War! What is it Good For?
The Effect of Combat Service on Economic Transitions of Veterans[1*]

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March 2018

[1*] The views expressed herein are those of the authors and do not reflect the position of the United States Military Academy, the Department of the Army, or the Department of Defense. We are grateful to Luke Gallagher of the Office of Economic and Manpower Analysis, Thanh Tam Nguyen of the University of New Hampshire, and Andrew Dickinson and Toshio Ferrazares of San Diego State University for their assistance. We thank seminar participants at American University's Department of Public Administration and Policy, San Diego State University's Center for Health Economics & Policy Studies, and the University of California-Irvine's Economic Self-Sufficiency Policy Research Institute (ESSPRI) for useful comments and suggestions on earlier drafts of this paper. This research received grant support from the ESSPRI at the University of California-Irvine.

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New Evidence from U.S. Army Administrative Data

Abstract

There are 18.5 million veterans in the United States, with unemployment and disability rates highest for recent veteran cohorts who served in Iraq and Afghanistan. At the same time, the U.S. Army has undergone its most substantial drawdown since the end of the Cold War. Using new Army administrative panel data, this study is the first to estimate the causal impact of post-9/11 combat service on veterans' economic well-being. We exploit a natural experiment in overseas deployment assignments and find that combat deployments substantially increase separating soldiers' reliance on Veterans' Disability Compensation (VDC) benefits for Post-Traumatic Stress Disorder (PTSD) and Traumatic Brain Injury (TBI), as well as Unemployment Compensation for Ex-Servicemember (UCX) benefits. In addition, we find that combat deployments of over 18 months are associated with a 20 to 35 percent reduction in educational attainment during enlistment and a 4 to 10 percent decline in the probability of obtaining a bachelor's degree following separation. These adverse human capital effects are exacerbated by unit-level combat exposure.

Keywords: schooling; veteran disability compensation; combat service, war deployments

1. Introduction

There are 18.5 million veterans in the United States, comprising 7.4 percent of the U.S. population, with approximately 7.0 million of these individuals in the labor force (American Community Survey 2016). While mortality rates of veterans of the Second World War, Korea, and Vietnam are rising as these populations age, veterans of recent wars in Afghanistan and Iraq are entering the civilian labor force at a steady rate. Importantly, unemployment and disability rates for these modern veteran cohorts exceed those for all veterans (Bureau of Labor and Statistics 2018) and the Bureau of Labor and Statistics' ongoing efforts to track and publish these statistics reflects the government's persistent interest in these groups. At the same time, the U.S. Army is undergoing its most dramatic drawdown since the end of the Cold War. By the end of 2018, the number of active duty soldiers in the U.S. Army is scheduled to reach 450,000, representing a nearly 20 percent decline from 2012 (Defense Manpower Data Center 2018). Despite the recent surge of separating soldiers into the civilian labor market, we know very little about how modern warfare in the post-September 11 era has impacted the economic transitions of new veterans.

While combat veterans possess cognitive, non-cognitive, and job-related skills that make them attractive to many employers, separating veterans also face a number of challenges in making successful transitions to the civilian labor market. These challenges include non-transferability of military skills, particularly those acquired and honed in combat, to civilian jobs (MacLean 2016), the employment-deterring effects of veterans' benefits (Autor et al. 2011; 2016), and adverse physical and mental health effects of combat (Cesur et al. 2013; Tanielian

and Jaycox 2008). Military service may also erode social capital needed for networking in the civilian labor market.

Surveys of human resource professionals suggest that nearly half of civilian employers report that mental health problems are "a potential barrier to hiring employees with military experience" (Society for Human Resource Management 2015). The Vice Chairman of the Joint Chiefs of Staff warned that prospective employers are "scared off" by concerns that veterans suffer from post-traumatic stress (Winnefeld 2015).

Despite efforts by policymakers to increase employment opportunities and incentivize greater human capital acquisition via the Opportunity to Work and Hire Heroes Act of 2011 and the Post-9/11 Veterans Educational Assistance Act, veterans face significant challenges in transitioning to economically self-sufficient civilian lives. Veterans under age 25 face an unemployment rate of 16 percent, approximately 4.5 percentage-points higher than non-veterans with comparable characteristics (Bureau of Labor Statistics 2016), with nearly half of separating soldiers applying for UCX benefits (Carter and Miller 2015).

While a wide body of literature has examined the economic effects of being drafted into prior wars (Angrist 1990; Angrist and Krueger 2004; Angrist and Chen 2011),[2] and the labor market effects of expansions in educational and disabilities benefit generosity (Bound and Waidmann, 1992; Autor et al., 2016; Barr 2015), next to nothing is known about how Global War on Terrorism (GWOT)-era combat service affected benefit take-up or schooling. This gap in knowledge is largely owed to a lack of longitudinal data that links servicemembers' military records with administrative data on veterans' benefit use and educational attainment.

[2] See also Card and Lemieuex 2001; Bound and Turner 2002; Ichino and Winter-Ember 2004; Angrist and Chen 2011; Angrist 1998; Maurin and Xenogiani 2007; Bauer et al. 2012; Siminski 2013; Hubers and Webbink 2015.

The effects of GWOT-era conflicts on servicemembers' economic well-being may differ from prior wars for a number of reasons. First, recent conflicts have been waged with an all-volunteer military as opposed to conscripted forces, which has changed the demographic composition of the Armed Forces.[3] Carter, Smith & Wojtaszek (2017) document important changes in the composition of post-9/11 active duty forces in the U.S. Army: increased enlistments and selection of combat occupations by whites and individuals from high income neighborhoods, and increased deployments and combat injuries among male soldiers who are white or Hispanic (relative to blacks) and who are from high income neighborhoods.

Second, GWOT-era wars in Iraq and Afghanistan involved frequent deployments for substantially longer durations than in prior conflicts (Marx 2009). Nearly 40 percent of servicemembers deployed to Iraq and Afghanistan were deployed on multiple occasions (Litz and Schlenger 2009), and the average duration of a combat tour was 28 percent higher than in prior conflicts (Baiocchi 2013). Moreover, the nature of conflict has changed, as the Army War College has prominently noted:

> "The GWOT contains elements of war and nonwar. It is an orchestrated mélange of combat operations, military operations other than war, and operations conducted by various nonmilitary departments of government. Colin Gray observes, 'The conflict with global terrorism . . . bears more resemblance to a protracted hunt than it does to what most people understandably call a war. (Gray 2003, p. 5)'" (Record 2003, p.29)

[3] In addition, Department of Defense policy changes between 2011 and 2013 repealed the bans on open service of gays in the military and women in combat, respectively, which also affected who might be impacted by combat.

Third, modern technological advances have resulted in servicemembers surviving combat at much higher rates than before (Marx 2009), while also generating a substantial number of physically and psychologically wounded veterans (Tanielian and Jaycox 2008; Cesur et al. 2013).[4] Approximately one-quarter of those deployed in GWOT-era conflicts suffer from depression, drug and alcohol dependency, or suicide ideation, with estimates of Post-Traumatic Stress Disorder reaching at least 20 percent (Tanielian and Jaycox 2008).

In addition to the significant tolls these conflicts have placed on servicemembers, they have also generated enormous economic costs. The Watson Institute at Brown University estimates the budgetary costs of wars in Afghanistan, Iraq, Syria and Pakistan to be over $5.6 trillion, including $1.0 trillion in future obligations in medical and disability benefits to veterans (Watson Institute 2018); Stiglitz and Blimes (2008) estimate the Iraq war alone has cost over $3 trillion. The Congressional Research Service places OEF and IEF conflicts as the second most costly war in the history of the United States, only behind World War II (Daggett 2010).

Uncovering the labor market effects of GWOT-era combat service is critical not only to assess the full social cost of recent conflicts in Iraq and Afghanistan, but also for policymakers to design effective Transition Assistance Programs (TAP) for separating servicemembers. Identifying at-risk veterans is also critical for the successful implementation of Executive Order 13822, which mandates the Secretaries of Defense, Veterans Affairs, and Homeland Security submit a Joint Action Plan to the president that targets improved mental health services to at-risk

[4] The source of war-related psychological trauma has been studied extensively by both military health researchers (McFarlane 2010) and health economists (Cesur et al. 2013). Combat experiences such as (i) witnessing deaths of unit members, coalition members, or civilians, (ii) engaging the enemy in firefight (including rocket or mortar fire), (iii) killing another human being, and (iv) witnessing injuries to those with whom a servicemember has a personal relationship, are associated with substantially increased levels of trauma (Litz and Schlenger 2009; Steenkamp et al. 2011), often manifest in the form of PTSD (Fontana and Rosenheck 2004; Litz and Schlenger 2009; Cesur et al 2013; Gubkin 2016). In addition, even if such traumatic events do not materialize, there is evidence that the fear and guilt associated with potentially enduring these events may generate symptoms of PTSD (Steenkamp et al. 2011; Cesur et al. 2013).

"transitioning uniformed service members in the year following discharge, separation, or retirement" (Executive Order of the President, 13822).

The current study exploits newly available administrative panel data to examine the economic transitions of separating veterans. This comprehensive dataset links military records compiled by the Army Office of Economic & Manpower Analysis (OEMA) at the U.S. Military Academy with individual-level data from the U.S. Department of Veterans Affairs, Federal and state Departments of Labor, and the National Student Clearinghouse. Together, these data include the universe of enlisted active duty soldiers who separated from the U.S. Army between 2001 and 2016 and covers each soldier's post-separation civilian transition. The vast majority of combat deployments measured in these data are post-9/11 assignments in Afghanistan and Iraq.[5]

This study makes three important contributions. First, we use these newly available data to describe the economic transitions of GWOT-era separating soldiers, including their use of the Veterans Disability Compensation (VDC) and Unemployment Compensation for Ex-Servicemembers (UCX) programs, use of educational assistance via the Post-9/11 GI Bill, and longer-run educational attainment. Second, we exploit a natural experiment in U.S. Army deployment assignments to estimate the causal impact of combat service on separating soldiers' use of VA benefits programs, attachment to the civilian labor force, and longer-run human capital acquisition. Finally, we explore heterogeneity in the effects of combat across unit-specific measures of combat exposure, as well as across soldier characteristics.

2. Background and Literature

[5]Among larger operations conducted over the period were Operation Enduring Freedom (Afghanistan, 2001-2014), and Operation Iraqi Freedom/New Dawn (2003-2011). In addition, there were a number of Army deployments for peacekeeping missions, such as Operation Uphold Democracy (Haiti, 1994-1995) and Operation Joint Endeavor (Bosnia-Herzegovina, 1995-1996).

There are a number of channels through which military service in general, and combat exposure in particular, could affect human capital acquisition and labor market outcomes. Time spent in the military (or in combat operations) may diminish civilian labor market experience and lead to greater skill mismatch and depreciation of human capital needed for successful civilian job transitions. While skill mismatch may lead to an increase in the demand for education, time spent in the military may also reduce the lifetime returns to such investments.

In addition, there may be important negative health effects of war service that impede human capital acquisition and successful economic transitions. Combat exposure may cause adverse physical and psychological effects, including battlefield wounds, Post-Traumatic Stress Disorder, Traumatic Brain Injury, depressive symptomatology, and suicide ideation (Cesur et al. 2013; 2016; Lyk-Jensen et al., 2016), each of which may negatively impact economic outcomes. Moreover, even if a veteran does not experience the adverse health consequences of combat, employers may statistically discriminate against veterans who they may fear suffer from PTSD.

Combat exposure may also increase reliance on Veterans Disabilities Compensation (VDC) and unemployment insurance benefits, which could generate disincentives for job search, labor market attachment, and investments in human capital (Bound and Waidmann, 1992; Autor et al., 2016; Angrist and Chen 2011). On the other hand, greater access to generous GI Bill benefits could increase educational attainment and improve longer-run labor market outcomes.

Together, the economic effects of war service in general, and combat exposure in particular, depend on (i) the physical and psychological health effects of war, and how such health effects impact labor market outcomes, (ii) the degree to which war experiences affect take-up of transition benefit programs, some of which may incentivize greater human capital investments (e.g. GI Bill), but others that may disincentivize successful transitions (e.g.

expanded UCX or VDC programs), (iii) how skills attained in the military translate to the civilian labor market, and (iv) the size of the penalty to diminished labor market experience.

2.1 The Effects of Conscription on Economic Well-Being

Prior studies examining the economic effects of military service have most frequently used the draft lottery to isolate the causal impact of service. The literature on the impact of draft lottery-induced military service on educational attainment (Angrist 1993; Keller et al. 2009; Angrist and Chen 2011; Hubers and Webbink 2015) and employment/earnings (Siminski 2013; Autor et al. 2016; Cousley et al. 2016; Angrist et al. 2010; Angrist and Chen 2011) is over three decades old and suggests differences across nations, conflicts, and cohorts of veterans.

Studies of American men generally find that military service is associated with an increase in educational attainment, largely due to veterans' eligibility for public education benefits via the GI Bill (Angrist 1993; Angrist and Chen 2011). There is also evidence that draft avoidance behaviors increase educational attainment via college deferments (Card and Lemieux 2001). In OECD nations and Australia, there is stronger evidence that conscripted military service is negatively related to educational attainment, perhaps due to less generous educational benefits earmarked for veterans (Keller et al. 2009; Hubers and Webbink 2015).

With regard to employment effects, most evidence suggests that U.S. World War II veterans have higher employment rates than comparable nonveterans, while the reverse is true for Vietnam veterans (Angrist and Krueger 1994). However, using conscription as a natural experiment, there is little evidence that U.S. military service in either war causally affected overall employment rates (Angrist and Chen 2011).[6] Again, there is stronger evidence for

[6] Angrist and Chen (2011) provide some evidence of positive public employment effects (Angrist and Chen 2011).

negative employment effects of draft-induced military service in other nations, such as Australia, which offers generous pension benefits that may deter work (Hubers and Webbink 2015).

The earnings effects of U.S. conflicts are also mixed, with evidence suggesting that any negative effects may dissipate over time. Angrist (1990) finds that draft-induced Vietnam War service is associated with an approximately 15 percent decline in earnings among U.S. men in the 1980s. However, evidence from more recent Censuses suggests that earnings penalties associated with Vietnam era conscription disappeared by the early 1990s (Angrist et al. 2011). Keller et al. (2009) documents stronger adverse effects of military service across OECD nations, particular when conscription is for longer durations. In contrast, findings from Israel suggest that conscription led to increased earnings, perhaps due to increased networking (Asali 2016).

The above studies identify the local average treatment effect (LATE) of randomly drawing a civilian into war service. However, the abolition of the draft in 1973, and the unlikelihood of its reinstatement makes this LATE less policy relevant in the United States. Moreover, the previous U.S.-based studies have been unable to link unit-level deployment histories, including combat exposure, to subsequent program use and labor market outcomes

2.2 Post-Draft Era

Isolating the economic impacts of U.S. military service in the post-draft era poses new empirical challenges. Some studies have attempted to restrict their analysis sample to military entrants and military applicants who chose not to enlist (Loughran et al. 2011; Martorell et al. 2016; Angrist 1998). Loughran et al. (2011) find that enlistment is associated with a reduction in the probability of obtaining a four-year college degree, but a small increase in the probability of completing a two-year associate's degree.

With respect to earnings, Martorell et al. (2016) find that veterans earn a premium relative to nonveterans, but that the premium narrows at the time of separation perhaps due to a compensating wage differential paid to those serving. Interestingly, they also find evidence of substantial heterogeneity in the labor market impacts of enlistment by total years of service. For those who serve less than four years, there is no post-separation earnings premium, while for those who serve longer, there is some evidence of a small earnings premium that grows over time. Those who serve in combat-related military occupations have smaller post-separation earnings gains than those in military occupations with more transferable skills, such as healthcare, intelligence, or communications (Martorell et al. 2016).

While descriptively important, the work of Loughran et al. (2011) and Martorell et al. (2016) are limited in that they do not have data on deployment histories of veterans to identify the impacts of combat, nor do they include administrative data on transition program assistance. Moreover, their identification strategy relies on the assumption that the decision to enlist, conditional on completing a service application, is orthogonal to the outcomes under study.

Finally, several recent studies have exploited the process by which active duty servicemen are deployed to identify a different LATE: the impact of war deployments and military relocations among active duty personnel. However, most of this work has examined the health and family well-being effects of these assignments. Angrist and Johnson (2000) examine the spillover effects of Gulf War deployments on spousal employment, marital dissolution, and child disability and find that deployment of husbands has no effect on the probability of divorce, but does induce an increase in the likelihood of spousal employment. On the other hand, deployment of wives increase the risk of divorce, but have no effect on spousal employment.

Lyle (2006) and Engel et al. (2010) use a similar identification strategy and find that parental deployments are associated with (relatively small) declines in academic performance. Kawano et al. (2017) extend this work to estimate the long-run effects of both moving and location quality on military children's young adult outcomes. They find adverse effects of these experiences on educational attainment and possible adverse effects on earnings, both of which increase in magnitude as children age.

Finally, a set of studies has used survey data (e.g., the Department of Defense Survey of Health and Related Behaviors Among Active Duty Personnel, the Millennium Cohort Study MCS) to identify the effects of deployment on health and family well-being. These studies find deployments are associated with increased risk of Post-Traumatic Stress Disorder (Cesur et al. 2013; Hourani et al. 2015; Smith et al. 2009; Tanielian and Jaycox 2008), divorce (Negrusa and Negrusa 2016), substance abuse (Cesur et al. 2016; Cuccaire et al. 2015; Jacobson et al. 2008), and domestic violence (Cesur and Sabia 2016).

No studies in this deployment literature have linked military records to administrative data on transition program use or on post-separation veteran labor market outcomes. Our study makes a unique contribution in this important area.

2.3 Coordination of Military Transition Services

Since 2012, the DOD has coordinated branch-specific Transition Assistance Programs that consolidate the provision of information about post-separation services. The previous TAP was a shorter, less resourced program with lower emphasis on attendance that consisted of pre-separation counseling, an employment workshop, an optional briefing on veteran benefits, and a special TAP for the disabled (GAO 2014). The Veterans Opportunity to Work and Hire Heroes

Act of 2011 now requires all separating veterans to attend their branch's TAP, which have placed more emphasis on attendance and attendance earlier in the life-cycle (up to a year prior to transition).

The largest component of the current TAP is the employment workshop, administered by the Department of Labor at military installations around the world (U.S. Department of Labor 2016).[7] Transitioning servicemembers are required to meet Career Readiness Standards (CRS), which includes satisfying several transition-related tasks.[8] The TAP is typically conducted in a classroom/computer laboratory setting with content provided on slides, through guided computer searches, and significant interaction via question and answer sessions with instructors and transition counselors. In addition to employment-related assistance and benefit eligibility and enrollment, the TAP affords servicemembers the opportunity to attend one or more of the following multi-day training seminars based on personal goals: enhancing employment prospects (i.e., the Career Technical Training), enrolling in educational institutions (i.e., the Accessing Higher Education Track), opening new businesses (i.e., the Boots to Business Program).

[7] Employment documents can also be obtained and completed via the Joint Knowledge Online (JKO) program. See: https://www.dol.gov/vets/programs/tap/DOLEW-Participant-Guide-January-2015.pdf

[8] CRS requires servicemembers to meet several tasks: (1) documenting personal goals (e.g., for personal employment, higher education, career technical training, and/or entrepreneurship), (2) developing a post-separation one-year budget (e.g., that identifies goals, current compensation and benefits, planned expenses during separation, estimated future compensation, and estimated expenses after separation), (3) registering on the VA eBenefits website (e.g., to apply and track the status of education, health, and/or disability benefits), (4) completing continuum of service opportunity counseling (e.g., for those transitioning from Active Duty service to Reserve Component service), (5) evaluating the transferability of military skills to the civilian workforce (e.g., use Department of Labor Occupation Net resources to find civilian occupations comparable to the service member's current military occupational specialty, and to identify gaps between goals and current skills), (6) identifying requirements/eligibility for certification or licensing in career field of interest (e.g., identifying licenses required to work in a specific occupation), (7) completing an individual assessment to help match personal interests to career plans (e.g., complete assessments like the O*Net Interest profiler (https://www.onetcenter.org/IP.html?p=2) or the Kuder education and career planning tool (https://www.kuder.com/about/success-stories/dantes/)), and (8) receipt of a DOL *Gold Card for American Job Centers*, which allows priority employment counseling services for separating servicemembers. Requirements and components can be tailored to the service member based on their career goals. So for example, an individual with the goal of pursuing higher education might identify appropriate colleges/universities with programs of interest for item (6) and then complete the appropriate applications.

The TAP engages unit commanders to mentor and monitor servicemembers' progress, resources TAP specialists at the installation to counsel and support servicemembers through the process, and mandates that servicemembers complete all CRS and complete a "capstone" event no later than 90 days prior to their transition.[9] Prominently included among the programs discussed in TAP, many of which are provided by the Department of Veterans Affairs, are disability compensation, unemployment compensation, and educational benefits.

2.4 Veterans Disability Compensation

Veterans who incur injuries, disease, or psychological trauma (or have their injuries or diseases aggravated) during active duty service or training may qualify for veterans disability compensation (VDC). According to the Department of Veterans Affairs:

> "a disability can apply to physical conditions, such as a chronic knee condition, as well as a mental health conditions, such as post-traumatic stress disorder" (U.S. Department of Veterans Affairs 2018)

All servicemembers complete a medical evaluation from their military service prior to transition. The TAP includes additional information on how to connect with the VA for disability claims, and how to file a claim. Servicemembers are not required to complete any screenings or evaluations with the VA, but disability is a salient topic among transitioning servicemembers and a VA representative completes the TAP session on VA benefits. The VA process is handled

[9] Anecdotal evidence suggests that while capstone completion 90 days prior to transition is less than universal, the revised TAP has significantly increased the number of service members participating in TAP and helped them to participate earlier.

separately from any military (e.g., Army) disability ratings, though the VA may rely in part on military health records (e.g., TBI or PTSD diagnoses) in its disability rating process. While the disability application process will be unique to each individual, the VA outlines its eight step disability compensation process on its website, and servicemembers can connect with a VA representative during the TAP to learn more and/or initiate their claim(s).[10]

Despite a 17 percent decline in the share of the U.S. population who were veterans between 2000 and 2013, annual Federal expenditures on the VDC program grew from $20 billion to $54 billion, with projections of over $65 billion by Fiscal Year 2016 (Congressional Budget Office 2014). The large increases in total expenditures is due to an 83 percent increase in the share of veterans who receive VDC benefits (9 percent in 2000 versus 17 percent in 2013), and a 60 percent increase in the per-veteran VDC payment (Congressional Budget Office 2014). Among the explanations for these trends include the intense physical and psychological consequences of combat operations in Iraq and Afghanistan (including increased diagnoses of Post-Traumatic Stress Disorder and Traumatic Brain Injury), liberalization of eligibility requirements, and slack labor markets (Congressional Budget Office 2014).

There is evidence that the generosity of VDC benefits may affect labor market outcomes. Using changes to program eligibility requirements or in the generosity of benefits, studies find that VDC benefit generosity is negatively related to civilian labor force participation (Angrist et al. 2010; Autor and Duggan 2007; Autor et al. 2011, 2016; Coile et al. 2015).

[10] The eight steps are: (1) Service members / veterans file a claim, (2) a Veteran Service Representative (VSR) reviews the claim, (3) the VSR gathers evidence from required sources (e.g., the service member, a VA medical professional, or another medical professional), (4) the VBR reviews the evidence, (5) the VSR prepares for a decision by preparing a recommendation and if required, gathering additional information, (6) The VA reviews the recommended decision and makes a final decision, (7) the notification packet is prepared, and (8) the VA sends the decision packet. Claims can be tracked on the VA eBenefits website and service members / veterans can appeal the decisions. For more information see: https://www.benefits.va.gov/compensation/process.asp.

2.5 Unemployment Compensation for Ex-Servicemembers

While VDC eligibility requires diagnosis of some physical or mental health condition, many more veterans are eligible for the Unemployment Compensation for Ex-Servicemembers (UCX) program. Service-related UCX eligibility requirements are determined by the Department of Defense (DOD) and include (i) receipt of an honorable or general discharge, (ii) separation for inaptitude or a personality disorder with at least one year of continuous service, or (iii) separation for medical conditions (Carter and Miller 2015). Moreover, receipt of disability compensation via VDC programs does not diminish eligibility for full UCX benefits.

States determine the maximum duration of benefit receipt, per-week benefit amounts, and work search or education requirements, generally following rules established under the Unemployment Insurance (UI) program for civilians. Most separating veterans are eligible for benefits for up to 26 weeks, with some states allowing maximum benefit duration of 52 weeks.[11] Veteran participation in the UCX program is common, with approximately half of all transitioning enlisted soldiers applying benefits (Carter and Miller 2015). Spending on the UCX program reached over $600 million in FY2015, with budget outlays coming from the DOD. In recent years, as the economic recovery continued, expenditures on the program have declined.

A handful of descriptive studies have examined demographic characteristics associated with UCX participation. Desrosiers et al. (2014) find that individuals who are less able, less educated, non-white, single, younger, female, and who worked in military service/supply occupations are more likely to receive UCX. Carter and Miller (2015) find a similar pattern for Army veterans in Texas, Illinois, and North Carolina. They also find that those with poor

[11] The American Recovery and Reinvestment Act, enacted in the midst of the Great Recession of 2009, permitted some to receive benefits for up to 99 weeks.

military performance, with family related needs, and serving in service support career fields (e.g. logistics and administrative work) are more likely to receive UCX. Finally, after adjusting for observable socioeconomic and demographic characteristics, Heaton et al. (2018) find that separating veterans had nearly identical durations of unemployment as compared to civilians receiving Unemployment Insurance (UI) benefits.

To date, no study has linked combat experiences to participation in this program or tracked its use over time.

2.6 Post-9/11 GI Bill

The original 1944 GI Bill ("The Servicemen's Readjustment Act") provided post-separation schooling benefits to servicemembers following World War II; these benefits were renewed for veterans serving in subsequent military conflicts, including the Korean War, Vietnam War, and first Gulf War. The Montgomery GI Bill (MGIB) was enacted in 1984 to augment a variety of smaller prior GI Bills. Veterans are required to contribute $100 per month for at least one year and serve for at least three years to be eligible for benefits.[12] This MGIB program provided benefits directly to veterans for use at public or private colleges or universities, with highest benefit take-up within the first three years of separation (Martorell and Bergman, 2013). For veterans who separated in 2000, the average benefit received was $20,994, with total government spending on the program of $384 million (Martorell and Bergman 2013).

[12]The MGIB's benefit package is primarily a monthly stipend. The exact monthly rate is adjusted every year to account for raising costs of tuition. For 2017, the maximum monthly rate for the MGIB was $1,928 (less for non-fulltime students). Additional funds can be earned if veterans opt in to a "$600 buy-up" in which a one-time payment of $600 can increase monthly rates by $150. The MGIB benefits last for a total of 36 months. While the MGIB is commonly used for universities, the funds can also be used for apprenticeships and on the job training at a maximum per month rates of $1,446 for the first 6 months, decreasing over time (Department of Veterans Affairs 2016).

The most recent expansion and revision of the GI Bill was the "Post-9/11 GI Bill," (PGIB) enacted in 2008 (and later amended) to provide educational benefits to servicemembers who recorded at least 90 days on active duty service following September 10, 2001. Benefits include payments for tuition and fees, monthly housing, and books and supplies (up to $1000). In 2016, the maximum benefit covers up to (i) 100% tuition and fees paid to in-state public educational institutions, or (ii) up to $17,500 per year to private institutions. Benefits are available for a maximum of 36 months and for up to 15 years following completion of active duty service. GI benefits can be used not only for universities and colleges, but also for technical training, flight school, and on-the-job training programs (Department of Veterans Affairs 2016). The PGIB also includes a provision for servicemembers to transfer all or a portion of their earned benefits to their military dependents. In Fiscal Year 2013, 754,229 veterans had received post-9/11 GI benefits, representing a 36 percent increase from two years prior (Department of Veterans Affairs 2014). Total expenditures on the post-9/11 GI Bill since its inception has reached nearly $11 billion (General Accounting Office 2015).

Studies of the schooling and labor market effects of GI Bill benefit receipt following the Second World War (Lemeiux and Card 2001), the Vietnam War (Angrist 1993), the Korean War (Stanley 2003), and Post-9/11 Iraq and Afghanistan Wars (Barr 2015) find that GI Bill benefits were associated with substantial gains in educational attainment, translating into important labor market benefits. However, Stanley (2003) finds that these benefits have mainly counteracted the adverse schooling effects of war rather than increased schooling beyond that which would have occurred in the absence of war. There is evidence that GI Bill participation and the probability of separation in the post-draft era increase with the generosity of benefits (Simon et al. 2010). Moreover, Castleman, Murphy and Skimmyhorn (2017) find that servicemembers of higher

socioeconomic status (e.g., those with more tenure, higher education, and who are officers as compared to enlisted) are more likely to transfer their benefits to eligible dependents. They also find suggestive evidence of a small increase in military reenlistments as a result of this benefit.

This study will be the first to explore the effects of post-9/11 combat assignments on use of the above benefits, as well as subsequent human capital acquisition and labor market outcomes.

3. Identification

To identify the causal impact of combat deployments on economic transitions of separating soldiers, we exploit a natural experiment in the process by which U.S. Army Human Resources Command (HRC) assigns active duty enlisted servicemen to their units and assigns those units to their deployments. HRC rarely deploys individual soldiers, but rather deploys units after assigning, and often re-assigning, servicemen to the units.

For the purposes of assignment of active duty servicemen to their units and the assignment of those units to overseas deployment duties, the U.S. Army regards servicemen of identical military rank and occupation specialty as essentially perfect substitutes in the assignment of their duties. As a rule, HRC does not consider the personal preferences, family background characteristics, or future civilian labor market prospects in making unit and deployment assignments (Lyle 2006; Engel et al. 2010; Kawano et al. 2017). In general, HRC assignment decisions are based on (i) the needs of the Army, driven by world events, and (ii) the availability of units, defined by equipment availability, unit completion of specified training, and the occupational skill set of unit members (Army Regulation 220-1). These regulations provide a strong prior for a valid natural experiment.

Of course, active duty soldiers may affect their probability of combat deployments as well as their lifetime combat exposure in a number of ways, including (i) branch of service selected, (ii) military occupation chosen, and (iii) length of service in the Army, depending on their ability to forecast the appropriate expected combat exposure. However, conditional on rank, primary occupation specialty, and years of service, combat deployment assignments are expected to be orthogonal to transition benefit receipt and schooling. Thus, our identification strategy exploits conditional random assignment of soldiers to their deployment duties. In addition, conditional on rank, occupation, and deployment length, we can exploit exogenous variation in unit casualty rates to estimate the impact of such exposure on economic well-being.

There are two potential threats to identification. The first is *stay-back selection*. This is the possibility that not all unit members are deployed, perhaps because some are non-randomly classified as "stay-back personnel" who remain back at home base for administrative duties. Stay-back personnel might also be servicemembers who are non-deployable for some period of time, often due to health reasons. To address this type of selection, we follow the approach of Lyle (2006) and use unit-level deployment orders as an instrument for individual deployment in a two-stage least squares (2SLS) framework.

The second type of selection is *Army exit selection*. While enlistment terms are exogenously set by the Army prior to an individual's reenlistment, it may be that those assigned to combat service are more or less likely to reenlist. This may be due to increased taste for combat and loyalty to comrades, dissolution with war, or increased likelihood of injury and death. This second type of selection is more challenging to empirically address and speaks to the generalizability of our results. We take a number of steps to address Army exit selection. First, because we have administrative data, we can ensure no sample attrition from the sample and are

able to control for rank (tenure) and total years of service (enlistment length) to ensure that combat assignment effects are not contaminated by decisions to reenlist. In addition, we separately estimate the effects of combat deployments for those with heterogeneous enlistment lengths, including those who serve one term and do not reenlist.

4. Data, Measures and Methods

Data and Measures. We construct an individual-level longitudinal dataset consisting of the universe of enlisted soldiers (i.e., omitting warrant officers and officers) separating from the U.S. Army between 2001 and 2016. These confidential data were assembled at the Office of Economic and Manpower Analysis at the US Military Academy and consist of four merged datasets: (1) administrative military records from the U.S. Army, including personal characteristics as well as individual- and unit-level deployment and casualty records, (2) administrative data on disabilities benefits and Post-9/11 GI benefit receipt from the U.S. Veterans Administration, (3) administrative data on UCX receipt from the U.S. Department of Labor and State Departments of Labor, and (4) administrative data on educational attainment from the National Student Clearinghouse (NSC).

Army administrative data include information on the soldier's enlistment and separation date, highest military rank achieved, primary military occupation specialty (PMOS), educational attainment at separation, Armed Forces Qualifying Test (AFQT) score, unit, as well as individual- and unit-specific casualty and death rates. These data also contain demographic characteristics, including race/ethnicity, marital status, number of dependents, and state to which the separating veteran will relocate. Veterans' Administration data include information on VDC benefits (along with codes for PTSD, TBI and the veteran's continuing disability rating, or CDR)

and Post-9/11 GI Bill use. VDC administrative data are available for fiscal years 1999 through 2017 and Post-9/11 GI Bill use for fiscal years 2015 and 2016. UCX data, available for fiscal years 2010 to 2015, are obtained from U.S. Department of Labor and state Departments of Labor, merged via the Military State Data Exchange System.[13] National School Clearinghouse data on educational attainment are available for the 2001 through 2017 period. Our primary analysis sample focuses on the post-9/11 period and consists of approximately one million soldiers:

- who separated from the U.S. Army between fiscal years 2001 and 2016;
- with military records that included information on duration of hostile fire pay receipt, length of military service, rank (E1-E9), military occupation, year of separation, and sociodemographic characteristics (age, gender, race/ethnicity, marital status, educational attainment at time of separation, intended state of residence for post-separation);
- and for whom administrative data on program participation and educational attainment were available in the fiscal year following separation.

The first set of dependent variables measures whether the soldier received VDC benefits at any point during his post-separation years. First, we generate indicators for whether the soldier had enrolled in a VDC benefits program for Post-Traumatic Stress Disorder (*PTSD*) and traumatic brain injury (*TBI*). In our analysis sample, 21 percent of separating soldiers enrolled in VDC benefits related to a *PTSD* diagnosis at some point during their post-separation life. Approximately eight percent (8.4 percent) enrolled in VDC benefits for *TBI.*

[13] While UCX data on applications, eligibility, and enrollment are available for all states, data on receipt are available from 26 states and can be merged to administrative Army records.

We also examine whether the soldier has an overall combined disability rating (CDR) indicative of multiple disabilities, generous VDC benefits, and high probabilities of non-employment for extended periods. Specifically, we examine whether a separating veteran has a CDR of 70 percent or greater ($CDR \geq 70$). This category of disability captures cases where servicemen are classified as "Priority 1" for health care services delivery by the VA as mandated by the Veterans' Health Care Eligibility Reform Act of 1996. In addition, a 70 percent cumulative rating constitutes an important cutoff for VA definitions of unemployability. A veteran can be deemed unemployable if he has a combined rating of 70 percent or more along with two or more service connected disabilities (with individual disability ratings of at least 40 percent) (U.S. Department of Veterans Affairs 2018).[14] We find that 23.7 percent had an overall $CDR \geq 70$. We also measure whether the veteran was wounded in combat (*Wounded*) using DOD casualty data and find that approximately 2 percent of the sample had been wounded.

UCX applications and state determination of eligibility are available for fiscal years 2010 through 2015. During this period, we find that 44.1 percent of separating servicemen applied for UCX benefits; a full 93 percent of those who applied were deemed eligible for these benefits.

Turning to schooling, we first measure educational attainment during enlistment. Among those with a high school degree or GED, we find that 11.2 percent either attend college or attain an advanced degree (bachelor's or associate's degree) prior to separation and 3.9 percent attain an associate's or bachelor's degree.

[14]In addition, the Department of Veterans Affairs (2018) requires:

> "You must be unable to maintain substantially gainful employment as a result of service-connected disabilities (marginal employment, such as odd jobs, is not considered substantial gainful employment for VA purposes)."

Next, we examine post-separation schooling outcomes for those without a four-year college degree (or higher). We measure whether the soldier had applied for and enrolled in the Post-9/11 GI Bill (*GI Bill)*, which retroactively applied to servicemembers serving following September 11. In fiscal years 2015-2016, 41.3 of separating veterans had applied and were eligible for the Post-9/11 GI Bill.

Finally, we generate a set of post-secondary school enrollment and educational attainment measures. We measure educational attainment by whether the respondent had attained a four-year college degree (*Bachelor's Degree*) or a two-year associate's degree (*Associate's Degree*). Among those without a bachelor's degree at separation, 11.2 percent attained a four-year college degree following separation. Among those with only a high school degree (or GED) at separation, 10.3 percent attained a four-year college degree and 10.0 percent attained an associate's degree (but not a bachelor's degree) following separation.

In addition, we measure the number of days that a separating veteran had attended college or some job training program following separation. Among those without an advanced degree at separation, 58.2 percent attended some post-secondary schooling following separation, and 38.0 percent enrolled for a full semester at a four-year college.

Our key independent variable, combat assignment, is measured in several ways. First, we use the number of years the soldier received hostile fire pay (HFP), using administrative pay records, as a measure of time spent deployed in a combat zone (*Combat Years)*. Over the sample period, 57 percent had ever been deployed to combat (*Any Combat*). The unconditional average deployment length was approximately 9 months, and 13 percent of our sample reported cumulative combat deployments over 18 months.

In addition, we measure unit-level combat exposure. Approximately 10 percent of servicemembers had a death occur to a member of their unit. For each servicemember, we also construct a measure of unit-level injury exposure, generated as the share of years that the servicemember had been "exposed" to a member of his unit being injured (excluding him or herself). We find that the average servicemember had been exposed to an injured member of his unit for 0.12 years.

Descriptive Analysis. Table 1 provides descriptive information on the outcomes of our key measures as well as by observable characteristics of soldiers. The average age of enlisted servicemen in our analysis sample is 27.5 years. Approximately 68 percent were white, 18 percent were black and 11 percent were of Hispanic origin and the vast majority were men (83 percent). A similar percentage (83 percent) had attained a high school degree or GED at the time of separation and the average Armed Forces Qualifying Test (AFQT) score was at the 59th percentile.[15] Approximately 47 percent were married, while a similar percentage were single at the time of separation. The average total length of enlistment was 5.6 years.

In Table 2, we provide observable characteristics of separating soldiers, stratified by selected outcomes. We find evidence that those who receive disabilities compensation benefits for PTSD are likely to have longer combat deployments than their counterparts who did not receive such benefits (1.35 years versus 0.60 years). There is some evidence that average combat deployment lengths are slightly longer for those who enrolled in UCX benefits than those who did not (1.12 years versus 0.922 years). Interestingly, for educational attainment, we find some evidence that those with a college degree have slightly longer combat deployment lengths than those without such degrees (0.96 versus 0.83 years).

[15] The average AFQT score percentile is greater than the 50th percentile due to minimum AFQT requirements.

Figures 1 through 5 provide descriptive evidence on trends in transition benefit use and educational attainment among separating veterans. We show separate graphs by year of separation in order to impose balanced panels to ensure that post-separation trends are not affected by compositional changes. The results in Figures 1 and 2 show that rates of VDC compensation for PTSD and TBI diagnoses continue to rise following separation; more recent separations see larger initial jumps in participation, perhaps reflective of improved medical screening techniques and more public awareness of these ailments. Rates of PTSD- and TBI-related benefit use are consistently higher for those who were assigned to combat zones.

In Figure 3, we show that rates of UCX participation are especially high in the period following separation; given state rules that limit duration of benefit receipt to under two years, it is not surprising to see participation rates fall to near zero two or more years following separation. Note that rates of participation, especially in the year after separation, are higher for those assigned to combat deployment relative to those that did not.

Figures 4 through 6 show post-separation schooling-related outcomes. We find that attendance rises in the four to five years following separation and then levels off or slightly declines (Figure 4). The probability of a four-year college degree rises immediately following separation and peaks four to five years following separation before trailing off (Figure 4); a similar pattern results for attaining an associate's degree, though the peak occurs at 2 to 3 years following separation. Interestingly, school attainment and college graduation rates are slightly higher for those assigned to combat than those not assigned to combat (Figure 5), but these trends do not condition on military occupation or reflect causal effects of combat service.

Methods. To identify the causal effect of combat, we rely on the conditional random assignment of soldiers to deployment duties. That is, *conditional on military rank, occupation,*

and time spent in military service, deployment assignments are exogenous to receipt of veterans' benefits and schooling. We first estimate:

$$Y_i = \beta_0 + \beta_1 Combat_i + \beta_2 \mathbf{M}_i + \varepsilon_i \quad (1)$$

where Y_i is an indicator for post-separation benefit receipt, school attendance, or educational attainment for individual *i* following separation (or at separation, for educational attainment during enlistment); $\mathbf{M}_i$ is a vector of individual-level military controls including fully interacted indicators of military rank (E1-E9), primary military occupation specialty (PMOS), years of enlisted military service, separation year fixed effects, and gender. Our key right hand side variable, $Combat_i$ is a measure of combat assignment constructed using information on total years (or shares of years) of hostile fire pay (HFP) received. Hostile fire pay accrues to servicemembers deployed to combat zones, defined by appropriate commanders as regions where military personnel are subject to hostile fire or explosion of a hostile mine, or are in close proximity thereto. For the purposes of the sample period examined, receipt of hostile fire pay is for deployments to Iraq and Afghanistan. However, it can also include operations in Qatar, Kuwait, Saudi Arabia, Yemen, Sudan, Tunisia, Egypt, Syria, and Guantanamo Bay, Cuba.

We generate an indicator for *Any Combat*, measuring whether the soldier had ever been deployed to a combat zone, as well as *Combat Years*, a continuous measure of number of years (or shares of years) that the enlisted servicemen was deployed. In subsequent specifications, we allow for linear and non-linear effects of combat deployment length.

If soldiers of identical rank (tenure) and occupation face the same probability of combat deployment by AHRC in a given calendar year, then β_1 should be an unbiased estimate of the effect of combat on the outcomes described above. Following Lyle (2006) and Cesur et al. (2013, 2016, 2017), we explore the exogeneity of deployments by adding a vector of personal

characteristics $\mathbf{P_i}$ (including age, race/ethnicity, marital status, educational attainment at separation, AFQT score, number of dependents, and post-separation state of residence) to equation (1). If combat assignment is exogenous, our estimate of β_1 should remain unchanged.

To ensure that our estimates are not contaminated by "stay back selection," we compute two-stage least squares (2SLS) estimates that instrument individual-level combat deployment length using unit-level deployment orders. The first-stage regression equation is:

$$Combat_i = \beta_0 + \beta_1 Order_{u\text{-}i} + \beta_2 \mathbf{M}_i + \tau_t + \varepsilon_{iu} \qquad (2)$$

where $Order_{u\text{-}i}$ measures whether the total number of years (or share of years) that a soldier's unit *u* received deployment orders. Following Lyle (2006), a deployment order is said to have been issued if at least one-third of other members of the soldier's unit has been deployed.[16] The identifying assumption of our IV approach requires that conditional on military observables, deployment orders are unrelated to any unmeasured determinants of benefit receipt or schooling.

Next, we exploit a somewhat different natural experiment in order to estimate the impact of combat exposure on veterans' economic transitions. We measure combat exposure in two ways: *Duration Injury Exposures*, the total number of years (or share of years) that other members of the soldier's unit experienced a war injury, and *Any Death Exposure*, an indicator for whether another member of the soldier's unit died in war. This natural experiment treats injury (or death) exposures among soldiers of identical rank, occupation, enlistment tenure, separation year, *and combat deployment length* as orthogonal to economic transitions. Specifically, we estimate:

$$Y_{iu} = \beta_0 + \beta_1 Duration\ Injury\ Exposure_{u\text{-}i} + \beta_2 Combat_i + \beta_4 \mathbf{M}_i + \varepsilon_{iu} \qquad (3)$$

[16] This approach is justified by the fact that the battalion to which a soldier is assigned generally consists of three companies (Alpha, Bravo, and Charlie) and if at least one third of a soldier's battalion is deployed, this is generally indicative of a company receiving deployment orders. In addition, we experimented with alternative fractional cutoffs, including one-half and two-thirds, with a similar pattern of findings as those reported below.

$$Y_{iu} = \beta_0 + \beta_1 Any\ Death\ Exposure_{u\text{-}i} + \beta_2 Combat_i + \beta_4 \mathbf{M}_i + \varepsilon_{iu} \quad (4)$$

Finally, we explore heterogeneity in the impacts of combat assignment and combat exposure estimating equations (1), (3), and (4) across military characteristics (rank, branch, enlistment tenure, separation year) and demographic traits (race/ethnicity, gender, marital status).

5. Results

Our main findings are shown in Tables 3 through 18 below. Regressions are estimated via ordinary least squares (OLS) with standard errors corrected for clustering at the rank-by-occupation level.[17]

5.1 *OLS Results*

Table 3 presents estimates of equation (1) for VDC benefits for PTSD. In Panel I of column (1), we find that, conditional on military observables, assignment to a combat zone (*Any Combat*) is associated with an 18.5 percentage-point increase in a VA diagnosis of PTSD. This effect is large relative to the mean (21.0) and suggests large psychological costs of war deployments. In Panel II, we replace *Any Combat* with *Combat Years* and find that each additional year of combat deployment is associated with an 8.9 percentage-point increase in VDC benefits for PTSD. The results in Panel III suggest that the PTSD effects of combat deployments increase with deployment length. We find that two or more years of combat deployment is associated with a 23.8 percentage-point increase in use of the VDC program for PTSD.

[17] Estimated marginal effects using probit models produce a quantitatively similar pattern of results.

In column (2) of Table 3, we add controls for age at separation, age-squared, race/ethnicity, Armed Forces Qualifying Test (AFQT) score, marital status, educational attainment at separation, number of dependents at separation, and intended state of separation. A comparison of estimates in columns (1) and (2) suggests very small differences, consistent with the hypothesis that deployment assignment is orthogonal to VDC benefit receipt.

In the first two columns of Table 4, we explore the effect of combat assignment on VDC benefits for a TBI diagnosis by the VA. We find that assignment to a combat zone is associated with a 4.7 to 4.8 percentage-point increase in the probability of VDC benefits for TBI (Panel I). As with TBI, the results suggest a dose-response relationship, where the effects of combat increase with deployment length. We find that combat deployments greater than 18 months are associated with a 6 to 8 percentage-point increase in TBI. This finding is consistent with longer deployment lengths associated with greater risk of exposure to intense combat activities including firefights, vehicle collisions, and head-related injuries that may be manifested in the form of TBI. Again, estimated effects are not sensitive to the inclusion of demographic controls.

The pattern of results is generally similar when we examine the impact of combat assignment on the probability of having CDR of 70 percent or greater (columns 3 and 4). We find that combat assignment is associated with a 5 to 6 percentage-point increase in a CDR greater than 70 percent, representing an approximately 25 percent increase relative to the mean. However, there is not strong evidence of a dose-response effect of combat, as we find the largest impacts of combat assignment for those deployed less than 18 months (Panel III).

In the final two columns of Table 4 (columns 5 and 6), we explore the impact of combat assignment on the probability of sustaining a service-connected physical injury. We find that combat assignment is associated with a 1.8 percentage-point increase in the probability of being

wounded in war (Panel I); the effects are larger, as expected for longer deployment lengths. Each additional month of combat deployment raises the likelihood of wounding by 1.5 percentage-points.

Next, we turn to outcomes related to the labor market and schooling. In Table 5, we examine the impact of combat assignment on take-up of the UCX program. We find that combat assignment is associated with a statistically significant, but economically small increase in the probability of applying (column 3) and being deemed eligible (column 4) for UCX benefits. Combat assignment is associated with a 1.0 to 1.5 percentage-point increase in the likelihood of UCX applications. This represents a 2.5 percent increase relative to the mean. The most economically important effects are found for those deployed for at least one year, where we find estimated combat deployment effects on UCX closer to 5 percent. These findings suggest that combat deployments may impede short-run attachment to the labor market.

Table 6 explores the impact of combat assignment on educational attainment during enlistment. Our sample is conditioned on those who had attained a high school degree or GED at the time of Army enlistment. We find that each month of combat deployment (Panel II) is associated with a 1.8 percentage-point (15.9 percent) decline in the probability of post-secondary college attendance by separation and a 1.1 percentage-point (28.2 percent) decline in the probability of earning an associate's or bachelor's degree by separation. There is strong evidence of a dose-response relationship, with the largest adverse education effects for those deployed for at least 18 months. While online programs have expanded (e.g. Liberty University, Southern New Hampshire University) and the Department of Defense has made efforts to increase "brick and mortar" offerings while soldiers are deployed overseas (e.g. University of Maryland University College, Central Texas College), the findings in Table 6 are consistent with

time substitution. In addition, they could be explained by the psychological and physical effects of war, which we explore in our discussion of the impacts of combat exposure.

In Table 7, we examine the impact of combat assignment on post-separation use of the post-9/11 GI Bill, post-secondary school (or job training) attendance, and educational attainment. We find that combat assignment is associated with a small increase—on the order of 1 percentage-point—in the probability of enrolling in post-9/11 GI benefits (column 1). There are a number of explanations for this result. Combat veterans may be more likely to enroll in PGIB benefits than noncombat veterans because are compensating for diminished educational attainment during their enlistment period (see Table 6). Combat-specific peer effects may also be at work, as Murphy (2017) finds that young Army Soldiers' educational benefit enrollment decisions may be influenced by their colleagues. Moreover, combat may serve as a "gateway" whereby veterans learn about schooling benefits from the VA and other organizations when they learn about needed medical and disabilities benefits. Finally, the inclusion of housing benefits in the PGIB may be particularly important to disabled veterans.

Consistent with increased participation in the GI Bill program, there is evidence of increases in college attendance, as measured by positive number of days attending a two- or four-year college (column 2). However, we find no evidence that combat assignment is associated with an increase in the probability of semester enrollment in a four-year college. In fact, we find that each additional year of combat assignment is associated with a 0.7 percentage-point decline in the probability of semester college enrollment, driven by a 1.6 percentage-point decline for those deployed to combat for two years or more (column 3). These findings persist when we restrict the sample period to the years for which we have post-9/11 GI Bill data (columns 4 and 5). Our results suggest that those assigned to combat may sign up for post-9/11 GI Bill benefits

for benefits other than four-year schooling or that they enroll but attend a two-year college or do not graduate.

Finally, in Table 8, we examine the impact of combat assignment on post-separation educational attainment. We find some weak evidence that combat is associated with an increase in the probability of obtaining an associate's degree following separation, though the effects are small in magnitude and are concentrated among those deployed between 12 and 17 months (column 1). There is much stronger evidence that combat deployments are negatively related to the probability of obtaining a four-year college degree following separation. This is true among those who were high school graduates at separation (column 2) and those without four-year college degrees at separation (column 3). When we further restrict the sample to allow at least four years of education data following separation (column 4), the results persist. Our results suggest that combat deployments of 18 months or more generate a 4 to 10 percent decline in the probability of obtaining a four-year college degree following separation.

Together, the findings in Tables 3 through 8 show that post-9/11 combat deployments generate increased reliance on the VDC and UCX programs and generate important schooling costs for veterans both during service and following separation.

5.2 2SLS Estimates

One concern with our prior estimates is that they could be contaminated by stay back selection. For example, if those who are chosen to be "held back" at the domestic base or who are deemed non-deployable are soldiers with the highest unobserved propensity for health ailments that may impede economic transitions. If this is the case, then OLS estimates will be

biased downward (negatively). Alternatively, if the savviest soldiers most concerned about future transitions find a way to avoid combat, then OLS estimates could be biased upward (positively).

First-stage results in Table 9 show that unit-level deployment orders are a very strong predictor of the probability of individual deployment. We find that a one-year increase in the number of occasions that a soldier's unit has at least one-third of its members deployed is associated with a 0.9 year increase in individual combat deployment length. T-statistics range from 200 to 350, suggesting that deployments are highly likely when a servicemember's unit receives deployment orders. Table 9 shows 2SLS (IV) estimates along with OLS estimates and our results provide no evidence that stay back selection is an important source of bias.

5.3 *Sample Selection*

One concern with the above estimates is that combat assignment may impact the probability of reenlistment, perhaps among soldiers of heterogeneous types. While we control for years of enlisted service in all regressions, this, of course cannot fully control for compositional changes.[18] To partially address this issue, we take two approaches. In Table 10, we restrict the sample to single-term enlistments where the soldier chose not to reenlist. For this sample, the results continue to show that combat deployment length is positively related to use of the VDC program and with diminished educational attainment during enlistment. However, for this select sample, we find little evidence of diminished educational attainment following separation. This is not surprising given that the results in Table 8 suggest that adverse post-separation education effects are driven by combat deployments of 18 months or more, which are far less prevalent in single-term enlistments, which last, on average, four years.

[18] In unreported results available upon request, we find that among soldiers in their first term of enlistment, combat assignment is associated with a reduced probability of reenlistment.

In Table 11, we more generally examine the impacts of combat deployments across all years of enlisted service, including those who reenlist. The effects of combat assignment on VDC benefits receipt exist across all enlistment periods (columns 1 through 3), with the largest effects for those serving fewer total years of service. Combat-induced increases in PGIB use are present only for those enlisted for shorter periods (column 8), where we also observe increases in the post-separation probability of receiving an associate's degree (column 12). However, the adverse educational attainment effects during enlistment (column 7) and in the post-separation period for four-year college degree receipt (column 11) are largest for those who reenlist and serve for at least seven years.

As noted above, if adverse school attainment effects are largest for combat deployment lengths over 18 months, those who reenlist are more likely to attain this threshold than those who serve only a single term. Another explanation for this result is that individuals who reenlist (and have more years of service and longer lifetime combat deployments) may distinguish themselves in the military performance system based on their duty performance and leadership in combat more than their education. As a result, these experienced and "combat hardened" enlisted military leaders might subsequently select into post-separation occupations requiring less education and more managerial and leadership skills due to their own self-conceptions from combat service. Moreover, the military transition system may guide them in this direction based on their most demonstrable skills and the smallest "gap" between their current work and a civilian job.

5.4 Combat Exposure

Table 12 presents estimates of the economic impacts of combat exposure, measured by whether there was a death to another member of the unit and duration of exposure to injuries of other members of the unit. Controlling for combat deployment length, a one year increase in exposure to unit-level injuries is associated with a 19.6 percentage point increase in the probability of VDC benefit use for PTSD, a 16.4 percentage-point increase in the likelihood of benefit use for TBI, and a 13.2 percentage-point increase in a CDR of greater than 70 percent. This suggests that unit-level injuries may capture intense combat experiences of servicemembers that lead to substantial increases in reliance on VDC benefits. We also find that each additional year of injury exposure is associated with a 15.1 percentage-point increase in the probability of own wounding.

While we find no evidence that unit-level injury exposure is associated with economically important changes in the probability of UCX receipt, we do find that injury exposure is associated with a small reduction in the probability of post-9/11 GI Bill receipt. This is in contrast to our prior evidence on combat assignment, which suggests that intense physical injuries and mental health ailments deter benefit take-up.

Our results show that unit-level injury exposure is associated with important reductions in educational attainment during enlistment as well as following separation. We find that each additional year of unit injury exposure is associated with a 20.5 percent reduction in the probability of an advanced degree (associate's or bachelor's degree) by separation and a 6 percent reduction in the probability of a four-year college degree following separation.

With regard to death exposure, deaths were sufficiently infrequent during GWOT operations (~3,000) such that a very small percentage of soldiers are exposed to the death of a member of his unit in multiple months of deployment (less than 4 percent). Thus, we present

estimates of the effect of any exposure to death in the unit. While less precisely estimated, we find that exposure to a unit-level death is associated with a 1 to 2 percentage-point increase in the probability of VDC benefit receipt (columns 1 through 3). Moreover, we find that unit-level death exposure is associated with declines in both post-9/11 GI Bill receipt and four-year college semester enrollment.[19]

5.5 Heterogeneous Impacts

Finally, we explore whether there are heterogeneous impacts of combat, focusing on injury exposure estimates from equation (3). First, we explore whether the effects of combat differ by military rank (Table 13) or combat heavy occupations in the Infantry, Armor, Field Artillery and Special Forces (Table 14). The results on rank are consistent with above findings on age. Junior enlisted personnel are more likely to participate in the VDC, UCX and GI Bill programs than senior NCOs, while senior enlisted veterans are more likely to suffer adverse educational effects of combat. Findings by Army branch suggest little evidence of heterogeneous effects by "combat-heavy" occupations. This result may lend credence to the hypothesis that traditional combat occupation distinctions are somewhat less important determinants of combat exposure in modern warfare. The non-linear nature of modern battlefields and non-traditional threats (e.g., improvised explosive devices) has made the traditional "combat role" distinction less important.

Next, we examine whether the impact of injury exposure differs by years of enlisted service. In Table 15, we show that the magnitudes of estimated VDC benefits effects are largest

[19]When we adjust deaths and injuries to the same scale (using time exposed to deaths and injuries or exposure to any death or injury), we find that the impacts of deaths are approximately three times larger than that of injuries, suggesting mechanisms related to both psychological trauma and heavy and intense combat operations.

for those who serve under 10 years, generally reaching a maximum around 4 to 6 years, the first enlistment term for many servicemembers. One possible explanation is that longer enlistment periods are accompanied by more training exercises and other (routine but) difficult work that can generate more injuries and conditions that qualify individuals for VDC. As a result, deployments might correlate less strongly with VDC claims among tenured soldiers. With regard to education, we find the largest effects for post-separation four-year college attainment for those with over four years of enlisted service. As discussed above, this may result from senior enlisted soldiers with more combat experience selecting into occupations with lower returns to education.

An examination of combat exposure effects by separation year (Table 16) suggests somewhat larger VDC effects for those serving during major combat operations in Iraq and Afghanistan relative to the post-2010 period, when these operations began to draw to a close.[20] However, education effects are larger in more recent separating cohorts.

In Table 17, we examine the impact of injury exposure by gender. While women were prohibited from entering some combat positions during a substantial share of the period under study, women increasingly participated in combat roles. By 2013, the Pentagon had lifted the ban on women in these roles, and women have long been serving in combat zones in supportive roles. The results suggest that combat assignment has generally similar effects for VDC benefit use, enrollment in the GI Bill, and educational attainment for women as compared to men. This finding is consistent with our results in Table 14, again suggesting that traditional combat role distinctions are less useful in modern conflicts.

[20] Due to data availability constraints, the sample of servicemembers separating prior to 2002 include (i) those separating between 1995 and 2001 for schooling outcomes, and (ii) those separating between 1999 and 2001 for VDC outcomes.

Turning to race in Table 18, we find little difference in VDC or educational benefit receipt effects of combat for whites (row 1) versus non-whites (row 2). The largest difference emerges when examining educational attainment, where we find that the negative impacts of combat are far larger for whites than non-whites, in percentage-point and percentage terms.

Finally, we explore whether the impacts of combat differ by marital status. Married veterans are much more likely to receive VDC, UCX, and schooling benefits than their non-married counterparts, and to suffer from the adverse post-separation schooling effects. These findings may be explained by larger adverse psychological effects of warfare for those with spouses. Married soldiers may also have the strongest incentives to enroll for benefits in response to combat given greater financial needs for married soldiers, particularly if there are dependent children in the household. Finally, given that the opportunity costs of returning to school are often higher for married than single soldiers (particularly if they have children), combat exposure may induce larger adverse schooling effects for such individuals.

6. Conclusions

Despite a large body of work examining the economic effects of military service, almost nothing is known about how post-9/11 war deployments or unit-specific combat exposure affects the economic transitions of separating veterans. This study seeks to fill this important gap in knowledge by linking Army administrative data on enlisted veterans to data from the Department of Veterans Affairs, the National School Clearinghouse, and state Departments of Labor. We use these newly available administrative panel data to estimate the impact of combat service on transition benefit receipt and educational attainment. We exploit natural experiments in (i) conditional random assignment of soldiers of identical rank and occupation to their deployment

duties, and (ii) conditional random exposure to unit-level combat exposure, to estimate the impact of combat service on benefit use and schooling.

Our findings show that combat deployment assignments are associated with substantially increased risks of diagnoses of and eligibility for VDC benefits for PTSD and TBI. The magnitudes of these effects are large and, coupled with lifetime per-servicemember cost of treating PTSD and TBI produced by the CBO (2014), suggest additional costs of almost $40 billion and $20 billion, respectively. We also find that combat assignment is associated with small increases in UCX applications, consistent with combat-induced challenges of integrating into the civilian labor market as well as disincentives to transition given the generosity of benefits. Our marginal effects imply costs of approximately $200 million from combat.

We find that combat assignment is associated with a significant reduction in educational attainment during enlistment, which may, in part, explain modest increases in enrollment in the post-9/11 GI Bill. However, we find very little evidence that these benefits translate to increases in post-separation human capital acquisition. Our estimates show that longer combat deployments are associated with substantial declines in the probability of receiving a college degree. Deployments of over 18 months are associated with a 4 to 10 percent decline in the probability of four-year college graduation. These adverse effects are concentrated among white, married veterans who attained the rank of junior or senior NCOs. Finally, our results show that unit-level combat exposure, measured by deaths and injuries to comrades, is associated with substantially increased reliance on transition benefits and diminished human capital acquisition.

There are a number of important public policy implications from this work. First, our findings can improve the Federal interagency Transition Assistance Program, known in the Army as the *Soldier for Life* program. The findings can also inform pilot programs and

experimental research that will use combat exposure to predict veterans' benefit receipt. The results might enable specialized training (e.g., additional psychological support services, special interview preparation, more tailored resume writing) for those exposed to combat and better tailor services offered to those in Warrior Transition Units. Finally, these results could suggest additional services and remediation efforts while individuals are still in service as well as provide a rationale for additional compensation for combat veterans.

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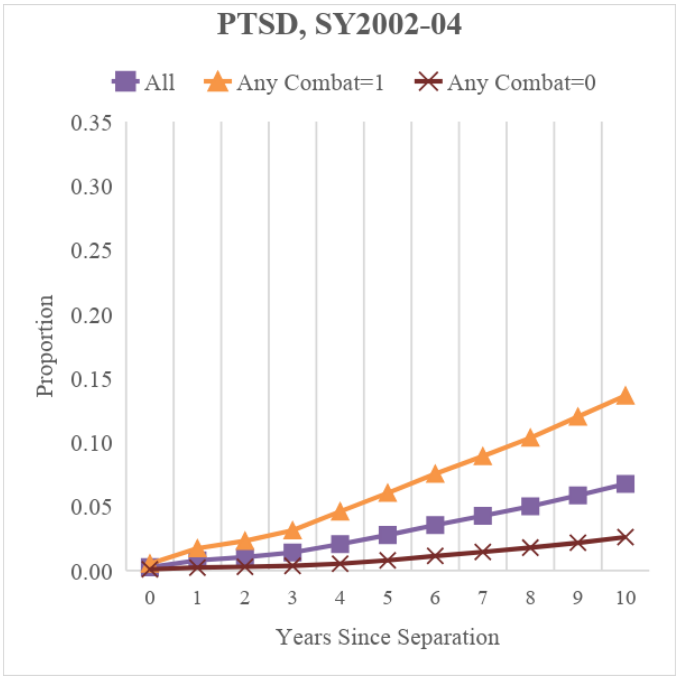
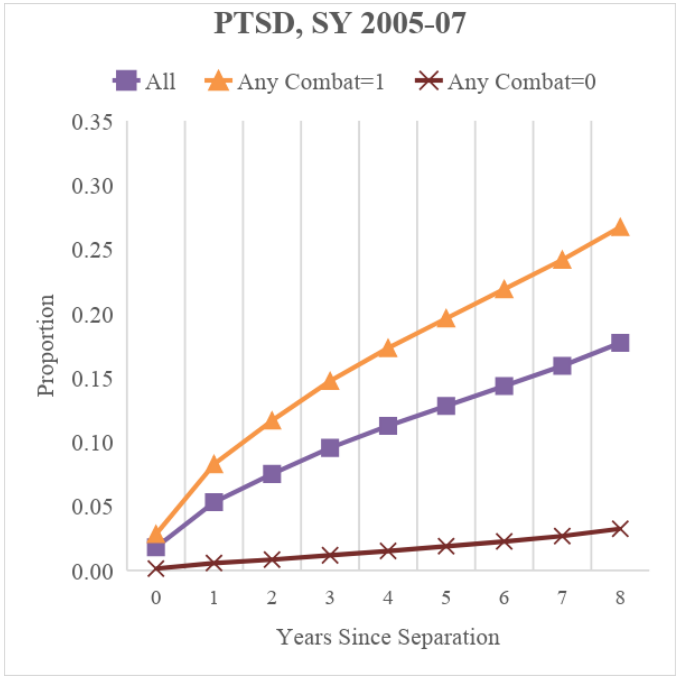
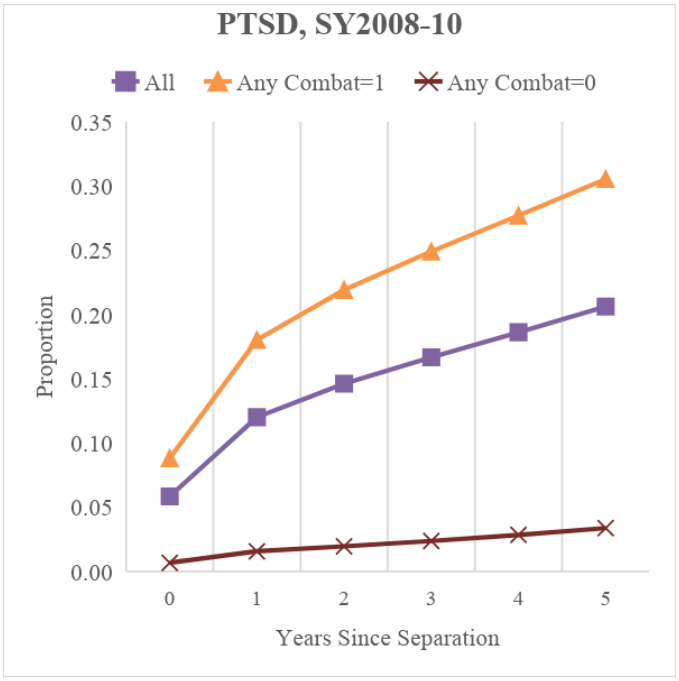
Figure 1. Post-Separation VDC Benefits for PTSD Diagnosis, by Separation Year (SY)







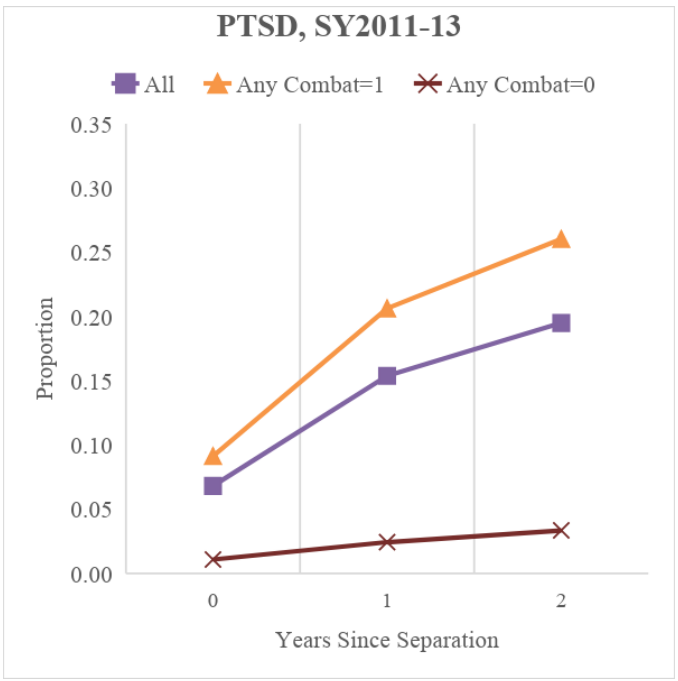


Figure 2. Post-Separation VDC Benefits for TBI Diagnosis, by Separation Year (SY)

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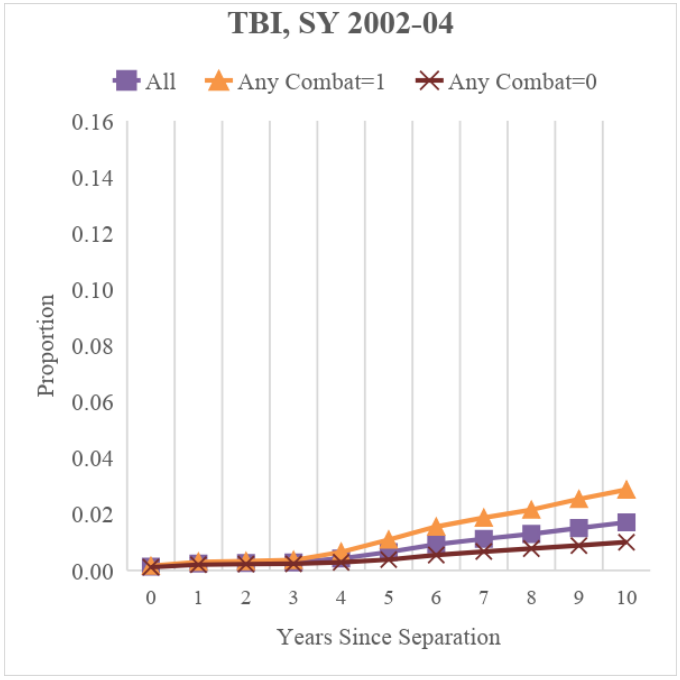
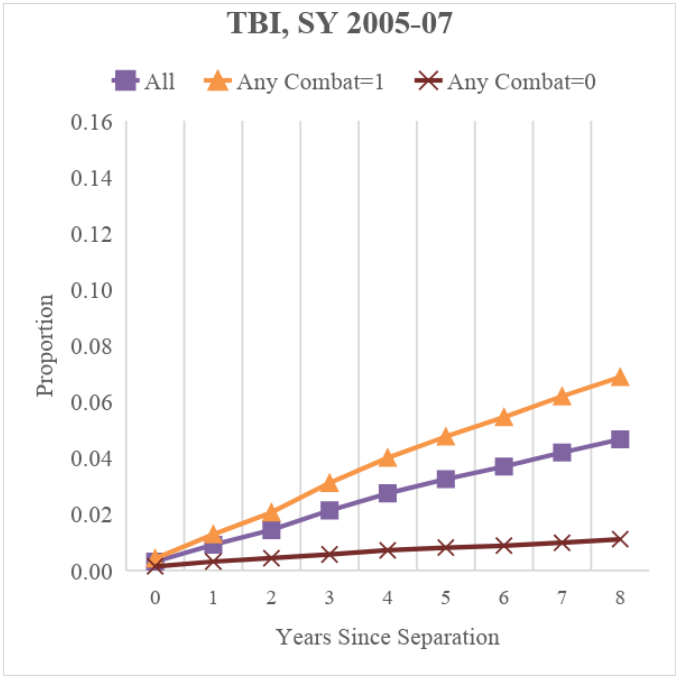
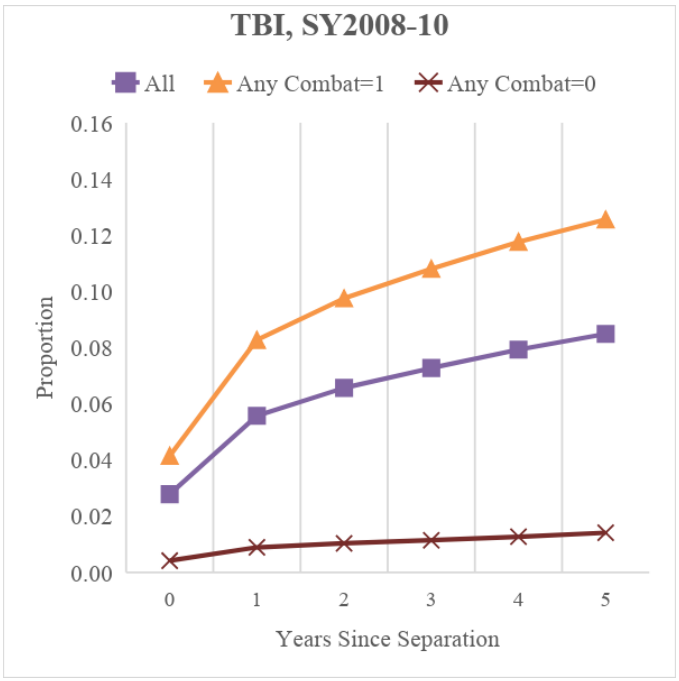






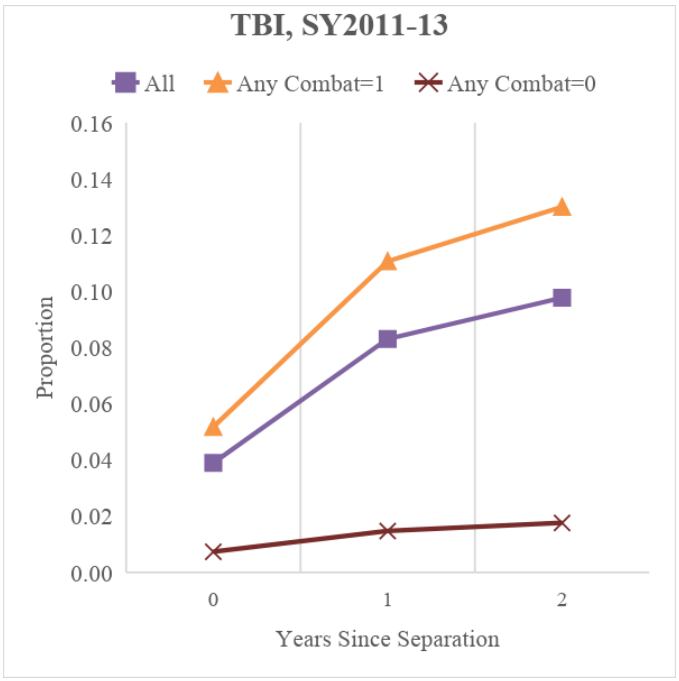
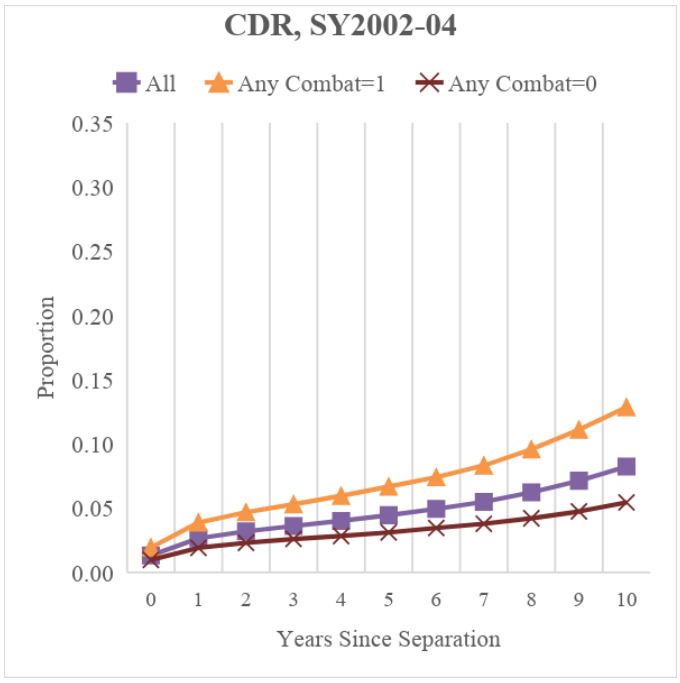
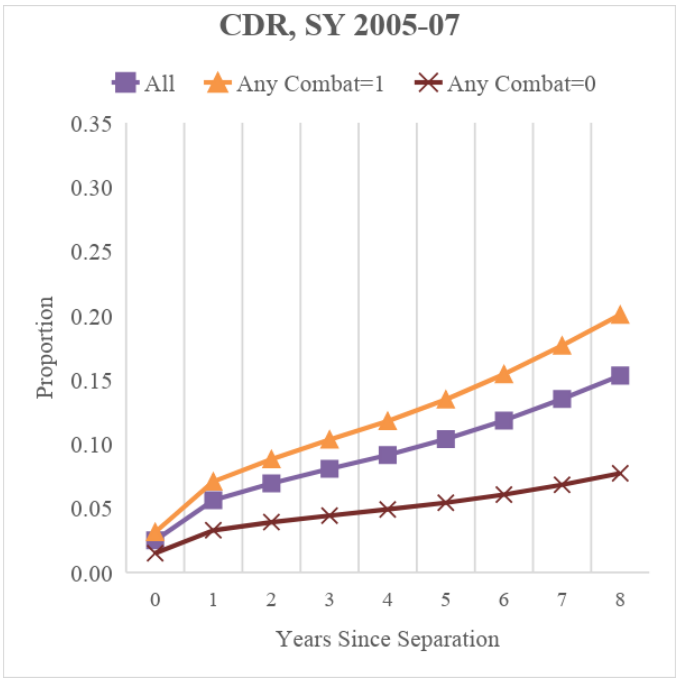
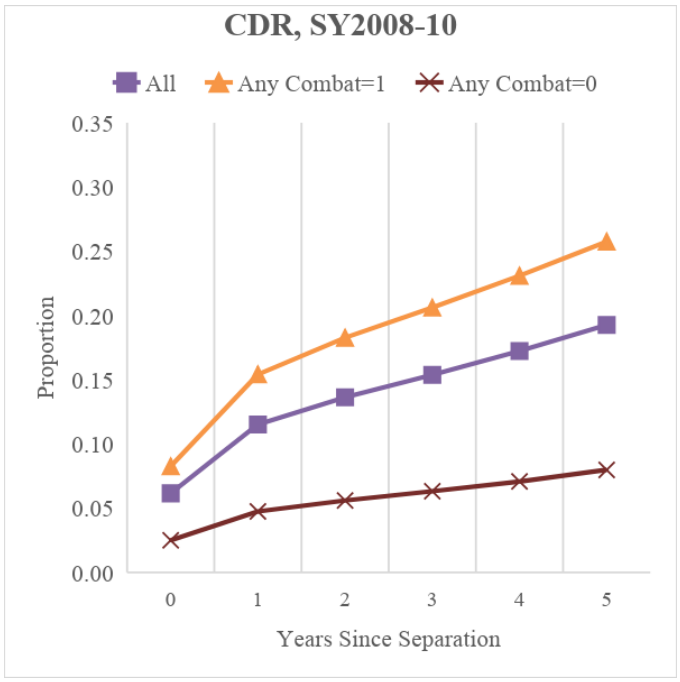


Figure 3. Post-Separation VDC Benefits for CDR ≥ 70%, by Separation Year (SY)







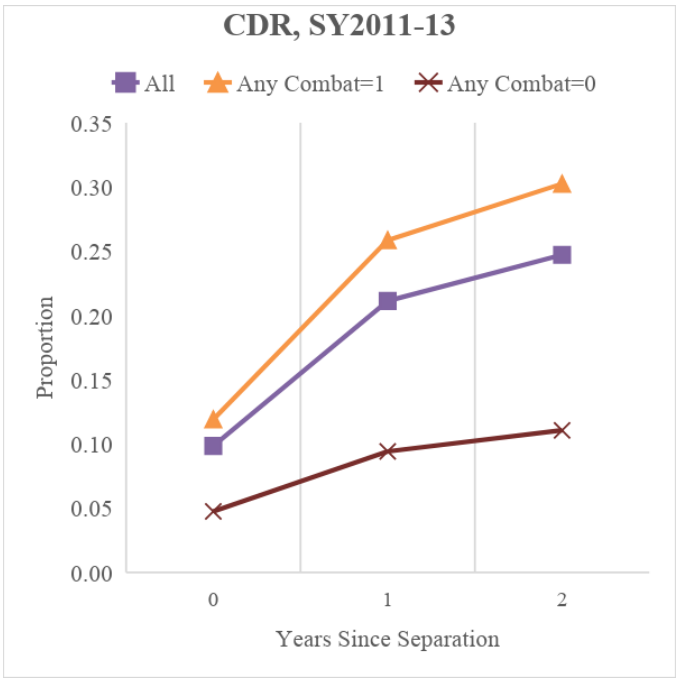


Figure 4. UCX Participation for those that Separate in FY 2010-2011

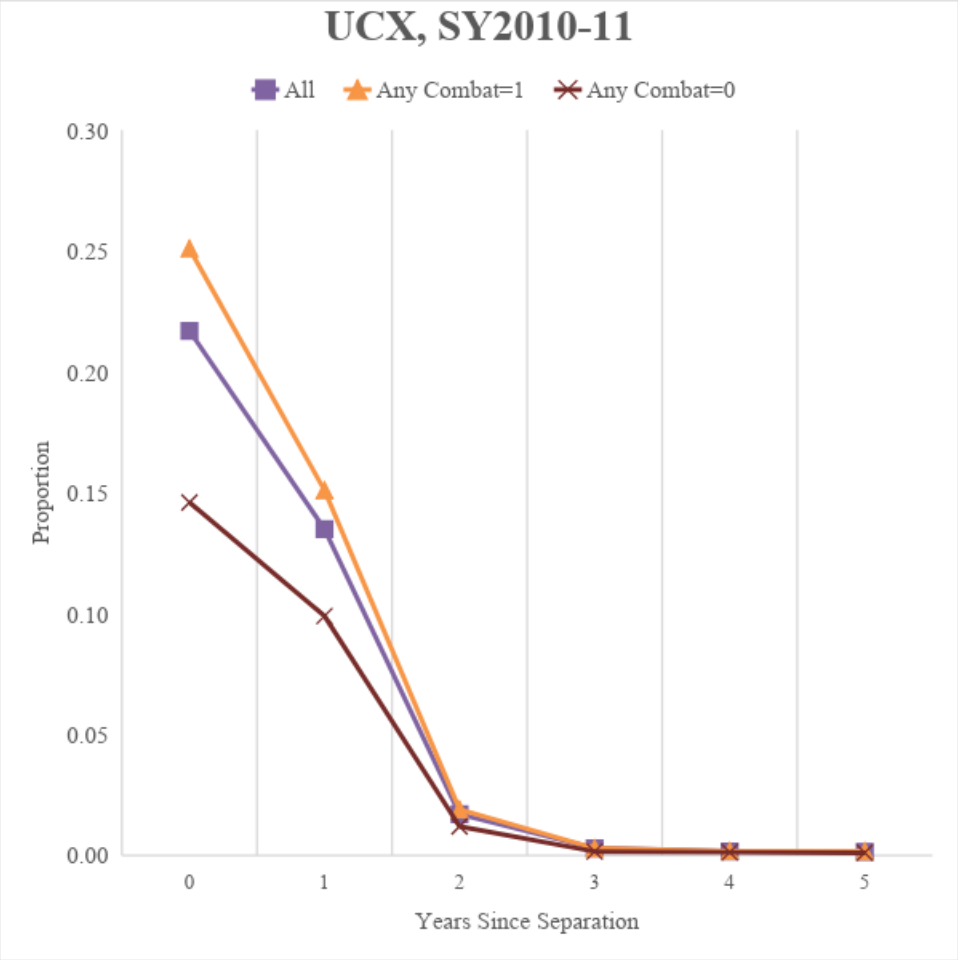
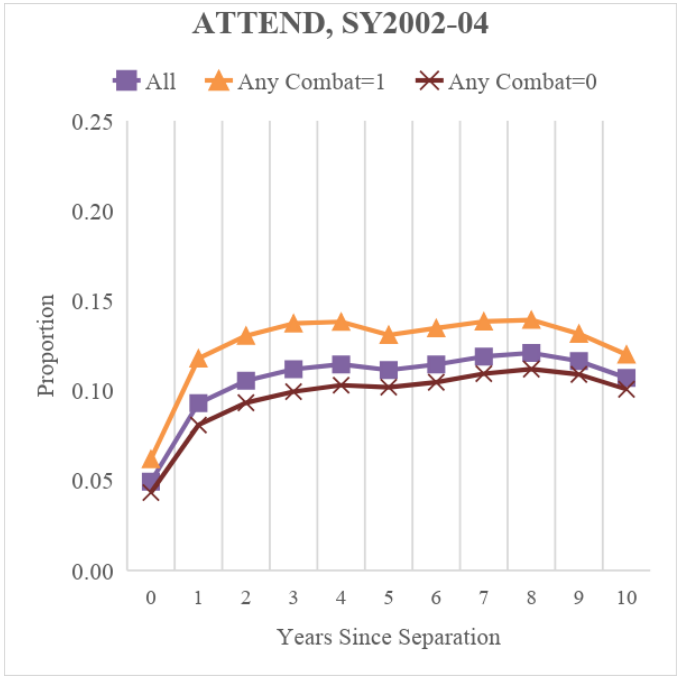
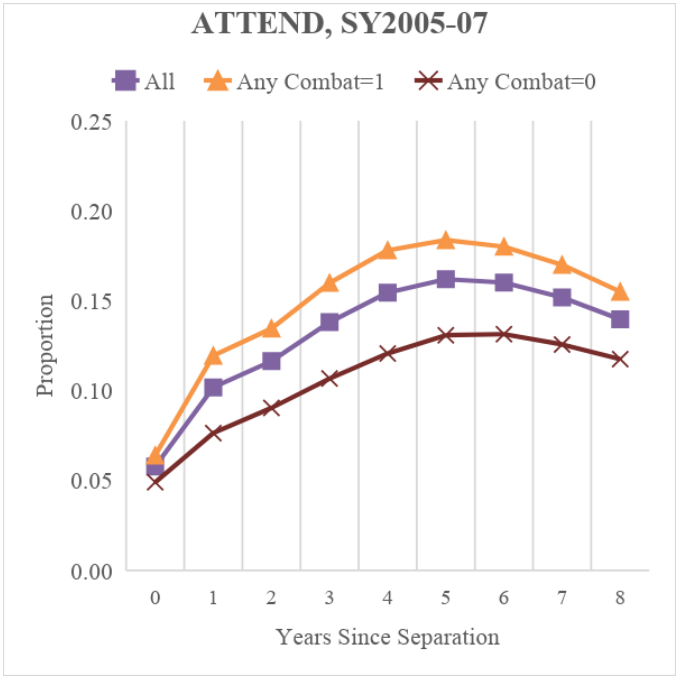
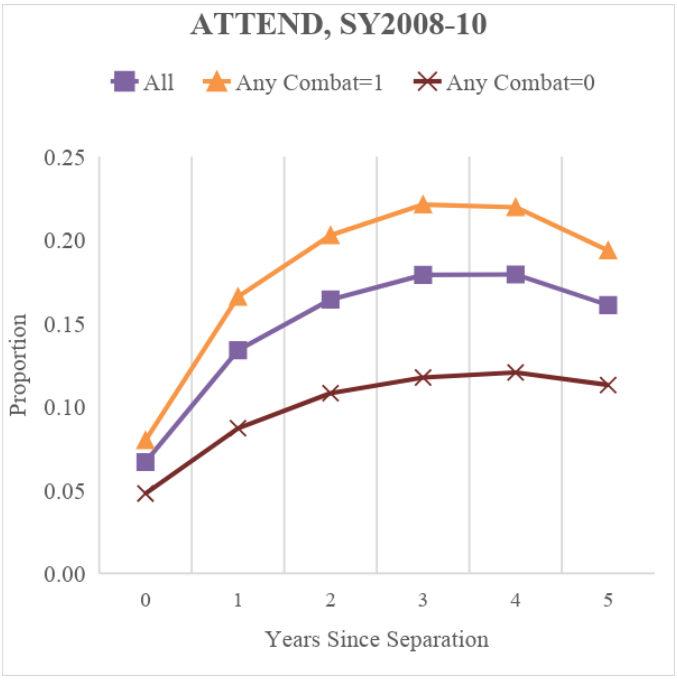


Figure 5. Post-Separation Post-Secondary School Attendance Among those without Bachelor's Degree, by Separation Year (SY)







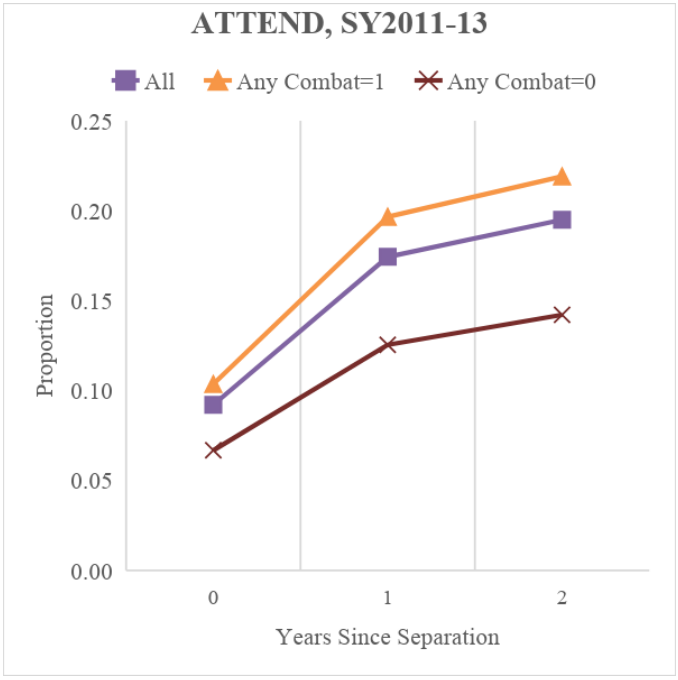
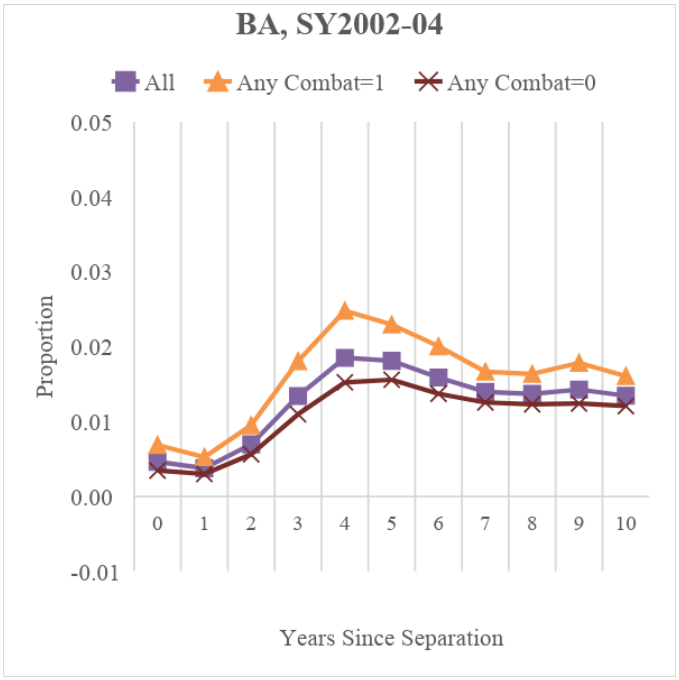
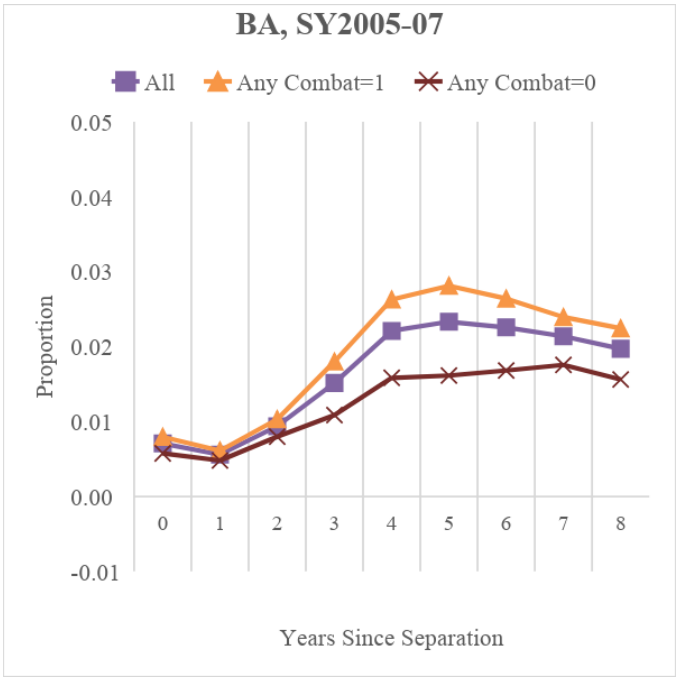
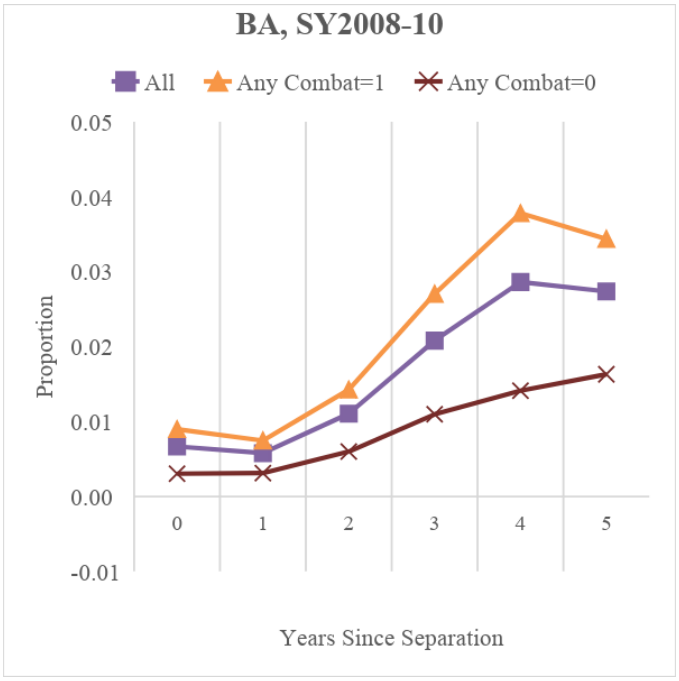


Figure 6. Post-Separation Four-Year College Degree Receipt Among those without Bachelor's Degree at Separation, by Separation Year (SY)







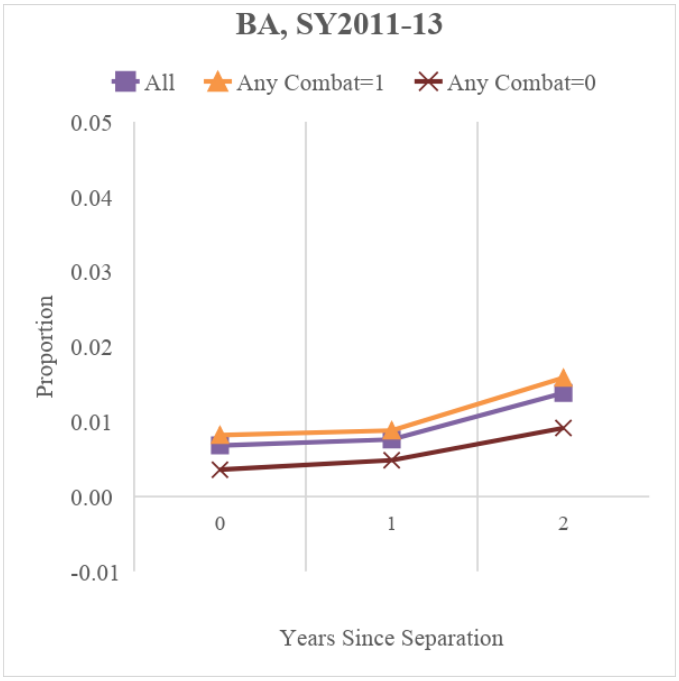


Figure 7. Post-Separation Associate Degree Receipt Among those without Associate's Degree at Separation, by Separation Year

Table 1. Means of Dependent Variables, Combat Measures and Selected Controls

	Mean	N
Dependent Variables		
PTSD[a]	.210	976,963
TBI[a]	.084	976,963
CDR ≥ 70%[a]	.237	976,963
Wounded[a]	.020	977,744
UCX-App[b]	.440	409,627
UCX-Elig[b]	.413	409,627
Attend College During Enlistment[c]	.111	861,612
Graduate from College During Enlistment[c]	.039	861,612
PGIB[d]	.428	131,606
Enroll in Post-Secondary College for Days > 0[e]	.582	928,837
Enroll for Semester at Four-Year College or University[e]	.380	928,837
Bachelor's Degree or Higher[e]	.112	928,837
Associate's Degree[f]	.097	928,837
Combat Measures		
Any Combat Deployment	.573	976,963
Years Combat Deployed	.755	976,963
Combat Deployment < One Year	.204	976,963
Combat Deployment of 12 to 17 Months	.183	976,963
Combat Deployment of 18 to 23 Months	.072	976,963
Combat Deployment of Two Years+	.055	976,963
Unit-Level Years of Injury Exposure	.116	976,963
Unit-Level Any Death Exposure	.116	976,963
Years of Combat Deployment of Other Unit Members	.752 (.913)	976,963
Selected Controls		
Years of Enlisted Service	5.61 (6.26)	976,963
Junior Enlisted (E01-E04)	.682	976,963
Junior NCOs (E05-E06)	.230	976,963
Senior NCOs (E07-E09)	.088	976,963
Combat Branches (Infantry, Armor, Field Artillery and Special Forces)	.291	976,963
Non-Combat Branches	.709	976,963
Age	27.5 (7.34)	976,963
Male	.829	976,963
White	.647	976,963
Black	.206	976,963
Hispanic	.111	976,963
Other	.036	976,963
AFQT-Cat 1	.045	976,963
AFQT-Cat 2	.320	976,963
AFQT-Cat 3A	.272	976,963

AFQT-Cat 3B	.334	976,963
AFQT-Cat 4	.028	976,963
AFQT-Cat 5	.001	976,963
Single at Separation	.475	976,963
Divorced at Separation	.051	976,963
Married at Separation	.474	976,963
Zero Dependents at Separation	.497	976,963
One Dependent at Separation	.193	976,963
Two Dependents at Separation	.141	976,963
Three Dependents at Separation	.112	976,963
Four Dependents at Separation	.055	976,963
Five+ Dependents at Separation	.002	976,963
High School Graduate at Separation	.709	976,963
GED at Separation	.116	976,963
Associates Degree at Separation	.037	976,963
Some College at Separation	.081	976,963
College Degree or higher at Separation	.050	976,963

[a]VDC benefit and wounding data are collected from FY2001 to FY2017.
[b] UCX benefit data are available from FY2010 to FY2015.
[c] Data on school attainment during enlistment is available from FY2001 to FY2017. Means are conditional on those for whom a high school degree or GED was the highest degree attained at enlistment.
[d]Post-9/11 GI Bill data are available in FY2015 and FY2016.
[e]Data on post-separation college attendance and four-year degree completion are available from FY2001 to FY2017. Means are conditional on those for whom an associate's degree or some college was the highest level of education attained at enlistment.
[f]Data on post-separation associate's degree receipt are collected from FY2001 to FY2017. Mean is conditional on those for whom a high school degree or GED is highest degree attained at enlistment.

Table 2. Means of Combat Measures and Selected Controls, by Post-Separation VDC, UCX, & Post-9/11 GI Bill Program Participation and Four-Year College Degree Receipt

	PTSD=0	*PTSD=1*	*UCX=0*	*UCX=1*	*PGIB=0*	*PGIB=1*	*BA=0*	*BA=1*
Combat Measures								
Any Combat Deployment	.483	.908	.602	.770	.495	.667	.560	.647
Years Combat Deployment	.596	1.35	.922	1.12	.829	.970	.743	.802
Combat Deployment < One Year	.193	.242	.179	.217	.169	.265	.198	.238
Combat Deployment of 12-17 Mos	.152	.300	.174	.257	.090	.140	.179	.215
Combat Deployment of 18 to 23 Mos	.056	.132	.080	.109	.070	.097	.071	.082
Combat Deployment of Two Years+	.082	.234	.168	.188	.167	.166	.112	.111
Unit Years of Injury Exposure	.083	.237	.146	.183	.133	.161	.117	.107
Unit Any Month Death Exposure	.082	.157	.103	.102	.080	.084	.095	.112
Selected Controls								
Years of Enlisted Service	5.04 (6.06)	7.75 (6.53)	6.05(6.92)	6.00(4.81)	6.05(6.74)	6.64(5.24)	5.12(5.78)	7.09(6.87)
Junior Enlisted (E01-E04)	.721	.538	.680	.675	.688	.618	.728	.483
Junior NCOs (E05-E06)	.201	.337	.211	.284	.220	.322	.207	.367
Senior NCOs (E07-E09)	.078	.125	.109	.041	.092	.060	.065	.150
Combat Branches	.274	.353	.324	.277	.220	.305	.305	.235
Non-Combat Branches	.726	.647	.676	.723	.092	.695	.695	.765
Age	26.9(7.16)	29.9 (7.53)	27.9(8.03)	28.6(6.41)	27.9(8.12)	28.5(6.41)	26.9(6.93)	28.6(7.42)
Male	.816	.877	.689	.830	.872	.851	.845	.733
White	.658	.607	.688	.620	.638	.598	.667	.610
Black	.200	.231	.177	.215	.205	.229	.197	.240
Hispanic	.108	.122	.102	.130	.122	.139	.111	.113
Other	.034	.040	.033	.035	.035	.034	.025	.037
AFQT-Cat 1	.051	.025	.052	.034	.034	.045	.031	.085
AFQT-Cat 2	.334	.271	.328	.297	.293	.324	.300	.430
AFQT-Cat 3A	.271	.278	.263	.266	.267	.257	.282	.246
AFQT-Cat 3B	.321	.382	.336	.371	.388	.354	.358	.216
AFQT-Cat 4	.023	.044	.021	.032	.018	.020	.029	.023
AFQT-Cat 5	.000	.000	.000	.000	.000	.000	.000	.000

Single at Separation	.515	.322	.471	.341	.451	.348	.490	.445
Divorced at Separation	.045	.070	.052	.071	.049	.072	.047	.064
Married at Separation	.439	.606	.477	.588	.500	.580	.463	.491
Zero Dependents at Separation	.512	.320	.481	.357	.461	.374	.480	.466
One Dependent at Separation	.190	.207	.183	.219	.174	.217	.190	.204
Two Dependents at Separation	.131	.177	.138	.174	.141	.165	.140	.134
Three Dependents at Separation	.100	.159	.111	.134	.121	.129	.108	.112
Four Dependents at Separation	.045	.085	.056	.071	.063	.070	.052	.054
Five+ Dependents at Separation	.022	.052	.031	.045	.040	.045	.030	.030
High School Graduate at Separation	.716	.680	.712	.706	.786	.676	.760	.696
GED at Separation	.114	.123	.095	.130	.074	.069	.132	.042
Associates Degree at Separation	.035	.043	.039	.031	.043	.046	.031	.107
Some College at Separation	.077	.098	.091	.084	.094	.109	.077	.155
College Degree+ at Separation	.050	.047	.056	.042	.000	.000	.000	.000

Table 3. Estimates of the Impact of Combat Assignment on VA Diagnosis of and Benefits Eligibility for PTSD, FY2001-FY2017

	PTSD (Mean= .210)	
	Military Controls	*Military + Personal Controls*
	(1)	(2)
	Panel I: Deployment to Combat	
Any Combat	.185***	.190***
	(.005)	(.005)
	Panel II: Linear Deployment Length	
Years Combat	.089***	.094***
	(.005)	(.005)
	Panel III: Non-Linear Deployment Length	
1 to 11 Months	.164***	.167***
	(.006)	(.006)
12 to 17 Months	.212***	.212***
	(.006)	(.006)
18 to 23 Months	.225***	.225***
	(.006)	(.006)
2 Years +	.238***	.238***
	(.006)	(.006)
N	976,963	976,963

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, year of separation, and gender. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, number of dependents, and educational attainment at the time of separation.

Table 4. Estimates of the Impacts of Combat Assignment on VA Diagnosis of and Benefits Eligibility for TBI, CDR ≥ 70%, and Physical Wounding, FY2001-FY2017

	TBI (Mean=.084)		**CDR ≥ 70% (mean=.237)**		**Wounded (Mean=.020)**	
	Military Controls	*Military + Personal Controls*	*Military Controls*	*Military + Personal Controls*	*Military Controls*	*Military + Personal Controls*
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel I: Deployment to Combat			
Any Combat	.047***	.048***	.052***	.062***	.018***	.018***
	(.004)	(.004)	(.006)	(.005)	(.003)	(.003)
			Panel II: Linear Deployment Length			
Years Combat	.028***	.029***	.001	.012***	.015***	.015***
	(.003)	(.003)	(.003)	(.003)	(.002)	(.003)
			Panel III: Non-Linear Deployment Length			
1 to 11 Months	.040***	.041***	.057***	.063***	.016***	.016**
	(.004)	(.004)	(.005)	(.005)	(.003)	(.003)
12 to 17 Months	.055***	.056***	.053***	.065***	.018***	.018***
	(.004)	(.004)	(.005)	(.005)	(.003)	(.003)
18 to 23 Months	.062***	.065***	.033***	.052***	.032***	.032***
	(.006)	(.006)	(.007)	(.006)	(.006)	(.006)
2 Years +	.072***	.076***	.009	.036***	.039***	.039***
	(.006)	(.006)	(.007)	(.007)	(.005)	(.005)
N	976,963	976,963	976,963	976,963	977,744	977,744

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, year of separation, and gender. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, number of dependents, and educational attainment at the time of separation.

Table 5. Estimates of the Impact of Combat Assignment on UCX Applications and Eligibility (FY2010-FY2015)

	UCX Applications (Mean= .440)	**UCX Eligible (Mean= .412)**
	(1)	(2)
	Panel I: Deployment to Combat	
Any Combat	.015***	.010***
	(.003)	(.003)
	Panel II: Linear Deployment Length	
Years Combat	.006***	.005***
	(.002)	(.002)
	Panel III: Non-Linear Deployment Length	
1 to 11 Months	.011***	.007**
	(.003)	(.003)
12 to 17 Months	.019***	.013***
	(.004)	(.003)
18 to 23 Months	.019***	.015***
	(.005)	(.005)
2 Years +	.021***	.018***
	(.005)	(.004)
N	409,627	409,627

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, year of separation, and gender. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, number of dependents, and educational attainment at the time of separation.

Table 6. Estimates of the Impact of Combat Assignment on Educational Attainment at Separation Among those with a High School Degree (or GED) at Start of Enlistment, FY2001-FY2017

	Attend College (Mean = 0.112)	**College Degree (Mean = 0.039)**
	(1)	(2)
	Panel I: Deployment to Combat	
Any Combat	-.0085***	-.0046***
	(.0014)	(.0008)
	Panel II: Linear Deployment Length	
Years Combat	-.0178***	-.0105***
	(.0017)	(.002)
	Panel III: Non-Linear Deployment Length	
1 to 11 Months	-.0046***	-.0023**
	(.0010)	(.0007)
12 to 17 Months	-.0092***	-.0050***
	(.0015)	(.0010)
18 to 23 Months	-.0221***	-.0117***
	(.0030)	(.0018)
2 Years +	-.0402***	.018***
	(.0041)	(.004)
N	861,612	861,612

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, year of separation, and gender. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and number of dependents. All regressions condition the sample on those with a high school diploma or GED at enlistment.

Table 7. Estimates of the Impact of Combat Assignment on GI Bill Receipt and College Attendance, FY1995-FY2015 Among those with No Bachelor's Degree at Separation

	FY2015-16	*FY2001-17*		*FY2015-16*	
	PGIB (Mean = .413)	**Attend > 0 Days (Mean = .582)**	**Semester (Mean = .380)**	**Attend > 0 Days (Mean = .432)**	**Semester (Mean = .249)**
	(1)	(2)	(3)	(4)	(5)
			Panel I: Deployment to Combat		
Any Combat	.0094**	.0102***	-.0006	-.0041	-.0027
	(.0046)	(.0020)	(.0021)	(.0030)	(.0059)
			Panel II: Linear Deployment Length		
Years Combat	.0044	-.0003	-.0074***	.0064	-.0108***
	(.0027)	(.0014)	(.0015)	(.0050)	(.0033)
			Panel III: Non-Linear Deployment Length		
1 to 11 Months	.0075	.0108***	.0015	.0071	-0014
	(.0046)	(.0020)	(.0020)	(.0047)	(.0053)
12 to 17 Months	.0177**	.0104***	-.0018	.0094	-.0019
	(.0075)	(.003)	(.0026)	(.0080)	(.0094)
18 to 23 Months	.0143	.0092***	-.0056	-0043	-.0013
	(.0087)	(.0033)	(.004)	(.0088)	(.0011))
2 Years +	.0137	.0012	-.0160***	-.0128	-.0292***
	(.0092)	(.0036)	(.0036)	(.0101)	(.0109)
N	131,606	928,837	928,837	131,606	131,606

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include military controls and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, year of separation, and gender. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and number of dependents. Sample is conditional on non-receipt of a four year college degree at the time of separation.

Table 8. Estimates of the Impact of Combat Assignment on Associates Degree and Four-Year College Degree Receipt, FY2001-FY2017

	Associate's Degree	***Bachelor's Degree***	***Bachelor's Degree***	***Bachelor's Degree***
Sample at Separation:	*HS Grads (Mean DV =.100)*	*HS Grads (Mean DV = .103)*	*Non-College Grads (Mean DV =.112)*	*Non-College Grads SY < FY2014 (Mean DV =.137)*
	(1)	(2)	(3)	(4)
		Panel I: Deployment to Combat		
Any Combat	.0008	-.0015	-.0028**	-.0036**
	(.0012)	(.0015)	(.0014)	(.0017)
		Panel II: Linear Deployment Length		
Years Combat	.0014	-.0029***	-.0051***	-.0060**
	(.0009)	(.0010)	(.0014)	(.0012)
		Panel III: Non-Linear Deployment Length		
1 to 11 Months	-.0012	-.0003	-.0016	-0020
	(.0014)	(.0014)	(.0014)	(.0018)
12 to 17 Months	.0041***	-.0031	-.0033**	-.0043**
	(.0015)	(.0019)	(.0016)	(.0019)
18 to 23 Months	.0029	-.0044*	-.0073***	-.0081***
	(.0025)	(.0026)	(.0029)	(.0029)
2 Years +	.0041	-.0050*	-.0109***	-.0129***
	(.0025)	(.0028)	(.0025)	(.0030)
N	692,991	692,991	928,837	727,336

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include military controls and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, year of separation, and gender. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and number of dependents. Samples are conditional on educational attainment at enlistment as indicated.

Table 9. 2SLS Estimates of the Effects of Length of Combat Deployment (Years) on Transition Benefit Receipt and Educational Attainment

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS	.098***	.027***	.008**	.006***	.005***	.011***
	(.004)	(.002)	(.003)	(.002)	(.002)	(.001)
OLS	.094***	.029***	.012***	.012***	.011***	.018***
	(.005)	(.003)	(.003)	(.002)	(.002)	(.003)
First Stage	.899***	.899***	.899***	.894***	.894***	.899***
	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
Mean DV	0.210	0.085	0.231	0.440	0.412	0.020
N	914,465	914,465	914,465	385,599	385,599	914,572

	College Degree at Separation	PGIB	Enroll Days > 0	Enroll Semester > 0	Associate's Degree	Bachelor's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
2SLS	-.0114***	.007***	.002	-.006***	.003***	-.005***
	(.0012)	(.003)	(.002)	(.002)	(.001)	(.001)
OLS	-.0104***	.005*	.001	-.005***	.002	-.004***
	(.0011)	(.003)	(.002)	(.002)	(.001)	(.001)
First Stage	.897***	.884***	.897***	.897***	.897***	.899***
	(.003)	(.005)	(.003)	(.003)	(.003)	(.004)
Mean DV	.034	.433	.582	.359	.097	.108
N	803,324	123,741	760,577	760,577	760,777	869,241

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and educational attainment at the time of separation.

Table 10. Sensitivity of Combat Assignment Estimates to Single-Term Enlistments (without Reenlistment)

	PTSD	TBI	CDR ≥ 70%	Wounded	UCX-App	GI Bill
	(1)	(2)	(3)	(4)	(5)	(6)
Years	.147***	.042***	.040**	.021***	-.0007	.0178**
Combat	(.006)	(.004)	(.004)	(.004)	(.0029)	(.0071)
N	585,045	585,045	585,045	585,272	229,204	69,978

	College Attend During Enlistment	College Degree at Separation	Enroll Days > 0	Four-Year Semester	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
Years	-.0065***	-.0019***	.0045**	-.0006	.0012	.0020
Combat	(.0010)	(.0003)	(.0019)	(.0022)	(.0013)	(.0032)
N	518,597	518,597	562,904	562,904	562,904	527,875

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and educational attainment at the time of separation.

Table 11. Estimates of the Impact of Combat Assignment, by Years of Enlisted Service

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
0-3 YOS	.202***	.0590***	.0749****	.0070	-.0004	.0232***
	(.0063)	(.0049)	(.0055)	(.0047)	(.004)	(.0052)
N	509,854	598,854	509,854	188,687	188,687	510,067
4-6 YOS	.099***	.0297***	.0115***	.0072**	.0088***	.0181***
	(.0041)	(.0024)	(.0029)	(.0032)	(.0033)	(.0027)
N	219,024	219,024	219,024	100,751	100,751	219,229
7-9 YOS	.0700***	.0250***	-.0013	.0128***	.0128***	.0158***
	(.0035)	(.0031)	(.0032)	(.0037)	(.0037)	(.0024)
N	87,812	87,812	160,273	46,748	46,748	87,911
10+ YOS	.0514***	.0175***	-.0096***	.0009	.0006	.0096***
	(.0027)	(.0020)	(.0020)	(.0024)	(.0023)	(.0016)
N	160,273	160,273	160,273	73,441	73,441	160,537

	College Degree During Enlistment	PGIB	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(12)	(11)
0-3 YOS	-.0020***	.0206***	.0124***	.0040*	.0017	.0037**
	(.0003)	(.0077)	(.0025)	(.0024)	(.0015)	(.0013)
N	457,984	60,867	494,002	494,002	494,002	486,404
4-6 YOS	-.0031***	.0039	.0023	-.0043	-.00004	.0028**
	(.0006)	(.0075)	(.0027)	(.0028)	(.0017)	(.0014)
N	191,034	26,760	209,798	209,798	209,798	204,881
7-9 YOS	-.0056***	.0067	-.0045	-.0126***	-.0085***	-.0011
	(.0010)	(.0074)	(.0030)	(.0033)	(.0017)	(.0020)
N	77,747	16,025	84,668	84,668	84,668	81,979
10+ YOS	-.0202***	.0003	-.0073***	-.0132***	-.0103***	-.0019
	(.0020)	(.0040)	(.0021)	(.021)	(.0013)	(.0011)
N	134,847	27,954	140,369	140,369	140,369	119,051

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and educational attainment at separation (except for the outcome examining educational attainment at separation).

Table 12. OLS Estimates of the Impacts of Unit-Level Injury Duration Exposure and Death Exposure (Conditional on Deployment Length) on Transition Benefit Use and Educational Attainment

	PTSD	TBI	CDR ≥ 70%	Wounded	UCX	GI Bill
	(1)	(2)	(3)	(4)	(5)	(6)
Duration Unit Injury Exposure	.196***	.164***	.132**	.151***	-.0087*	-.0360***
	(.010)	(.010)	(.001)	(.014)	(.0049)	(.0080)
N	976,963	976,963	976,963	977,744	409,627	131,606
Death Exposure	.0196***	.0200***	.0149***	.0140***	-.0020	-.0096
	(.0027)	(.0033)	(.003)	(.0024)	(.0028)	(.0059)
N	976,963	976,963	976,963	977,744	409,627	131,606

	College Attend During Enlistment	College Degree at Separation	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
Duration Unit Injury Exposure	-.0151***	-.0080***	-.005	-.013***	-.006***	.002
	(.0036)	(.0026)	(.004)	(.004)	(.003)	(.003)
N	861,612	861,612	928,837	928,837	928,837	839,026
Death Exposure	-.0012	-.0008	-.0016	-.0039*	-.0020	-.0019
	(.0013)	(.0011)	(.0021)	(.0020)	(.0014)	(.0019)
N	861,612	861,612	928,837	928,837	928,837	839,026

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, and marital status. Columns (1) through (5) control for level of education attained at separation and columns (6) through 12) condition the sample on educational attainment at separation or enlistment as noted in Table 1.

Table 13. Estimates of the Impact of Duration of Injury Exposures, by Rank

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
Junior Enlisted (E01-E04)	.237***	.184***	.177***	-.0102	-.0101	.1579***
	(.010)	(.0014)	(.011)	(.0082)	(.0077)	(.0228)
N	666,157	666,157	666,157	277,825	277,825	666,577
Junior NCOs (E05-E06)	.166***	.158***	.109***	-.0104	-.0101	.1557***
	(.012)	(.011)	(.014)	(.0074)	(.0075)	(.0178)
N	224,765	224,765	224,765	98,692	98,692	224,997
Senior NCOs (E07-E09)	.050***	.096***	.024*	-.0024	-.0027	.1043***
	(.004)	(.012)	(.014)	(.0116)	(.0116)	(.0188)
N	86,041	86,041	86,041	33,110	33,110	86,170

	College Attend During Enlistment	College Degree at Separation	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
Junior Enlisted (E01-E04)	-.0014*	-.054***	-.0015	-.033	.002	.006*
	(.0008)	(.005)	(.0074)	(.004)	(.003)	(.004)
N	603,343	603,343	650,482	650,482	650,482	640,517
Junior NCOs (E05-E06)	-.0084*	-.022*	-.0053	-.015**	-.012***	-.005
	(.0046)	(.012)	(.0058)	(.006)	(.004)	(.004)
N	189,374	189,374	208,984	208,984	208,984	198,409
Senior NCOs (E07-E09)	-.0345***	-.041*	-.0213*	-.038***	-.016	-.003
	(.0119)	(.021)	(.0123)	(.013)	(.010)	(.009)
N	68,895	68,895	69,371	69,371	69,371	53,389

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, and marital status. Columns (1) through (6) control for level of education attained at separation and columns (7) through 12) condition the sample on educational attainment at separation or enlistment as noted in Table 1.

Table 14. Estimates of the Impact of Duration of Injury Exposures, by Combat Branch

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
"Combat" Branch	.208*** (.016)	.191*** (.011)	.153*** (.016)	-.0071 (.0061)	-.007 (.006)	.2068*** (.0100)
N	284,219	284,219	284,219	124,646	124,646	284,428
Other Branch	.182*** (.008)	.136*** (.009)	.108*** (.007)	-.0122 (.008)	-.012 (.008)	.0996***).0091)
N	692,744	692,744	692,744	284,981	284,981	693,316

	College Degree During Enlistment	PGIB	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
"Combat" Branch	-.0100** (.0042)	-.043*** (.007)	-.012** (.005)	-.011* (.006)	-.008*** (.003)	.0004 (.004)
N	257,688	40,949	276,113	276,113	276,113	269,590
Other Branch	-.0075** (.0029)	-.029* (013)	-.0008 (.0056)	-.014*** (.005)	-.004 (.004)	.0003 (.0004)
N	603.924	90,657	652,724	652,724	652,724	622,725

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, and marital status. Columns (1) through (6) control for level of education attained at separation and columns (7) through 12) condition the sample on educational attainment at separation or enlistment as noted in Table 1.

Table 15. Estimates of the Impact of Duration of Injury Exposures, by Years of Enlisted Service

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
0-3 YOS	.288***	.208***	.211***	-.017	-.017	.1790***
	(.014)	(.019)	(.013)	(.012)	(.012)	(.0241)
N	509,854	509,854	509,854	188,687	188,687	510,067
4-6 YOS	.204***	.168***	.145***	-.012	-.013	.1614***
	(.007)	(.008)	(.007)	(.008)	(.008)	(.0143)
N	219,024	219,024	219,024	100,751	100,751	219,229
7-9 YOS	.158***	.176***	.119***	-.009	-.010	.1597***
	(.013)	(.011)	(.010)	(.012)	(.012)	(.0160)
N	87,812	87,812	87,812	46,748	46,748	87,911
10+ YOS	.126***	.109***	.050***	-.002	-.002	.1070***
	(.010)	(.007)	(.010)	(.008)	(.008)	(.0105)
N	160,273	160,273	160,273	73,441	73,441	160,537

	College Degree During Enlistment	PGIB	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
0-3 YOS	.0003	-.016	.0069	-.002	.007	.007
	(.0008)	(.032)	(.0090)	(.007)	(.005)	(.005)
N	457,984	60,867	494,002	494,002	494,002	486,404
4-6 YOS	-.0031*	-.041*	-.0039	-.010	-.008**	-.001
	(.0019)	(.024)	(.0079)	(.009)	(.004)	(.006)
N	191,034	26,760	209,798	209,798	209,798	204,881
7-9 YOS	-.0047*	-.042**	-.0186**	-.011	-.011**	.005
	(.0028)	(.020)	(.0095)	(.009)	(.005)	(.006)
N	77,747	16,025	84,668	84,668	84,668	81,979
10+ YOS	-.0207***	-.033**	-.0096	-.025***	-.009	-.005
	(.0068)	(.014)	(.0082)	(.008)	(.006)	(.005)
N	134,847	27,954	140,369	140,369	140,369	119,051

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, and marital

status. Columns (1) through (6) control for level of education attained at separation and columns (7) through 12) condition the sample on educational attainment at separation or enlistment as noted in Table 1.

Table 16. Estimates of the Impact of Duration of Injury Exposures, by Year of Separation

	PTSD	TBI	CDR ≥ 70%	Four-Year Semester	Bachelor's Degree	Associate's Degree
	(1)	(2)	(3)	(4)	(5)	(6)
Pre-2002	.5093*	-.0579	.2592	-.1085	-.0629	-.1848*
	(.2990)	(.1222)	(.2377)	(.2571)	(.2440)	(.1006)
N	485,926	485,296	485,296	470,666	470,666	456,173
2002-2005	.3006*	.1266***	.2034***	-.0355**	.0075	-.0018
	(.0171)	(.0102)	(.0171)	(.0155)	(.0026)	(.0115)
N	240,913	240,913	240,913	230,393	230,393	221,692
2006-2009	.2234***	.1690***	.1695***	-.0066	-.0039	.0077
	(.0100)	(.0114)	(.0097)	(.0087)	(.0074)	(.0065)
N	223,770	223,770	223,770	211,823	211,823	202,672
2010-2016	.1713***	.1614***	.1124***	-.0114***	-.0055***	-.0010
	(.0130)	(.0106)	(.0127)	(.0044)	(.0019)	(.0028)
N	487,004	487,004	487,004	461,328	461,328	443,439

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, marital status, and educational attainment at separation.

Table 17. Estimates of the Impact of Duration of Injury Exposures, by Gender

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
Men	.196***	.167***	.132***	-.010*	-.009*	.155***
	(.010)	(.009)	(.011)	(.005)	(.005)	(.014)
N	809,989	809,989	809,989	349,318	349,318	810,669
Women	.170***	.079***	.124**	.005	.006	.055***
	(.023)	(.003)	(.020)	(.004)	(.004)	(.013)
N	166,974	166,974	166,974	60,309	60,309	167,075

	College Degree During Enlistment	PGIB	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
Men	-.0079***	-.034**	-.007*	-.012***	-.006***	.0004
	(.0026)	(.009)	(.004)	(.004)	(.002)	(.003)
N	719,208	113,610	773,328	773,328	773,328	744,743
Women	-.0127	-.047	.033**	-.010	-.0002	.008
	(.0090)	(.049)	(.014)	(.017)	(.013)	(.017)
N	142,404	17,996	155,509	155,509	155,509	147,572

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, and marital status. Columns (1) through (6) control for level of education attained at separation and columns (7) through 12) condition the sample on educational attainment at separation or enlistment as noted in Table 1.

Table 18. Estimates of the Impact of Injury Exposures, by Race and Marital Status

	PTSD	TBI	CDR ≥ 70%	UCX-App	UCX-Elig	Wounded
	(1)	(2)	(3)	(4)	(5)	(6)
White	.2041***	.1772***	.1434***	-.0076	-.0080	.1685***
	(.0114)	(.0092)	(.0108)	(.0063)	(.0062)	(.0138)
N	631,866	631,866	631,866	270,069	270,068	632,306
Non-White	.1837***	.1368***	.1103***	-.0097	-.0074	.1174***
	(.0115)	(.0127)	(.0136)	(.0103)	(.0105)	(.0158)
N	345,097	345,097	345,097	139,558	139,558	345,483
Unmarried	.2155***	.1668***	.1531***	-.0112	-.0134*	.1673***
	(.0112)	(.0123)	(.0112)	(.0089)	(.0082)	(.0172)
N	513,806	513,806	513,806	195,421	195,421	514,116
Married	.1837***	.1640***	.1181***	-.0105*	-.0093	.1440***
	(.0116)	(.0104)	(.0124)	(.0062)	(.0061)	(.0134)
N	463,157	463,157	463,157	214,206	214,206	463,628

	College Degree During Enlistment	PGIB	Enroll Days > 0	Enroll Semester > 0	Bachelor's Degree	Associate's Degree
	(7)	(8)	(9)	(10)	(11)	(12)
White	-.0058**	-.0392***	-.0081	-.0126***	-.0083**	.0003
	(.0024)	(.0096)	(.0056)	(.0049)	(.0035)	(.0032)
N	558,861	81,636	604,516	604,516	604,516	584,823
Non-White	-.0114**	-.0235	-.0003	-.0165**	-.0021	.0003
	(.0048)	(.0169)	(.0073)	(.0076)	(.0054)	(.0053)
N	302,751	49,970	324,321	324,321	324,321	307,492
Unmarried	-.0031	-.0439**	-.0107	-.0139*	-.0018	.0006
	(.0020)	(.0185)	(.0078)	(.0072)	(.0042)	(.0043)
N	462,913	61,274	495,691	495,691	495,691	484,865
Married	-.0114**	-.0380***	-.0035	-.0100**	-.0073**	.0009
	(.0048)	(.0098)	(.0049)	(.0049)	(.032)	(.0038)
N	302,751	70,332	433,146	433,146	433,146	407,450

***Significant at 1% level **at 5% level *at 1% level

Notes: Estimates obtained using Army administrative data available from the Office of Economic & Manpower Analysis merged with administrative panel data from the Veterans' Administration. All models include the full set of military and personal controls. Military controls include fully interacted indicators for rank, primary military occupation specialty, years of enlisted service, gender, and year of separation. Personal controls include age at separation, age-squared, indicators for race/ethnicity, Armed Forces Qualifying Test (AFQT) scores, and marital status. Columns (1) through (6) control for level of education attained at separation and columns (7) through 12) condition the sample on educational attainment at separation or enlistment as noted in Table 1.