacle clearance for future amphibious landing operations. Expanding to 34 teams by the end of the war, the UDTs were utilized in every major amphibious operation in the Pacific and later assisted in the amphibious landing operation at Inchon during the Korean War (NSWC, n.d.). Unfortunately, as was the case with the NCDUs in the European theater, the UDTs sustained very high casualty rates. Of the 3,500 UDT sailors who served in WWII, 83 were killed (Couch & Doyle, 2014).

Seeking to repurpose the UDTs to meet the new challenges of the Cold War and advance the nation's unconventional warfare capability, President John F. Kennedy authorized the formation of SEAL Team ONE and SEAL Team TWO in 1962 (Couch & Doyle, 2014). Formed primarily of UDT sailors, SEAL Team's ONE and TWO immediately deployed to Vietnam. Although deployed initially in an advisory role, the SEALs were soon responsible for conducting counter-guerilla warfare and clandestine reconnaissance operations throughout Vietnam. With the incorporation of helicopters and riverine assault crafts into their operations, the SEAL platoons conducted ambushes, raids, reconnaissance patrols, and intelligence collection operations (Couch & Doyle, 2014). In addition to the value provided by the intelligence collected and number of South Vietnamese resistance fighters trained, the SEAL historian, Dale Andrade, notes in the

book, *Navy SEALs: Their Untold Story*, "By the end of 1970s SEALs and their South Vietnamese allies had killed more than two thousand Viet Cong and captured about twenty-seven hundred, many of them important members of the political infrastructure" (Couch & Doyle, 2014, p. 117). In addition, SEALs were responsible for six POW rescue operations that freed 152 Vietnamese captives, roughly half of all the POWs freed during the conflict (Couch & Doyle, 2014). Considering the SEAL teams rarely deployed more than 120 SEALs to Vietnam at any given time (Couch & Doyle, 2014), a tiny fraction compared to the total U.S. military force of 543,400 deployed to Vietnam in 1969 (DMDC, n.d.), it is evident the SEALs had an outsized effect on the war. However, during the years of active hostilities from 1965 to 1972, 46 SEALs died in battle and many more were wounded in action (Couch & Doyle, 2014).

After the Vietnam War, the SEAL Teams participated in a number of smaller, but nonetheless strategic, operations. In Grenada, 1983, SEALs conducted several operations ranging from hydrographic reconnaissance to safely rescuing the island's appointed governor during Operation URGENT FURY. Unfortunately, while conducting a parachute insertion over open water, four SEALs were killed due to a random squall (Dockery, 2004). As part of Operation EARNEST WILL in the Persian Gulf, on 21 September, 1988, SEALs boarded and seized an Iranian ship caught laying mines. In doing so, the SEALs not only prevented the further mining of the nine mines they found on the ship, but also captured documentation showing the locations of the mines already deployed. More importantly, their actions exposed Iran to international scrutiny for mining international waters (USSOCOM History and Research Office, 2007). During Operation JUST CAUSE, the U.S. operation to restore the democratically-elected Panamanian government in 1989, SEALs conducted several operations to assist in the effort. Most notably, they prevented the escape of the Panamanian dictator, General Manuel Antonio Noriega, by preemptively destroying the patrol boat called the *Presidente Porras* and capturing the personal Learjet belonging to the dictator (Dockery, 2004). Their successful efforts at preventing his escape came at the staggering cost of four SEALs KIA and another eight WIA (Dockery, 2004). During Operation DESERT SHIELD/DESERT STORM (1990-1991), the U.S. operation to defend Saudi Arabia and remove Iraqi forces from Kuwait, the SEAL Teams conducted

the full gamut of strategic operations that included combat search and rescue, training the Saudi and Kuwaiti Special Forces, and most importantly, a successful maritime deception operation that diverted several Iraqi divisions away from the main line of attack (Dockery, 2004). Through the remainder of the 1990s, SEALs were involved in operations in Somalia, Bosnia, Haiti, and Liberia (NSWC, n.d.).

Following the terrorist attacks on the World Trade Center on September 11, 2001, the SEAL Teams continued to deliver strategic effects to the battlefield through a multitude of mission sets that included direct action, foreign internal defense, counter-insurgency, special reconnaissance, and counter-terrorism operations. During Operation ENDURING FREEDOM (2001–2014) in Afghanistan, SEAL elements completed more than 75 special reconnaissance and direct action missions destroying more than 500,000 pounds of explosives and weapons and capturing or killing key enemy personnel (NSWC, n.d.).

In Iraq, the SEAL Team's special operations capabilities enabled them to be at the forefront of offensive combat operations in both Operation IRAQI FREEDOM (2003–2011) and Operation INHERENT RESOLVE (2011-present). The most notable contributions include: securing critical maritime oil infrastructures, clearing key waterways, enabling humanitarian aid deliveries, and conducting reconnaissance and direct action raids to capture high value targets, seize suspected chemical, biological and radiological sites, and rescue a U.S. prisoner of war (NSWC, n.d.). According to the Navy SEAL Foundation, since 2001 there has been a total of 71 Naval Special Warfare operators killed in action, 57 of which were SEALs.

B. BACKGROUND HISTORY OF COMBAT PAY

Beginning in World War II, the U.S. military has recognized the tremendous additional risk of combat with compensation appropriately referred to as "combat pay." What began as Badge Pay in 1944 progressed into Combat Pay during the Korean War and ultimately became the current Hostile Fire Pay/Imminent Danger Pay of today. In the effort to ensure no deserving combat veteran was ineligible for this supplemental pay, U.S. combat pay policy has evolved extensively over the years, expanding eligibility to ever greater numbers of service members while slowly loosening its relationship with combat.

Today's combat pay policy no longer includes "combat" in the name and is instead called Imminent Danger Pay (IDP) or Hostile Fire Pay (HFP) depending on the circumstances under which it is received. Although the policy behind combat pay changed substantially over time, the original intent of compensating individuals for the heightened risks of combat has largely remained constant (Gould & Horowitz, 2011a).

The most extensive history on combat pay was outlined in a 2011 research paper completed for the 11th *Quadrennial Review of Military Compensation* (QRMC) by Brandon Gould and Stanley Horowitz. In their paper, they note that the first combat compensation was introduced to frontline ground troops as Badge Pay in June 1944 in order to boost morale and equalize the pay differential with the other services entitled to various incentive pays. According to background papers from the Under Secretary of Defense for Personnel and Readiness (USDP&R), submariners had already been receiving an extra $5-$15 a month for "the arduous and hazardous nature of submarine duty" since 1901 (2018, p. 327). Similarly, aviators began receiving "flight pay" in 1913 which increased their wages by 35% for "the exceedingly hazardous nature of military flying duty" (2018, p. 22). Because Army infantry was engaged in direct combat and sustained similar fatality rates to that of both submariners and aviators, Congress eventually agreed with the Army infantry leaders and authorized Badge Pay (Gould & Horowitz, 2011a). Badge Pay constituted an additional $5 per month for an Expert Infantryman Badge, earned in infantry training, and $10 per month for the Combat Infantryman Badge, earned in combat (Gould & Horowitz, 2011a). Though it was first reserved solely for the infantry, it later expanded to include combat medics in 1945 (Gould & Horowitz, 2011a). However, as Gould and Horowitz point out, because Badge Pay was predicated on a single specialty, the infantry, other non-infantry specialties such as artillery, special forces, and tank crews were ineligible for Badge Pay despite also being exposed to the dangers of combat. While not being directly tied to combat, Gould and Horowitz conclude that Badge Pay inadvertently established the legacy of "recognition" for the severe demands of combat and infantry service (2011a).

After terminating Badge Pay in 1949, Congress passed the Combat Duty Pay Act in 1952 which authorized additional compensation for service members deployed to Korea.

This additional compensation was appropriately called “Combat Duty Pay” or “Combat Pay” and consisted of $45 per month to service members physically located within Korea who either served at least six days in designated “combat units” or were wounded, injured, or killed by hostile fire. According to Gould and Horowitz, “combat units” were narrowly defined by statute which limited the pay to only the frontline ground troops actively engaged in combat. This resulted in many soldiers from “non-combat” units being ineligible to receive the added pay even when they were subject to hostile enemy action from guerilla warfare and bombings (Gould & Horowitz, 2011a). In total, only 15% of the entire military and 19% of the Army deployed to Korea received Combat Pay according to the *Military Personnel Historical Report of 1953* (Gould & Horowitz, 2011a). Continuing with Gould and Horowitz, the bill also restricted anyone receiving both a specialty or incentive pay and Combat Pay. This meant that many fighter pilots or submariners who already received special pay were barred from also receiving Combat Pay even if they were subject to enemy fire or sustained injury or death in combat. Nevertheless, unlike Badge Pay that preceded it, Combat Pay was open to all services and occupational specialties, had narrow conditions for what constituted a “combat unit,” and mandated a geographic requirement (Gould & Horowitz, 2011a). Essentially, combat pay went from being a special pay reserved for “badged” infantry—even those not actively engaged in combat—to more of a risk-based compensatory pay to all service members actively engaged in ground combat. Gould and Horowitz contend that one similarity Combat Pay did have to Badge Pay was that it was a “recognition” of the extreme “hazards and hardships” frontline service members endured in combat. However, as Gould and Horowitz are quick to point out, this rationale of “recognition” opened the door for the other services to also demand combat pay for the added risks they sustained while in combat.

This transition from recognizing both the “hazards and hardships” of the frontline soldier to just “hazards” or “risk” was realized at the outset of hostilities in Vietnam with the Uniformed Services Pay Act of 1963 (Gould & Horowitz, 2011a). Renaming Combat Duty Pay to Hostile Fire Pay, the Uniformed Services Pay Act of 1963 raised the rate of combat pay to $55 per month, delegated administrative discretion of combat pay over to the Department of Defense, and removed the statutory restrictions on multiple special and

incentive pays. Under this special pay provision, service members were eligible for Hostile Fire Pay if a service member met one of three conditions:

1. Was subject to hostile fire or explosion of hostile mines; or
2. Was on duty in an area in which he was in imminent danger of being exposed to hostile fire or explosion of hostile mines and in which, during the period he was on duty in that area, other members of the uniformed services were subject to hostile fire or explosion of hostile mines; or
3. Was killed, injured, or wounded by hostile fire, explosion of a hostile mine, or any other hostile action. (37 U.S.C., Section 310)

Gould and Horowitz note that delegating the discretion to the Secretary of Defense eliminated the need for future authorizations and provided the Department of Defense with more flexibility to better respond to emerging theaters of conflict. Additionally, without a ban on multiple special and incentive pays, eligibility from other services increased. However, unlike WWII in which the fatality rates of pilots and submariners were fairly similar to the frontline soldier, in Vietnam the rates were considerably lower. This raised a controversy with many believing that pilots and submariners were already being compensated for the heightened risks in their own specialty with specialty pay, and therefore, did not need to be further compensated for combat (Gould & Horowitz, 2011a). In effect, these changes diluted the original purpose of recognizing the unique "hazards and hardships" of the frontline soldier and refocused the compensation towards a broader "recognition for risk" standard (Gould & Horowitz, 2011a).

Because there was no longer a ban on multiple special and incentive pays, the justification behind combat pay shifted from the need to recognize the dual standards of both the "hardships and hazards" of the frontline soldier to solely recognizing the "hazard" of the frontline soldier (Gould & Horowitz, 2011a). If the "hazards" were equal to that of the frontline soldier, then combat pay was deserved regardless of hardship. Thus, if the "hazard" or "risk" of combat was identical for both ground troops and bomber pilots, then the bomber pilots should also be recognized with combat pay. However, over time the degree of hazard or risk warranting "recognition" with combat pay lowered from the level of the frontline soldier to any level of risk (Gould & Horowitz, 2011a).

Although Congress provided increased discretion to the Secretary of Defense in the administration of Hostile Fire Pay to allow for greater flexibility and responsiveness, the lawmakers believed the Department of Defense would keep the pay aligned with the narrow eligibility criteria presented in the Combat Duty Pay Act of 1952, and at first it did (Gould & Horowitz, 2011a). According to Gould and Horowitz, the Secretary of Defense kept the narrow interpretation of the Uniformed Services Pay Act by issuing the first draft of the Department of Defense Instruction (DODI) 1340.6 in November of 1963 which maintained much of the same provisions found in the Combat Duty Pay Act of 1952 such as the six-day service requirement and limitation on the size of a "combat unit." As a result of this narrow interpretation, only 25% of the personnel stationed in the Vietnam theater of operations received Hostile Fire Pay between 1963–1965, according to the report for the 1971 QRMC.

Then, in 1965, the Secretary of Defense made three notable changes to DODI 1340.6 for administering Hostile Fire Pay (Gould & Horowitz, 2011a). The first change expanded eligibility for all personnel across all services to "areas designated by the Secretary of Defense" (p. 33). The second change eliminated the 6-day requirement. And finally, the third change extended Hostile Fire Pay to any member "killed, wounded, or injured by hostile fire, explosion of hostile mines, or any other hostile action any place in the world" (p. 33).

Together, these changes transformed the eligibility for Hostile Fire Pay and immediately increased the total number of HFP recipients by 500% reaching a height of 300,000 recipients in 1965 (Gould & Horowitz, 2011a). By 1968, the number of HFP recipients peaked at 1.25 million (Gould & Horowitz, 2011a). According to Gould and Horowitz, the first change removing the "unit-based" restrictions eliminated any notion that combat pay was reserved for the frontline soldier and their associated "hardships." Instead, for any service member not actually killed, injured, or wounded by hostile action, Hostile Fire Pay became entirely dependent on risk determined solely by where a service member was physically located. There was now no longer a distinction between the level of risk the frontline soldier sustained and those working outside of combat as long as they

were within the same “area” designated by the Secretary of Defense (Gould & Horowitz, 2011a).

Once the hostilities in Vietnam ended, the recipients of HFP lowered to a sparse few and it was not until the 1983 bombing of the Marine Corp barracks in Lebanon which killed 241 service members that Congress sought to provide additional compensation to recognize risk even when there was no hostile fire that would warrant HFP (Gould & Horowitz, 2011a). Under current legislation, the Marines in Lebanon were not receiving any additional compensation for the risk of being in a dangerous area prior to the bombing. Arguably, despite the lack of active hostile fire within Lebanon, the Marines sustained high amounts of risk and deserved extra compensation just by being physically located in Lebanon.

Consequently, in the 1984 Department of Defense Authorization Act, Congress extended combat pay to include those “on duty in a foreign area in which the member was subject to the threat of physical harm or imminent danger on the basis of civil insurrection, civil war, terrorism, or wartime conditions” (37 U.S.C., Section 310). Now, all service members were eligible to receive what is commonly referred to as Imminent Danger Pay (IDP) without the requirement of actually being exposed to combat so long as they were in an “imminent danger zone” approved by the Secretary of Defense. As a result of this new expansion of combat pay, the number of personnel across the DOD eligible for IDP/HFP went from a low of 4 in 1982 to 3,646 in 1984 (Gould & Horowitz, 2011a).

Although this newly relaxed requirement did well to recognize the risk in low-level conflicts, once large-scale hostilities began in 2003, the disparity of risk between those actually in combat and those just residing in an “imminent danger zone” became more apparent (Gould & Horowitz, 2011a). Now, there were large contingents of soldiers engaging the enemy in direct combat and sustaining higher fatality rates than any of the other low-intensity conflicts of the ’70s, ’80s, and ’90s. Yet, despite the differences in risk between the different theaters, the compensation remained the same. Non-combat deployments to the Balkans and sub-Saharan Africa received the same compensation as combat deployments to Anbar Province, Iraq, despite vast differences in the level of risk (Gould & Horowitz, 2011a). Recognizing this disparity, in 2003 President George W. Bush

attempted to create two tiers of HFP/IDP by extending a temporary increase in HFP/IDP from $150/month to $225/month for only those operating in Iraq and Afghanistan (Gould & Horowitz, 2011a). However, fearing that extending the HFP/IDP raise to only service members in Iraq and Afghanistan would amount to a pay cut for all other IDP locations, Congress permanently extended the raise to all imminent danger zones worldwide (Gould & Horowitz, 2011a).

There have been no significant changes to combat pay policy since the 2003 IDP/HFP increase. Present combat pay policy consists of $225/month for any service member located in any imminent danger zone designated by the Secretary of Defense or those service members who meet the HFP requirements. Since 2001, of the nearly 80 areas designated as imminent danger zones, 36 have been undesignated (Asch et al., 2019). To date, there are 42 areas designated as imminent danger zones including Iraq, Afghanistan, Yemen, Egypt, Djibouti, Israel, Malaysia, and 35 others (DOD, 2020a).

C. SPECIAL AND INCENTIVE PAYS

In addition to combat pay, there are other special pays (also referred to as incentive pays) to the military base salary for those that qualify. Special pays are generally applied for one of two purposes: to incentivize service members to meet manpower requirements or to compensate service members for higher-risk, more-arduous service conditions or sometimes both (Under Secretary of Defense for Personnel and Readiness [USDP&R], 2018). Arguably, these pays also compensate service members for increased risk. In addition to incentivizing service members to take on the higher-risk, less-desirable occupations, special pays also provide greater compensation to match levels offered in the civilian sector for similar occupations (USDP&R, 2018). Unlike combat pay which offers a flat amount for all ranks and specialties, special pays vary based on the rank and years in service.

Without special incentive pays, there would likely be fewer service members who would volunteer or continue to serve in less desirable or more arduous jobs such as submarine and sea duty. As a result, there are special incentive pays for both submarine

and sea duty called Submarine Duty Incentive Pay ($75-$835/month) (Military.com, n.d.) and Sea Pay ($60-$805/month) (Absher, 2020), respectively.

There is also a special pay designed to compensate for additional "hardship" experienced by a service member called Hardship Duty Pay which can be distributed on the basis of location, mission, operational tempo, and restriction of movement (DOD, 2018). The one most often used, Hardship Duty Pay-Location (HDP-L), is provided to compensate service members ordered to live in "locations where living conditions are substantially below those normally found within the continental United States" (DOD, 2018). Currently, there are over 150 designated areas entitled to HDP-L ranging from $50 to $150. In locations where service members are also entitled to IDP/HFP, HDP-L is capped at $100/month (DOD, 2018). Consequently, service members in Iraq and Afghanistan receive a total of $325 in extra pay consisting of $100 from HDP-L and $225 from IDP/HFP.

Other specialty pays, called Hazardous Duty Incentive Pays, attempt to compensate service members for the duties or skills that present an increased risk to the service member (DOD, 2019b). Such pays include Dive Pay ($340/month), Parachute Pay ($150-$225/month), Demolition Pay ($150/month), and Flight Deck Duty Pay ($150/month) (Powers, 2019). Rather than issuing three separate pays for dive, parachute, and demolition, Navy SEALs are compensated with a single pay called Skills Incentive Pay ($515-$715/month) to compensate for the total increased risk acquired from conducting high risk activities in both training and while deployed (Navy Personnel Command, n.d.). Combat pay or IDP/HFP, is considered a type of Hazardous Duty Incentive Pay.

D. OTHER COMBAT COMPENSATION: COMBAT ZONE TAX EXCLUSION

Although not directly tied to combat or risk, U.S. military personnel also receive tax benefits for military pay earned during wartime. Military tax exclusion benefits have been federal policy since World War I and continues under the present policy called Combat Zone Tax Exclusion (CZTE) (Gould & Horowitz, 2011b). Following the ratification of the 16th Amendment authorizing the first federal income tax in 1913,

Congressional legislators believed that those serving in the war should not also be burdened with having to fund the war (Gould & Horowitz, 2011). Thus, once the U.S. entered World War I, Congress passed the Revenue Act of 1918 providing a $3,500 tax exclusion benefit for all military personnel in an attempt to restore tax liabilities for military service members to pre-war levels (Gould & Horowitz, 2011). Over time, the policy surrounding the exclusion of military pay from federal income taxes has been amended over the years. The most notable change occurred in the Revenue Act of 1950 in which Congress limited the tax benefit to only the service members physically serving in the Korean conflict rather than providing it to all service members regardless of location as was the norm during WWI and WWII (Gould & Horowitz, 2011). At present, CZTE allows all military personnel to exclude military pay earned while in one of the 17 currently-designated combat zones (DOD, 2019a). For enlisted service members, the excludable amount is unlimited. For commissioned officers, the excludable amount is limited to the maximum enlisted pay allowance for that year. Currently, the maximum enlisted pay allowance is set at $8,844 per month (Combat Zone Tax Exclusions, n.d.). Despite slight modifications over the years, the military wartime tax exclusion was never intended to compensate warfighters for risks sustained in combat, but rather, to avoid administering a dual penalty for service members having to both finance and fight a war.

E. PREVIOUS ACADEMIC STUDIES

Previous studies have assessed both the effectiveness and equity of IDP/HFP and CZTE by analyzing the distribution of such combat compensation across a variety of demographics and combat zones. A study in 2011 by Pleeter et al. titled *Risk and Combat Compensation* analyzed the distribution of IDP payments across all the designated combat zones eligible for IDP and found that Iraq and Afghanistan contained 98.1% of all the fatalities during 2003–2009, yet received only 55.2% of the entire distribution of combat pay (2011). In addition, Pleeter et al. found that for 2007, Afghanistan and Iraq had the highest casualty rates of 1.26% and 1.22%, respectively, while the remaining combat zones were all under 0.2% if not outright zero. Consequently, Pleeter et al.'s study illustrates the wide disparity of risk between combat zones and how the current distribution of combat pay across combat zones disregards risk differentials.

In the same 2011 study, Pleeter et al. also sought to determine whether or not the casualty rates were spread equally among the ranks. As combat pay (IDP/HFP) is identical across all pay grades, this would identify if combat pay was being effectively distributed or if it should be directed towards the pay grades that were most "at risk." Not surprisingly, Pleeter et al. found that the casualty rates peaked at the rank of E-2 for enlisted and O-1 for officers and steadily declined as the pay grade increased (2011).

To further accentuate this imbalance of risk and monetary compensation, Pleeter et al. also determined that the higher ranks received the most benefit in combat compensation due to Combat Zone Tax Exclusion (2011). As previously stated, the current CZTE policy allows enlisted to exclude their total income and officers to exclude up to the highest enlisted income, currently at $8,844 per month (Military Compensation, n.d.). Thus, the higher the pay grade, the more money earned in base salary, and therefore the more tax benefits received from the federal tax exclusion. In addition, as Pleeter et al. identifies, CZTE introduces another tax benefit, the Earned Income Tax Credit, or EIC, which provides additional compensation for those who exclude enough income to be eligible. For example, under the current policy, an O-6 with two children deployed for 11 months in a combat zone can reduce taxable income to $7,000 and earn an extra $5,036 in EIC benefit (Pleeter et al., 2011). Moreover, Pleeter et al. estimated that there were approximately 200,000 officers earning over $100,000 that were eligible for the earned income tax credit in 2011. In a separate study that further highlights the disparity of combat compensation by rank, the authors state, "Under today's exclusion, an O-6 deployed to Bahrain receives almost quadruple the tax benefits of an E-3 serving in Baghdad. Note also that a service member dying from hostile fire outside a designated combat zone receives no benefits and must pay tax on any outstanding income or estate liabilities" (Gould & Horowitz, 2011b, p. 30).

Following the results of Pleeter et al.'s study, in 2018, Armey et al. completed an analysis of combat risk for various demographics in the paper titled *Combat, Casualties, and Compensation: Evidence from Iraq and Afghanistan*. By analyzing the fatality rates of deployed service members to Iraq and Afghanistan from 2001–2012, Armey et al. discovered that deployed service members had an increased likelihood of death of 48 per

100,000 than non-deployed military service members who remained stateside (2018). Moreover, Armey et al. discovered that fatality risk was not equally shared across the services. The Army had the highest increased likelihood of death at 65.7 deaths per 100,000 while the Air Force actually had a negative change in the likelihood of death at -7.43 per 100,000, that is they were less likely to die in a combat theater than they were stateside. Furthermore, Armey et al. found the most significant disparity in risk occurred between combat and non-combat jobs. Personnel assigned to combat units experienced the most dramatic increase in likelihood of death at 180 per 100,000 as a result of an Iraq or Afghanistan deployment while those in non-combat job types experienced a lower fatality risk compared to stateside. Finally, to recommend a compensation level commensurate with the level of risk from combat, Armey et al. used the Department of Transportation's 2016 Value of a Statistical Life (VSL) at $9.6 million and the average additional likelihood of death at 48 per 100,000 to calculate a monthly compensation value of $808 per month (pp. 17–18). Although the current IDP/HFP amount of $225 per month is considerably lower than the $808 per month, it is important to note the additional tax benefit provided by CZTE, which according to Pleeter et al. is 4.5 times greater than the compensation provided through IDP on average (2011). However, one must also note that CZTE most significantly benefits the higher pay grades who are the least likely to endure combat and have the lowest fatality rates (Pleeter et al., 2011). Finally, as risk was not evenly distributed between service and job types, Armey et al. further recommends that combat compensation should be adjusted on the basis of service or job type to more effectively and equitable allocate combat pay to the service members who sustain the most risk (2018).

At the request of the Department of Defense to fulfill a directive in the 2019 National Defense Authorization Act (NDAA), the RAND Corporation, an independent research organization, conducted an evaluation of the current system for awarding combat pay to determine if the current methodology is "effective in meeting the needs of service members or whether an alternative approach based on deployments would be more appropriate" (Asch et al., 2019, p. ix). Specifically, the FY 2019 NDAA asked, "Is the current IDP process effective? Does it meet the needs of service members, including special operations forces?" The resulting evaluation titled *An Examination on the*

Methodology for Awarding Imminent Danger Pay and Hostile Fire Pay provided two notable recommendations for improving the current combat pay policy. The first recommendation was to "create tiered rates of IDP based on severity of threat. Setting IDP to reflect different levels of exposure to danger would address inequities among members who currently receive the same pay but face different exposure" (Asch, pp. xi). The second recommendation called to "increase the current $225 rate for HFP and IDP. IDP should be increased to restore its real value since 2003 and to exceed the $250-per-month Family Separation Allowance" (Asch, pp. xii). Overall, the RAND Corporation found that IDP/HFP was relevant and effective, but that changes needed to be made "to better align the pay to exposure to danger" (p. 47).

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III. DATA

Data was compiled from the Social Security Administration (SSA) and the Defense Manpower Data Center (DMDC) to identify and profile all active duty enlisted Navy SEAL operators deployed to either Iraq or Afghanistan and those stationed in the United States for the years 2007–2012. The data from the SSA provides the date of death for all Navy SEALs who died during 2007–2012 regardless of where the death occurred. By comparison, data from the DMDC provides the descriptive characteristics for each SEAL operator such as age, marital status, number of dependents, education, and race. Data from the DMDC also identifies whether or not a SEAL operator deployed in a given year and if so which country the operator deployed to.

One limitation in the data compiled is that the data set does not cover the entire duration for the main years of U.S. war efforts in Iraq and Afghanistan. Ideally, this research would have included data from the years 2001–2007 as Navy SEAL operations into Afghanistan and Iraq began in 2001 and 2003 respectively. Also, doing so would enable a more complete analysis and be better aligned with the results from Armey et al., but unfortunately, this was not possible due to data collation issues at the DMDC.

However, Navy SEALs were deployed in both Iraq and Afghanistan during the 2007–2012 time period and the data set is reflective of the routine danger assumed during kinetic combat deployments normally associated with Special Operations Forces (SOF). Conversely, it is important to note that in the six years between 2001 and 2007 there were 18 SEALs KIA, whereas in the five years between 2007 and 2012 there were 31 SEALs KIA. This two-fold increase in fatalities from 2007 to 2012 is largely attributed to a catastrophic event that resulted in 17 SEALs KIA in one day.[7] Although this likely skewed the results to reflect a higher likelihood of death, it is important to remember that combat fatality rates are largely dependent on the size of the deployed force and without the data

[7] On August 6, 2011, an enemy rocket hit and destroyed a helicopter in Afghanistan killing all 38 personnel onboard to include 17 SEAL operators (Pruitt, 2018).

from 2001–2007, it is impossible to determine the extent to which the results are skewed. Figure 1 displays the distribution of SEAL combat deaths from 2001–2012.

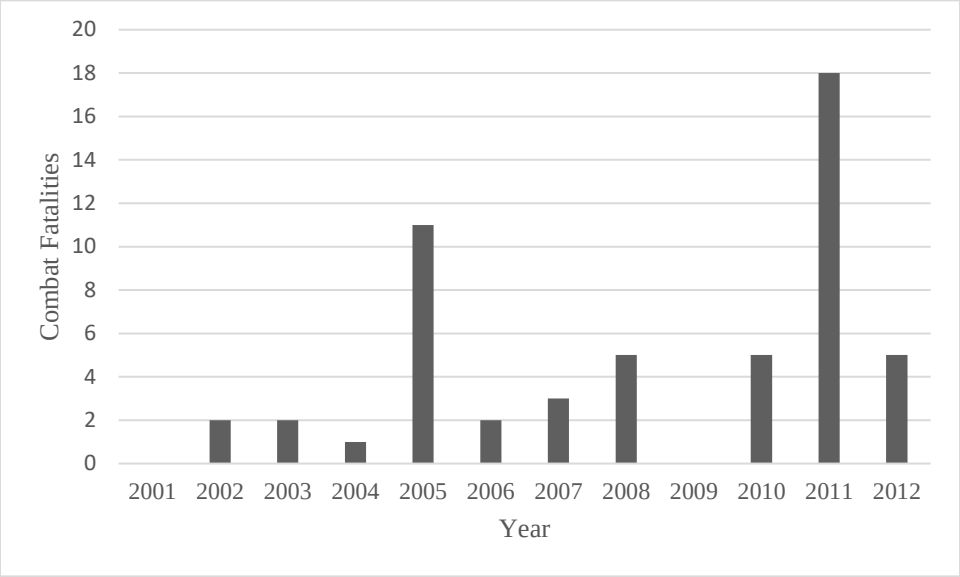

Figure 1. Navy SEAL Combat Fatalities in Iraq and Afghanistan by Year. Adapted from Defense Manpower Data Center (2020).

Not having the data from 2001–2007 also presents another limitation to the data by further reducing an already small sample size. Although Navy SEALs sustain relatively high casualty rates for their small force size, the actual numbers of KIA deaths in the sample—31—are too low to achieve a high degree of certainty that the results are not caused by random chance. Consequently, only the first column in Table 2 is within a 10% statistical significance level. Still, the remaining columns in Table 2 are all within a 15% statistical significance level. However, Table 3, which estimates the same effect as Table 2 but with a different regression method, is statistically significant at the 1% level. For Table 4, all the estimates are at the 10% statistical significance level.

Table 1 provides the descriptive characteristics for the entire data set of deployed and non-deployed Navy SEALs between 2007–2012. From nearly 10,500 observations in the data set, Navy SEALs experienced an overall fatality rate of 0.31% and a combat fatality rate of 0.24%. The combat fatality rate is defined as all fatalities, hostile or

otherwise, that occurred while deployed to Iraq or Afghanistan or from an injury sustained in Iraq or Afghanistan. The 0.07% difference between overall fatalities and combat fatalities can be attributed to stateside deaths likely occurring in training and other accidental deaths. The data set shows 35% of the observations were deployed for any given year and 58% were married. The average age of a SEAL operator in the data set was 31.8 years. The data set is comprised of 11.5% Hispanic, 2% Asian, and 86.5% other ethnicity with 90% White, 3% Black, and 7% other. Finally, within this data set of enlisted SEAL operators, 79% completed high school, 4% completed some college, 13% completed a 4-year college, and 1% completed schooling beyond college.

Table 1. Summary Statistics

	Observations	Mean	Standard Deviation	Minimum	Maximum
Death	10,491	0.0031	0.056	0	1
Combat Death	10,491	0.0024	0.047	0	1
Deployed	10,491	0.35	0.48	0	1
Married	10,491	0.58	0.49	0	1
Number of Dependents	10,491	1.31	1.40	0	7
Age	10,491	31.75	7.20	19	65
Hispanic	10,005	0.12	0.32	0	1
Asian	10,005	0.02	0.14	0	1
Other Ethnicity	10,005	0.87	0.34	0	1
Black	10,020	0.03	0.16	0	1
White	10,020	0.90	0.30	0	1
Other Race	10,020	0.07	0.26	0	1
Less than High School	10,083	0.03	0.18	0	1
High School	10,083	0.79	0.41	0	1
Some College	10,083	0.04	0.20	0	1
College (4-year degree)	10,083	0.13	0.33	0	1
Beyond College	10,083	0.01	0.08	0	1

In summary, when compared to the data set of overall U.S. active duty military personnel from Armey et al. (2018), an enlisted Navy SEAL operator is 20% more likely to die stateside, about nine times more likely to die in Iraq and Afghanistan, 150% more likely to be deployed, 16% more likely to be married, and three years older.[8]

[8] From a data set of over 17 million observations of U.S. active duty military service members from 2001–2012, Armey et al. found the overall fatality rate to be 0.0854%, combat fatality to be 0.0272%, 13.8% deployed, 50% married, and average age equal to 28.8 years (2018).

IV. ANALYSIS

A. METHODOLOGY

The previous research conducted by Armey et al. (2018) used an estimation strategy that measured fatalities to estimate "deployment risk." Specifically, Armey et al. compared "fatalities of stateside U.S. service members with those deployed to Iraq or Afghanistan" (p. 8) across the four major armed services (Army, Navy, Air Force, and Marines) and job types (Combat, Support, Service and Other). However, no analysis was completed for any of the USSOF units. Staying consistent with the estimation strategy presented in Armey et al., this research compares the fatalities of Navy SEALs deployed to Iraq or Afghanistan with those that occurred within the United States to identify the added risk assumed while deployed.

Consistent with Armey et al. (2018), to identify the effect of deployment into combat zones on fatality rates for active duty Navy SEALs, the following multi linear regression model from Armey et al. was used,

$$Fatality_{it} = \alpha + \beta Deployment_{it} + X'_{it}\theta + \varepsilon_{it}$$

where $Fatality_{it}$ assumes a value of one if the SEAL operator i dies in year t and zero otherwise. Similar to Armey et al., the binary indicator variable $Deployment_{it}$ is equal to one if the SEAL operator i is deployed to either Iraq or Afghanistan in year t and zero if stationed in the U.S. for the entire year. As specified by Armey et al., the vector X' is a set of individual control variables which include age, marital status, number of dependents, level of education, race, ethnicity, battalion fixed effects, time fixed effects, and ε, an idiosyncratic error term. Finally, as stated by Armey et al., "β is the coefficient of interest and can be interpreted as the effect of being deployed into a combat zone on death" (2018, p. 8).

B. RESULTS

Table 2 displays the linear regression results from comparing all deployed active duty Navy SEALs to Iraq or Afghanistan to non-deployed Navy SEALs remaining stateside from 2007–2012. Table 2 is separated into four columns for the various

permutations of control variables and the effects from unit and length of time. The only column to reach statistical significance is column 1 with no control variables or unit and time fixed effects. This is likely due to the limited sample size. The coefficients in the first row are all positive indicating an increase in the risk of death for deployed Navy SEALs to Iraq or Afghanistan compared to those remaining stateside. The coefficients range between 0.0048 and 0.0053 corresponding to an increased likelihood of death ranging from 480 per 100,000 to 530 per 100,000 for deployed SEALs in Iraq or Afghanistan compared to non-deployed SEALs stationed stateside. Column 1 has a statistically significant coefficient at the 10% level. Columns 2, 3, and 4 have statistically significant coefficients under the 15% level. Column 1 provides the best estimate as it is not only statistically significant, but it also does not incorporate unnecessary control variables such as age, race, ethnicity, and education which should have no impact on the likelihood of death in a war zone. Additionally, because columns 1 and 3 are identical, it appears that incorporating the unit and time fixed effects has no effect on the coefficient. The preferred estimate in column 4 suggests that Navy SEALs deployed to Iraq or Afghanistan in a given year experienced an increased likelihood of death of 530 per 100,000 compared to non-deployed Navy SEALs remaining stateside.

Table 2. The Incremental Effect of Deployment to Iraq or Afghanistan on Death for Navy SEALs

	(1)	(2)	(3)	(4)
Deployment	0.0053 *	0.004800	0.005300	0.004900
	(0.0031)	(0.003)	(0.0036)	(0.0035)
Control Variables?	No	Yes	No	Yes
Unit and Time Fixed Effects?	No	No	Yes	Yes
Observations	10,491	9,220	10,491	9,220

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Standard errors are clusters at the unit (i.e., battalion) level. Control variables include married, number of dependents, age, gender, race, ethnicity, and education. Time fixed effects include year dummy variables. The linear probability model shown in this table has the primary outcome variable (i.e., $Fatality_{it}$) take a value of 1 if soldier i is killed in year t and zero otherwise.

Given the low levels of statistical significance in the linear models, a logistic or logit regression was also performed to determine if it yielded similar results. Where linear models are more intuitive to interpret the average marginal effects, logit models are better suited for binary variables with limited or rare outcome effects (Wooldridge, 2010). Given the relative infrequency of death, this model may produce more accurate results. In the previous research done by Armey et al., linear probability models were used to estimate the marginal effect of deployment on death. However, because those regressions analyzed the effect for all U.S. service members deployed to Iraq or Afghanistan, they contained many more observations allowing for a greater statistical significance level. Due to the non-linear shape of the logistic curve, marginal effects are different depending on where a variable is measured in the logit model. However, they are often estimated from logits either using the average of all covariates or averaging all the marginal effects. In this model, the average effects are estimated by averaging all the marginal effects. One issue with logit is that it is unable to include observations from variables that predict 1 or 0 outcomes perfectly. This means that any battalion with no fatalities is dropped from the analysis. Moreover, we are unable to estimate the models in Table 4 with logit because non-deployments are coded as having a 0 probability of death while deployed. For these reasons, only columns 1 and 2 present accurate results while columns 3 and 4 should be disregarded.

Results from the logit regression reveal coefficients for the average marginal effects ranging between 0.00526 and 0.00528 corresponding to an increased likelihood of death of 526–528 per 100,000 for SEAL operators deployed to Iraq or Afghanistan in any given year between 2007–2012 compared to those stateside. These results are consistent with the preferred estimate from Table 2 of 0.0053 and are statistically significant at the 1% level. Although the logit regression garnered a better statistical significance level, this thesis uses the linear model for further extrapolation to maintain consistency with previous research and ease of understanding.

Table 3. The Incremental Effect of Deployment to Iraq or Afghanistan on Death for Navy SEALs (Logistic Regression)

	(1)	(2)	(3)	(4)
Deployment	1.61***	1.56***	0.98**	0.866*
	(0.47)	(0.422)	(0.457)	(0.46)
Average Marginal Effects	0.00526	0.00528	0.0003	0.01
Control Variables?	No	Yes	No	Yes
Unit and Time Fixed Effects?	No	No	Yes	Yes
Observations	10,491	8,623	5,320	5,139

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Standard errors are clusters at the unit (i.e., battalion) level. Control variables include married, number of dependents, age, gender, race, ethnicity, and education. Time fixed effects include year dummy variables. The logit probability model shown in this table has the primary outcome variable (i.e., $Fatality_{it}$) take a value of 1 if soldier i is killed in year t and zero otherwise.

Where Table 2 and Table 3 demonstrate the *increased* likelihood of death as a result of a combat deployment to Iraq or Afghanistan, Table 4 presents the *total* likelihood of death for all enlisted Navy SEAL operators deployed to Iraq or Afghanistan from 2007–2012. Essentially, Table 4 assumes the chance of death stateside is zero so every combat death that occurs in Iraq or Afghanistan is accounted for in the prediction coefficient. Table 4 can also be interpreted as the upper bound for the increased likelihood of death presented in Table 2 and Table 3. Again, there are four columns with coefficients representing the total effect deploying to Iraq or Afghanistan has on fatalities. All four coefficients have positive values indicating deployments have a positive relationship on fatalities. The coefficients range from 0.0062 to 0.008 corresponding to a total likelihood of death that is between 620 per 100,000 and 800 per 100,000 for a deployment to Iraq and Afghanistan. All four coefficients are statistically significant at the 10% level, but the preferred estimate for Table 4 is column 3. Similar to Table 2, column 3 does not account for the unnecessary control variables, but unlike in Table 2, column 3 accounts for unit and time fixed effects which does appear to have an effect on the regression. In this case, the preferred estimate

suggests the total likelihood of death for a Navy SEAL deploying to Iraq or Afghanistan in a given year is 800 per 100,000.

Table 4. The Likelihood of Death on Deployment to Iraq or Afghanistan for Navy SEALs

	(1)	(2)	(3)	(4)
Deployment	0.0066 *	0.0062*	0.008*	0.007*
	(0.0037)	(0.004)	(0.004)	(0.004)
Control Variables?	No	Yes	No	Yes
Unit and Time Fixed Effects?	No	No	Yes	Yes
Observations	10,491	9,220	10,491	9,220

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Standard errors are clusters at the unit (i.e., battalion) level. Control variables include married, number of dependents, age, gender, race, ethnicity, and education. Time fixed effects include year dummy variables. The linear probability model shown in this table has the primary outcome variable (i.e., $Fatality_{it}$) takes a value of 1 if soldier i is killed in year t and zero otherwise.

As noted by Armey et al. (2018), the average deployment to Iraq or Afghanistan increased the service members chance of death by 48 per 100,000 which is 15 times higher than the national workplace average in 2012 (See Figure 2). Similarly, deployed Navy SEALs to Iraq or Afghanistan experience an increased chance of death that is over 165 times higher than the average civilian job and a total likelihood of death that is 250 times higher than the civilian national average. Moreover, when compared to logging workers, the most dangerous non-military occupation with a fatality rate of 128 per 100,000, Navy SEALs deployed to Iraq or Afghanistan experience four times an increase in fatality risk and six times a total fatality risk (U.S. Department of Labor, 2013).

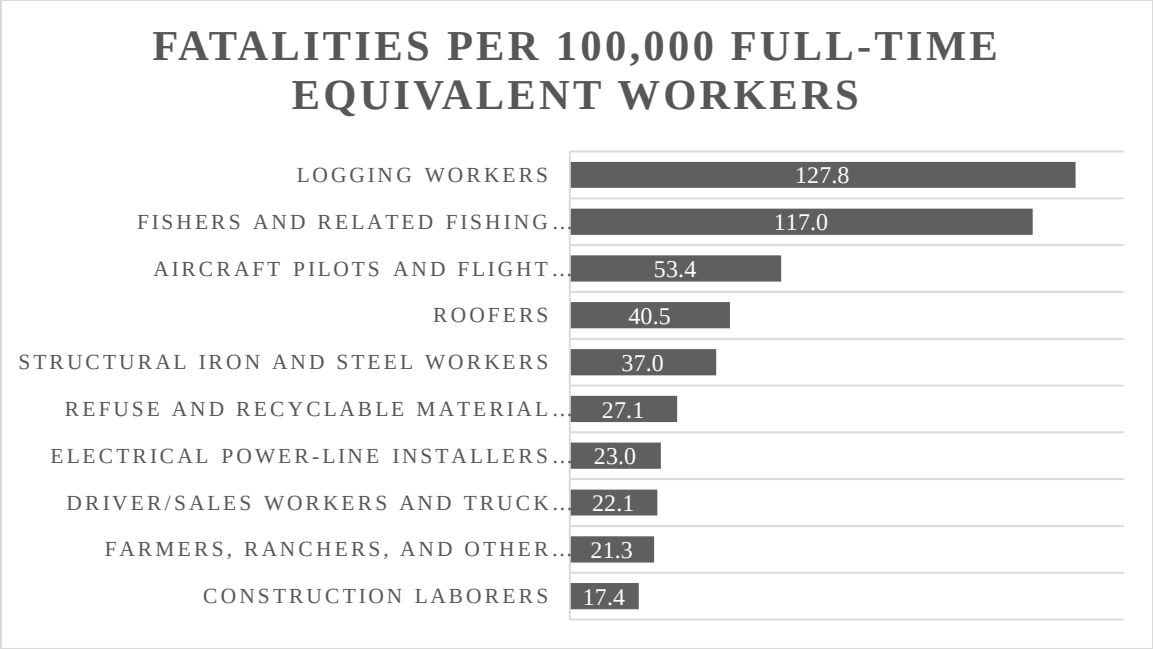

Figure 2. U.S. Civilian Occupations with High Fatal Injury Rates, 2012. Adapted from U.S. Department of Labor (2012).

V. IMPLICATIONS FOR COMBAT PAY POLICY

Under the current policy for combat pay, every service member who is within a designated combat zone receives the full amount of IDP/HFP of $225/month regardless of pay grade, job description, or risk. However, instead of basing combat pay on some arbitrary amount, one could base combat pay on the cost of the additional risk assumed for deploying to a combat theater (Armey et al., 2018). This research has shown that Navy SEALs sustain an increased risk of death of 530 per 100,000 compared to Navy SEALs located stateside. Additionally, the Department of Transportation has estimated the national Value of a Statistical Life for 2019 at $10.9 million[9] (Department of Transportation, 2016). By multiplying the 2019 VSL ($10.9 million) by the probability of death, it is possible to estimate an expected value of compensation for the added risk of a combat deployment for a SEAL operator. Thus, a risk-based compensation amount for a SEAL combat deployment is equal to: 0.0053 x $10.9 million = $57,000. This amount can further be converted to a monthly basis by dividing the total by the average length of a SEAL deployment. The data show an average SEAL deployment from 2007–2012 was equal to 4 months. Consequently, the monthly compensation for the extra risk a SEAL sustains during a combat deployment is: $57,770 / 4 months = $14,442/month.

Although $14,442/month is a large monthly wage increase, it is not an abnormal compensation level compared to the civilian sector for similar occupation profiles. Indeed, SOF personnel are often solicited for contractor jobs that require similar skillsets and experience. In 2004, such jobs were offering upwards of $100,000-$200,000 per year (Schmitt & Shanker, 2004). Assuming the demand for contractor jobs has remained the same, those same jobs in 2019 would be offering between $135,000-$270,000 accounting for inflation. By comparison, in 2019 an E-6 Navy SEAL living in Virginia Beach, VA with at least six years of experience and no dependents will earn a monthly stipend of

[9] The Department of Transportation's 2016 VSL estimate of $9.6 million was updated to $10.9 million to account for real wage growth and inflation up through 2019 (Department of Transportation, 2016).

$5,671.[10] This translates into a yearly wage of $68,052. If the same SEAL operator conducted a 12-month deployment to Afghanistan or Iraq and earned an additional $14,442/month in combat pay, he would receive a yearly total of $241,356—roughly equivalent to the market rate for contractors in 2004.

Furthermore, there are many other risks which can leave an operator severely and permanently disabled that were not included in this research. Such risks include the risk of being physically and mentally wounded in combat or injured during high-risk training evolutions. Although outcomes from those risks are compensated by ex-post recompences such as medical and disability pay, they are incredibly destructive to the individual and the pay can never recover what was lost.

There are several recommendations that would make the current combat pay policy more equitable. Previous authors have noted how the Combat Zone Tax Exclusion policy mostly benefits the pay grades with the lowest risk, and proposed recommendations such as a tax credit to correct for the regressive nature of the current tax exclusion policy (Pleeter et al., 2011; Armey et al., 2018). However, as noted earlier, the original purpose of CZTE was never to compensate service members for the additional risk sustained in combat, but rather to avoid making service members both pay and fight for the war (Gould & Horowitz, 2011b). Policy makers will need to decide if the current purpose of Combat Zone Tax Exclusion is to compensate service members for the risk of deploying to a combat zone, and if it is, then should consider options such as a standard tax credit to correct for the regressive nature of the current CZTE policy.

Other authors, such as the RAND Corporation, have recommended creating tiered levels for IDP based on the severity of risk, but noted doing so would require specifying the severity of threat (Asch et al., 2019). Fortunately, this research in conjunction with that from Armey et al. (2018), measures the "severity of threat" using fatality rates and quantified the wage differential appropriate to the risk across various job types. Although

[10] In 2019, an E6 SEAL operator earned $3,254 in base salary (2019 Pay Chart, n.d.), $590 in Skills Incentive Pay (Navy Personnel Command, n.d.), $369 in Basic Allowance for Subsistence (DOD, 2020c), and $1,458 in Basic Allowance for Housing (BAH Calculator, n.d.).

the Navy SEALs (and presumably other USSOF units)[11] sustained the highest amount of risk, Armey et al. discovered a significant difference in risk between combat specialties and non-combat specialties (Armey et al., 2018). Consequently, a more effective and equitable manner to distribute combat pay would be to have multiple tiers based on the severity of threat by job occupation. For example, a three-tiered system for IDP would enable non-combat, combat, and SOF occupations to each be recognized for the relative risks they assume while deployed to a combat zone. Even a two-tiered system—one for combat specialties and one for non-combat specialties—would be more equitable than the current combat pay policy while maintaining parity in pay between conventional and SOF service members.

However, a multi-tiered system for IDP still does not alleviate the problems identified in Badge Pay in which all soldiers were given extra pay, regardless of their proximity to combat. Put simply, not all personnel in a combat specialty are engaged in combat in a war zone. Many, including some Navy SEALs, remain in headquarter elements inside the wire and never experience combat. It would be widely apparent and grossly inequitable for service members in a combat specialty such as infantry to receive the higher rate of combat pay despite being assigned to a non-combat job.

To alleviate this concern, a more equitable manner to reform combat pay would be to separate IDP from HFP by raising the compensation level for HFP and limit the statutory clause providing HFP to those who were within an area in which there was imminent danger of hostile fire to just those in a "combat unit." This would ensure that all service members engaged in actual combat receive HFP and that only those service members in a combat "unit" —those that are most likely to be engaged in combat—receive the higher rated HFP, while also recognizing the lower risks for most other service members in non-combat roles with IDP.

[11] As most USSOF were executing similar mission sets and conducting operations with similar risks, it can be generally presumed that the added risk of death for all USSOF (Army SOF, Air Force SOF, Marine SOF) is similar to what was estimated for Navy SEALs, but further research should be done to confirm.

For a revenue neutral option, one could lower the rate for IDP and put the difference in HFP (or a higher tiered IDP). For example, using a conservative estimate from a study that found combat troops composed 40% of the total deployed military force in Iraq, 2005, (McGrath, 2007), lowering IDP to $150 for the non-combat force would allow for an increase to $337/month for a higher tiered combat pay (IDP or HFP) without changing the overall military obligation for combat pay. Doing so would raise combat pay for the combat troops to a level above the $250/month Family Separation Allowance alleviating some of the concerns brought forward from a survey conducted by Asch et al. Furthermore, if one were to adjust for inflation since the last IDP/HFP increase in 2003, it would further raise the revenue neutral option to $476/month for 2020. However, as noted by Asch et al., a raise in HFP above $450 would require congressional action (2019).

In summary, to equitably allocate combat pay on the basis of risk, combat pay should be reformed to have either multiple tiers of IDP that reflect the different levels of risk by job occupation or a higher level of compensation for HFP. For Navy SEALs, the risk estimates provided in this study indicate that SEAL operators deployed to a combat zone should receive either IDP or HFP in the amount of $14,442/month. Further risk assessments on the basis of job occupation should be done to develop appropriate risk-based combat pay levels for each job type.

VI. CONCLUSION

This thesis presented research into the fatality risk for U.S. Navy Special Warfare (SEAL) operators deployed to Iraq or Afghanistan from 2007–2012 using restricted data from the Defense Manpower Data Center (DMDC) and Social Security Administration (SSA). The effect a deployment to Iraq or Afghanistan had on casualties for Navy SEALs from 2007–2012 was determined using a multivariate linear regression using stateside SEAL operators as the control group and deployed SEAL operators in Iraq or Afghanistan as the treatment group. This thesis also presented a risk-based compensation level for deployed U.S. Navy SEALs.

In summary, the results presented here show SEAL operators deployed to Iraq or Afghanistan in 2007–2012 experienced a total likelihood of death of 800 per 100,000 and an increased likelihood of death of 530 per 100,000 compared to the SEAL operators who remained stateside. An appropriate compensation amount for that level of additional risk was estimated at $14,442/month using a 2019 VSL estimate from the Department of Transportation. This compensating wage differential contrasts with the current level of combat pay set at $225/month.

Clearly combat pay (IDP/HFP) is woefully deficient in terms of risk compensation, but it does recognize service members for duty within combat, close proximity to combat, or within an area subject to the threat of imminent danger. However, by attempting to ensure that no service member deserving of that recognition misses out on such pay, the current policy treats all service members the same, regardless of risk. Those engaged in direct combat are given equal amounts of combat pay as someone in a non-combat role and with a much lower risk of death. Congress must evaluate the purpose of combat pay and determine if it should be based on risk, and if so, establish a combat pay policy that accounts for risk differentials. Short of congressional action, the Department of Defense has the discretion to adjust the eligibility criteria and increase HFP to $450. Such a revision would immediately improve the disparities between occupational risk and combat pay.

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