YOU CAN'T HANDLE THE TRUTH:

THE EFFECTS OF THE GI BILL ON

HIGHER EDUCATION AND EARNINGS

By ANDREW BARR, LAURA KAWANO,

BRUCE SACERDOTE, WILLIAM SKIMMYHORN AND MICHAEL STEVENS*

The Post 9/11 GI Bill (PGIB) is among the largest and most generous expansions of post- secondary educational subsidies ever enacted in the U.S. Using a variety of identification strategies, we examine the impact of the PGIB on veterans' college going, degree completion, federal education tax benefit utilization, and longer-run earnings and demographic outcomes. We consider impacts on both veterans potentially induced to attend college by the policy, and on veterans already enrolled when the additional money arrived. Among those potentially induced to enroll, the introduction of the PGIB raised college enrollment by 5 percentage points and B.A. completion by 2 to 3 percentage points (on a base of 19 percentage points), but reduced average earnings seven years after separation from the Army by 2 percent. We explore whether this negative impact is driven by changes in college type, heterogeneity in the returns to college, or reductions in labor force experience. Under a variety of conservative assumptions, veterans are unlikely to recoup the reduced earnings experienced in the seven years following separation. Among veterans who were already enrolled in college when the legislation passed, the program raised months of college completed by 2 months, B.A. completion by 1.5 percentage points, and Associates completion by .4 percentage points. The impact on earnings appears to be negative seven years after initial enrollment. The method of payment of benefits (to the school versus individual) impacts veteran's claiming of educational tax credits and tuition and fee deductions.

*Barr: Texas A&M University (Department of Economics, Texas A&M University, 4228 TAMU, College Station, TX 77843, abarr@tamu.edu); Kawano: University of Michigan (701 Tappan Street Rm R5380, Ann Arbor, MI 48109: lkawano@umich.edu); Sacerdote: Dartmouth College (6106 Rockefeller Hall, Hanover NH, 03755: bruce.sacerdote@dartmouth.edu); Skimmyhorn: William and Mary (Mason School of Business College of William & Mary. P.O. Box 8795, Williamsburg, VA 23187-8795: william.skimmyhorn@gmail.com) Stevens: U.S. Department of the Treasury (1500 Pennsylvania Ave, Washington DC, 20220: Michael.Stevens@treasury.gov). Sacerdote thanks the National Science Foundation and Smith Richardson Foundation for generous support. Barr acknowledges funding from a National Academy of Education / Spencer Post-doctoral Fellowship and the Upjohn Institute. The views expressed in this paper are those of the authors and do not necessarily reflect the policy of the U.S. Department of the Treasury or the United States Army.

I. Introduction

Policymakers and social scientists have lauded the original GI Bill (the 1944 Serviceman's Readjustment Act) and the 1984 Montgomery GI Bill (MGIB) as examples of thoughtful policy and engines of social mobility (Burrell 1967, Greenberg 1997, Humes 2006). The GI Bill has been shown to increase college going, geographic mobility, and upward income mobility for veterans. The GI Bill diversifies the students on college campuses and encourages veterans to attend selective private colleges or flagship public universities that they may not have considered in the absence of the policy.

Authors have used the GI Bill as a source of variation to identify the effects of subsidies on college completion and the effects of college going or college completion on earnings. Bound and Turner (2002) find that the 1944 GI Bill raised college completion among WWII veterans by 5 to 6 percentage points and years of schooling by about 0.28 years. Angrist (1993) finds that Vietnam-era veterans who took up veterans' educational benefits saw schooling increases of 1.4 years and earnings increases of 6 percent.

In 2008, the GI Bill was significantly revamped and expanded in several ways in what is commonly referred to as the Post-9/11 GI Bill (PGIB).[1] The PGIB does not replace the MGIB, but rather offers veterans an attractive alternative intended to increase benefit levels and pay a larger fraction of actual tuition and living expenses. Under the MGIB, enrolled veterans are directly paid a flat monthly amount to be used towards tuition, books, and living expenses: for the 2008-09 academic year, the maximum MGIB benefit was $1,321 per month for 36 months.[2] The PGIB roughly doubled the average maximum benefit amount, and the extent to which benefits changed varies geographically. Benefits for tuition and fees are paid directly to institutions, and the amounts are based on the highest in-state tuition of public institutions in the state.[3] Those enrolled at least half-time also received a generous monthly housing allowance (called the Basic Allowance for Housing or BAH), which varies by the zip code of the institution that the veteran attends. As a result of the PGIB, there is significant geographic variation in the

[1] Formally the law is the Post-9/11 Veterans Educational Assistance Act of 2008, Title V of the Supplemental Appropriations Act, 2008 (P.L. 110-252).
[2] Amounts depend on whether a veteran is enrolled half-time, three-quarters time, or full time.
[3] Over a thousand U.S. institutions participate in the U.S. military's Yellow Ribbon program (a matching program) which helps cover any additional gap between the PGIB max payment and tuition and fees that the veteran would incur.

expansion of benefits available to eligible veterans. For example, in 2008 the monthly BAH ranged from $630 in parts of Oklahoma and Louisiana to $2512 in the San Francisco/Bay area. Total PGIB benefits could approach $60,000 per year if a veteran attended school in an expensive area and attended a high-tuition school. For example, veterans attending school in Colorado or Oregon could receive up to $43,000 in tuition and fees and living expenses of $1200-1500 per month.[4] This policy change constitutes one of the largest policy shocks in college subsidies (as measured in dollar terms) in U.S. history.

We exploit the timing and cross-sectional variation in veterans' benefits for higher education to examine the impact of subsidies on education and earnings. We utilize multiple sources of identification within a difference-in-differences framework. First, only veterans that are honorably discharged are eligible for either the MGIB or the PGIB. We consider the full set of Army veterans to ask whether access to additional financial aid impacts college-going rates, college choice, or subsequent earnings by comparing those who were and were not eligible for GI Bill benefits, and how their outcomes change as the expanded benefits became available. We also examine the interactions between the utilization of GI Bill benefits and federal education tax benefits as the structure of veterans' benefits changed from a pure conditional cash transfer to an in-kind benefit system. Second, we take advantage of the significant cross-sectional variation in the generosity of the PGIB relative to the MGIB, comparing veterans from areas with large expansions in expected benefit with those from areas with small expansions, and how their outcomes changes as the expanded benefits became available.[5]

We also examine effects of the PGIB on students who were already enrolled prior to the benefit expansion. We compare students enrolled at the same college prior to the PGIB expansion, but who had initially enrolled in different years relative to when the additional money arrived. Students who initially enrolled in college several years before the PGIB expansion are likely to be less able to utilize the PGIB than those who enrolled just before the additional benefits were

[4] See https://www.benefits.va.gov/gibill/resources/benefits_resources/rates/ch33/tuition_and_fees_2008.asp and www.defensetravel.dod.mil/site/bahCalc.cfm . The Yellow Ribbon Program could further add to this total if the veteran is a student at a participating private school with tuition and fees that exceed the PGIB maximum.

[5] Barr (2015) finds positive affects to the PGIB on enrollment and completion using a similar strategy in a smaller data set. Here, we use zip-code level variation versus the state-level variation in Barr (2015). He does not examine earnings which is where we are finding significant heterogeneity of impacts.

announced. We combine this variation in the likelihood of benefit access over time with variation in eligibility (across veterans and between veterans and civilians) and benefit size (across colleges), to understand whether the availability of additional funding has measurable impacts on degree attainment and earnings.

We use detailed administrative data for a large set of individuals to examine the effect of increased benefits for higher education. We merge the full set of U.S. Army veterans separating between 1994 and 2016 with National Student Clearinghouse (NSC) data and population-based administrative tax return data. The NSC provides measures of college-going and degree attainment. Information from the 1098-T tax form provides supplementary information on college-going. The 1098-Ts are particularly useful because they have complete coverage of for-profit institutions while the NSC does not. Tax return data also contain information on the utilization of federal tax benefits for higher education, labor income, total income, and demographic characteristics such as marital status and family size. We supplement these with third-party reported information on labor income from Forms W-2 and 1099-MISC. These information returns provide individual-level measures of earnings that are available even if an individual does not file a tax return. Because these administrative tax records are available through 2017, we are able to track income and demographic outcomes for eight or more years after separation from the Army and initial enrollment in college.

For the full set of Army veterans separating during this period, we find positive impacts on educational attainment but negative impacts to earnings. This result suggests that the housing subsidies are so generous as to be drawing veterans into education and out of the labor market – even for veterans with low marginal returns to education. We explore whether this negative impact is driven by changes in college type, heterogeneity in the returns to college, or reductions in labor force experience. Our results suggest that some combination of lost experience and enrollment choices of veterans from military occupations that have lower predicted returns explains some of the effect. Veterans who were already enrolled when the new policy arrives see very modest degree attainment gains and suggestive evidence of a negative effect on earnings seven years after initial enrollment.

We also explore the interactions between the utilization of GI Bill benefits and federal education tax credits. Beginning in 1997, the Hope Tax Credit and the Lifetime Learning Credits were available to offset the tuition and fees associated with higher education; starting in 2009, the Hope Tax Credit was replaced with the more generous American Opportunity Tax Credit. In line with the change in the method of benefit transfer under the PGIB, we find a sharp shift away from utilizing tuition and fee deductions towards claiming federal education tax credits. In future versions of the paper, we will also explore the tax compliance implications of the change in the way that benefits for tuition and fees were remitted. Understanding the impacts of the GI Bill expansion has several important policy implications. Broadly speaking, our study is related to the large literature that examines whether higher education subsidies (e.g., federal education tax credits) positively impact college enrollment, degree completion, and earnings. Within the set of education subsidies, the PGIB is a very large program; at over $13 billion a year it exceeds the amount of grants and scholarships provided by all states combined and is roughly half the size of expenditures on the Pell grant. Unlike the vast literature that focuses on traditional students, our population of Army veterans comprise an older, non-traditional student group that may respond differently to education subsidies. Earlier draft lottery studies speak to the benefits of additional education in a group chosen at random from the U.S. population (e.g., Angrist 1993 and Angrist 2002). We, on the other hand, examine the benefits of the GI Bill for an economically disadvantaged and heavily non-white population, most of whom explicitly chose not to enroll in college at the time that they graduated from high school, more closely approximating today's modal student.

Further, we provide estimates of the effect of subsidies for those already enrolled, testing for heterogeneity in effects based on the institution type in which a veteran is enrolled. This allows us to answer questions regarding the effect of directing subsidies towards one type of institution versus another.

Overall, our results suggest caution in providing education subsidies of this generosity to non-traditional students. While educational attainment increased modestly as a result of the benefit expansion, subsequent earnings did not. Furthermore, our analyses suggest that it is unlikely that earnings will ever grow enough to recover the earnings lost during the first seven years following separation. e

II. Background and Institutional Features

A Very Brief History of the GI Bill

The original GI Bill, officially called the Servicemen's Readjustment Act of 1944, offered numerous provisions for World War II veterans including payments to colleges for tuition, housing benefits, and zero-down-payment, low-interest loans for home mortgages. The law also included unemployment benefits of $20 per week for up to 52 weeks.[6] There were at least three major motivations for passing the GI Bill. First, Congress wanted to reward returning veterans. Second, Congress wanted to redeem itself after the debacle of the 1932 WWI veterans march on Washington in which veterans demanded "early" payment of their veteran's bonus. Finally, there was a belief that reintegrating veterans into the civilian labor force would be a costly adjustment and that sending many of them to college would both smooth out this process and create greater economic opportunity for veterans. The Bill contributed to a near-doubling of college enrollment in less than a decade. Noted historian Sidney Burrell argued that the original GI Bill, passed after World War II, brought about "what may have been the most important educational and social transformation in American history" (Burrell 1967).[7]

Numerous updates to the GI Bill followed as Congress attempted to keep up with rising real costs of higher education. The 1984 Montgomery GI Bill (MGIB) increased education benefit amounts, but also required military personnel to "pay-in" $100 per month during twelve months of their active duty service.[8] The main benefit is a monthly payment for up to 36 months for eligible veterans who are enrolled at a qualified education or training program. The 2017 monthly maximum benefit is $1,857 for full time enrollees and this is scaled down for part-time enrollments. The MGIB also includes a provision known as the "kicker" or "Buy-Up" option, which offers an additional $8 for $1 matching program. If a servicemember makes an additional monthly contribution (totaling $600 over all months) while on active duty, they can then receive

[6] The original drafters of the legislation included Harry Colmery (Republican National Committee Chairman), Senator Ernest McFarland (D-AZ), Warren Atherton (R-CA), Congresswoman Edith Nourse Rogers (R-MA). The American Legion was a driving force behind the legislation, and Colmery and Atherton both had held leadership positions in the American Leadership.

[7] It is important to note that these benefits did not accrue equally across races due to segregation, etc. (Bound and Turner 2003).

[8] Service members must elect whether to pay in to the benefit during their first year of enlistment. Choosing not to pay in to the benefit is framed as opting out, likely explaining why 85% of Army veterans choose the default option of paying in.

an additional $150 per month for 36 months, for a total additional benefit of $5,400. The benefit is paid directly to the student veteran, is non-taxable and is intended to cover tuition, fees, and living expenses.[9]

Key Provisions of the Post 9/11 GI Bill

A large expansion of benefits was passed in June 2008 and took effect August 2009. This is the Post-9/11 Veterans Educational Assistance Act of 2008 (Post-9/11 GI Bill or PGIB) which is Title V of the Supplemental Appropriations Act, 2008 (P.L. 110-252). The PGIB was motivated by a variety of concerns. First, Congress recognized that military service has been particularly arduous during the wars in Iraq and Afghanistan; Congress wanted to repay, reward, and recognize veterans for their service (Dortch 2014). Second, given the rising real cost of higher education, there was a need to expand benefit amounts to provide better opportunities for transitioning veterans. Third, the expansion of benefits and the new transferability of benefits to dependents is intended to aid in military recruitment and retention.[10]

Veterans can receive up to 36 months of benefits up to 15 years after separation from the military, with a month of benefits scaled by the intensity of enrollment. Financially, the most significant provisions of the PGIB are the tuition and fees payments to schools and the Basic Allowance for Housing (BAH) payments to veterans. Importantly, the PGIB generated changes in benefit generosity that varied by geography; unlike the MGIB which paid a flat amount regardless of the location of the veteran or the level of tuition and fees of the college attended, the PGIB incorporated variation in both.

Between 2009 and 2011, the PGIB tuition and fees payments were capped at the maximum of in-state public tuition in the state where the veteran attends.[11] The PGIB would cover any tuition and fees charged up to these limits, but did not refund the difference between the maximum and

[9] https://www.benefits.va.gov/gibill/resources/benefits_resources/rates/ch30/ch30rates080108.asp

[10] In practice, the transferability provision is largely irrelevant for our sample given very low rates of use and the need to reenlist for four or more years to take advantage of the provision.

[11] The Veteran's Administration also offers a Yellow Ribbon program which provides additional assistance to veterans whose tuition and fees exceed the maximum. This is a one-for-one matching program in which the VA matches contributions from the school to cover tuition and fees above the maximum benefit. Schools participate voluntarily and can designate a maximum number of vets for whom they can offer Yellow Ribbon. In practice, well over 1,000 institutions offer Yellow Ribbon.

the charges to the veteran. In 2011, this state-by-state maximum changed to a nationwide maximum of $700 per credit or $17,500.[12]

The BAH is paid monthly at the Department of Defense (DOD) determined monthly basic allowance for a servicemember at the E-5 rank with dependents in the zip code in which the student attends school.[13] The BAH varies significantly by military service area (which is similar in size to an MSA).[14] For example, Manhattan, Kansas has a BAH of $1,083 for E-5s with dependents whereas Manhattan, New York has a BAH of $3,366 per month. The above figures are the maxima which a veteran might receive, but these benefits are adjusted both for length of service and enrollment intensity (full versus part time) (Barr 2015, Dortch 2014).[15] Figure 1 shows our prediction of average benefit level; we predict benefits received using institutions attended by veterans from the same zip code but who separated prior to 2004.

The eligibility criteria for the PGIB are: (a) having served on active duty for at least 90 days after September 10, 2001; and, (b) having received an honorable discharge. Unlike the MGIB, veterans are not required to elect into the program upon enlistment, or forego some monthly salary during active-duty service. Unlike previous GI Bills, PGIB benefits can be transferred to a spouse or child. This benefit can be particularly important for officers, especially if they have already completed their education (Skimmyhorn et al. 2018). However, the decision to transfer benefits must be made *during* active duty; transfer of benefits cannot occur after the individual is in the reserves or separated from the military. Furthermore, most soldiers must commit to an additional four years of service if they elect to transfer their benefits.

PGIB benefits can be used at a wide variety of educational institutions, including traditional undergraduate and graduate programs, vocational and technical training, flight school, courses designed for certification in a particular profession, and courses designed for standardized test

[12] This maximum grew to $19,198 by 2016/2017 and $23,672 by 2018/2019. Veterans who were already enrolled in states with higher maximums were grandfathered.
[13] This rate is determined for the purposes of covering off-base housing in the area.
[14] See the current tables here: https://militarybenefits.info/bah-rates-state/.
[15] Veterans must serve at least 90 days on active duty to receive some PGIB benefits. This entitles a veteran to 40 percent of benefits. There are incremental increases at 6,12, 18, 24, and 30 months of service. At 36 months of active duty service, a veteran is entitled to 100% of PGIB benefits. An important exception is that veterans who are discharged with a service connected disability are eligible for 100% of benefits if they have 30 days or more of active service.

prep such as the SAT, AP, GMAT, etc. In Appendix Table 2, we provide a frequency tab of some of the most common schools attended by vets using PGIB benefits during 2009-2016.

IV. Data Description

We begin with a data set of the 1.2 million veterans who separated from the Army during 1994-2017. The data include demographics such as birth date and race, as well as home town of record, marital status, number of dependents, and educational attainment at the point of enlistment and separation. The data also include Primary Military Occupation Specialty (PMOS)[16], scores on the Armed Forces Qualification Test (AFQT), rank at each year, military assignment and location at each year, dates of entry and separation from the Army, characterization of service (i.e. honorable discharge, general discharge etc.), and many other details.

We merge in benefits data from the Veteran's Administration (VA) for information on GI Bill utilization and amounts. We define total benefits received as the sum of all MGIB and PGIB benefits paid to the veteran, measured in thousands of dollars, and we use the cumulative amount as opposed to an annual or monthly amount.[17]

For information on college enrollment and degree completion, we use data from the National Student Clearinghouse (NSC). The NSC provides data on all institutions in which a student is enrolled, degree attainment, and the length of time required for degree completion. Although the NSC data cover 90 to 97 percent of all college enrollments during our period, one concern is that the coverage rates for for-profit institutions is low. As an alternative source of college enrollment information, we use Form 1098-T, the information return that colleges submit to the IRS to report qualified educational expenses in a particular calendar year. We collect these data from administrative, population-based tax records for each veteran, which are available beginning in 1999. These data do not suffer from measurement error due to differential coverage across institutions. We match both the NSC and 1098-T data to the Integrated Postsecondary Education Data System (IPEDS) to incorporate additional information about each institution that a student

[16] https://usarmybasic.com/army-jobs/army-mos-list and https://en.wikipedia.org/wiki/List_of_United_States_Army_careers

[17] The VA did not begin capturing annual amounts used until the last few years.

attends. Our key enrollment measures are indicator variables for enrollment (overall or in a particular institution type) that occurs within two years of separation from the Army.

For information on the utilization of federal benefits for higher education that are administered through the tax system, we use administrative, population-based tax records. There are three main tax credits that are available to college students over this time period. The Hope Tax Credit (HTC) and Lifetime Learning Tax Credit (LLTC) have been available since 1998. Both credits allow for a dollar-for-dollar reduction in taxes for qualified education expenditures, capped at the household's overall tax liability amount (i.e., the credits are nonrefundable). Whereas the HTC is available only for the first two years of college, the LLTC can be used for virtually any postsecondary coursework. In 2009, the HTC was suspended and temporarily replaced by the more generous American Opportunity Tax Credit (AOTC), which provides benefits that are partially refundable and can be claimed for the first four years of college enrollment. An alternative to the tax credits is the above-the-line deduction for tuition and fees (DTF) from gross income, up to a cap. The DTF was created under the Economic Growth and Tax Relief Reconciliation Act of 2001, and is available to students who have modified adjusted gross incomes (MAGI) below a specified amount. An individual must choose between the DTF and one of the other education tax credits; he cannot take both. For all Army veterans, we collect information on the take-up and amounts claimed for education tax credits and the tuition and fee deduction from 1999 through 2016.

Labor market, income, and demographic characteristics are also drawn from administrative federal tax filings. For each Army veteran, we construct a panel of their tax returns spanning the years 1999 through 2016. These data provide information on wage and salary income, self-employment (Schedule C) income, unemployment insurance compensation, Earned Income Tax Credit (EITC) amounts claimed, and adjusted gross income (AGI), all measured at the level of the tax filing unit. We also collect the limited demographic information that is available on a tax return: marital status (derived from filing status), the number of children claimed, and state of residence.

Because tax return data provide information conditional on filing a tax return, and because earnings are reported at the household-level when married filing jointly, we also construct individual-level measures of labor income. This information comes from Form W-2, the

information return that employers submit to the IRS to report wage and salary income, and Form 1099-MISC, the information return that businesses submit to the IRS to report non-employee compensation. We compute labor income as the sum of earnings from these two tax forms. Because AGI is only available for tax filers, we construct a comprehensive income measure for non-filers using the sum of wage and salary income (Form W-2), gross distributions from retirement accounts (Form 1099-R) and unemployment insurance compensation (Form 1099-G). Our key labor market outcomes are measures of individual employment and earnings seven years after the year of separation.

To account for the unedited nature of the administrative tax return data, we winsorize all income amounts at the 99th percentile of the distribution of positive values; in the case of variables that can also take on negative values (i.e., self-employment income and AGI), we winsorize at the 1st and 99th percentiles of the distribution of non-zero values. All income measures are adjusted to 2016 dollars using the CPI research series.

We impose several sample restrictions. We limit our analysis sample to the cohorts that separated between 2001 and 2010. The lower limit is driven by the fact that the fields we use for exact date of separation and characterization of service are only available starting in 2001.[18] We impose the upper cohort limit of 2010 so that we have meaningful earnings data on the veterans from their late 20s and early 30s. We exclude all Army veterans who already had a B.A. upon entering or who earned one while on active duty. We limit the sample to veterans who served between 1 and 6 years and who were age 39 or younger upon separating. Our logic for these latter two restrictions is that we want to drop veterans who are career military and we want to focus on younger veterans who are most likely to make significant human capital investments after separation. These restrictions reduce the sample size to 325,000 veterans.

Summary statistics are shown in Table 1. Eighty one percent of the veterans are male, 18 percent are black, and 11 percent are Hispanic. The average age of separation is 24, and 35 percent were married at the time of separation. At the time of enlistment, the highest level of education for 78 percent of the sample was a high school degree, while 5 percent had some college. Turning to our key outcome variables, twenty four percent of our sample had one or

[18] We are working to resolve this issue.

more enrollments in a four year public institution while forty four percent had an enrollment in two year public. Fifteen percent of the veterans completed a bachelor's degree (NSC data). Average earnings seven years after separation are $48,000 in 2019 dollars.

Part of our analysis examines veterans who had enrolled in college post separation but prior to the new policy being enacted. One of our strategies is a comparison between veterans who enrolled in 2003 or 2004 versus 2007 or 2008. Summary statistics for this group are shown in the second to last column of Table 1. The age at separation is similar to the overall sample at 24 years. The "already enrolled" sample is 77 percent male versus 81 percent for the overall. And the already enrolled sample has an AFQT score that is two percentile points higher.

V. Empirical Strategy and Identification

Overall Impacts of the PGIB Including the Enrollment Margin

Building on Barr (2015) and Barr (2019), we first investigate the overall impact that the PGIB has on college enrollment, degree completion, and earnings using two difference-in-differences strategies. In both strategies, the key idea is to compare cohorts that separated earlier (and thus had limited potential to use the higher level of benefits that became available in 2009) with those who separated just prior to the benefit expansion. In the first strategy, we compare changes in outcomes over time for those eligible for veteran education benefits to changes for those who were ineligible. In the second strategy, we compare changes in outcomes over time for veterans from areas with large predicted increases in education benefits to changes for those from areas with low predicted increases.

Eligible versus ineligible

We begin with a standard difference-in-differences framework, comparing veterans who are eligible and ineligible for GI Bill benefits before and after the PGIB expansion. Because tax data are reported on a calendar year basis, we adjust the Army separation year forward one year for separations that occur between August 15 and December 31.

We run regressions of the following form:

(1) $Y_i = \alpha + \beta 1 * post_i * eligible_i + \beta 2 * post_i + \beta 3 * eligible_i + \gamma * \mathbf{X}_i + \rho * \mathbf{Z}_i + \varepsilon_i$,

where Y_i is an outcome of interest, *eligible* is an indicator variable for being eligible for GI Bill benefits, defined as having an honorable discharge, and the indicator variable *post* equals one for servicemembers whose adjusted year of separation from the Army is 2008 or later. The vector $\mathbf{X}_i$ represents veteran pre-treatment characteristics, and $\mathbf{Z}_i$ represents a set of fixed effects for Primary Military Occupational Specialty (PMOS). We control for gender, race, interactions between AFQT score and enlistment year, initial level of education, marital status upon entry, and military rank upon exit. The key parameter of interest is the coefficient on the interaction of eligible and post, the effect of the additional funds provided under the PGIB. The identifying assumption is that the change in outcomes for the ineligible veterans captures the change that would have taken place for the eligible in the absence of the program; any difference is assumed to be a causal effect of the PGIB. Within this framework, we explore effects of the PGIB on benefit utilization, enrollment, educational attainment, and longer-run labor market outcomes.

In some regressions, we limit the sample to cohorts separating in 2003, 2004, 2007, or 2008. These limitations are intended to create a comparison between adjacent cohorts that likely completed their schooling prior to the arrival of the generous PGIB (i.e. 2003, 2004) versus cohorts that made initial separation and enrollment decisions prior to PGIB but spent much of their college careers under the influence of PGIB (i.e. 2007, 2008). We omit the 2005 and 2006 cohorts as being partially treated and partially untreated.

We then broaden this strategy to an event study framework. Instead of relying on pre versus post-expansion year cohorts, we interact year of separation (cohort) with eligibility status for each year 2001-2010. This equation is implemented as follows:

(2) $Y_i = \alpha + \sum_{t=2002}^{2010} \beta_t * cohort_t * eligible_i + \gamma * \mathbf{X}_i + \rho * \mathbf{Z}_i + \tau * \mathbf{T}_i + \varepsilon_i$

where $\mathbf{t}_i$ represents cohort fixed effects that are identified by the ineligible veterans in the sample.

High versus low-benefit areas under the PGIB

Our second identification strategy for obtaining the overall impacts of PGIB is to rely on cross-sectional variation in the generosity of the BAH and tuition benefits, which generates over time variation in benefit generosity within localities. Because the actual benefits that a veteran receives are determined by his endogenous school choice, we rely instead on the exogenous variation that stems from interacting the timing of the PGIB with the benefit generosity variation associated with the veteran's home of record (zip code). Specifically, we predict expected available benefits for each veteran given the college choices of prior cohorts from the same home of record.[19] We then interact that predicted benefit amount (which is constant within home of record) with separation year indicator variables or an indicator for separating in the post-PGIB period. Prior to the PGIB, veterans received the same education benefit regardless of the cost of living or education in their area. As a result, the policy change constitutes a much bigger increase in generosity for people who attend school in New York versus Grand Forks, North Dakota, for example. This variation is illustrated in Figure 1, which shows the variation in predicted education benefit levels under the PGIB.

The estimating equation becomes:

(3) $Y_i = \alpha + \beta 1 * post_i * (\widehat{Benefits}_{HOR}) + \beta 2 * post_i + \gamma * \mathbf{X}_i + \delta * \mathbf{HOR}_i + \rho * \mathbf{Z}_i + \varepsilon_i$,

where **HOR**i is a vector of home of record fixed effects and $\widehat{Benefits}_{HOR}$ is the predicted level of benefits assigned to each home of record. We scale expected benefits in thousands of dollars per year. We also run versions of this equation in an event study framework, allowing for separate effects on PGIB generosity by year of separation. In both cases, the key identifying assumption is that conditional on the set of observables, unobserved factors that affect enrollment, educational attainment, or earnings are not associated with the size of the benefit expansion in a home of record.

Within College Estimates of PGIB Effects for Veterans Already Enrolled

[19] We calculate a hypothetical 2009 max PGIB BAH and tuition benefit for each college going veteran in cohorts 2001-2005 and average those by zip codes.

We have a related quasi-experiment for thinking about the effect of additional grant subsidies on students who are already enrolled. We consider the set of veterans who had already separated and enrolled in a college prior to the announcement of the PGIB. For veterans who were just beginning their college careers when the PGIB was announced, the policy is a large unexpected jump in subsidies for tuition and housing expenses conditional on continued enrollment relative to those who had enrolled many years earlier and thus may not be able to utilize the additional funds.

In our first specification, we compare the outcomes of eligible and ineligible veterans who initially enrolled at an institution well before the PGIB expansion relative to those who enrolled at that same college just before the additional funds became available. Specifically, we run the following regression:

$$(4)\ Y_i = \alpha + \beta 1 * post_i * eligible_i + \beta 2 * post_i + \beta 3 * eligible_i + \gamma * \mathbf{X}_i + \delta * \mathbf{C}_i + \rho * \mathbf{Z}_i + \varepsilon_i$$

Here, Y_i is an outcome of interest, and the vectors $\mathbf{X}_i$ and $\mathbf{Z}_i$ contain the same controls as in equation (1). We limit the sample to veterans who were already enrolled prior to 2009, and define the indicator variable, *post*, to equal one for veterans who initially enrolled in college in 2007 or later. We include institution-specific fixed effects, $\mathbf{C}_i$, so identification here comes from within-institution (college) variation in changes in benefits. The identifying assumption is that the inclusion of the ineligible veterans removes any remaining pre-post difference (trend) in within institution outcomes that would have occurred in the absence of the program. In other words, we assume that outcomes for the eligible veterans at a given institution would have evolved in a similar way to the ineligibles and that PGIB causes any differential growth. We define institution fixed effects based on the first college in which a veteran is enrolled, within 2 years of his separation from the Army. Our outcomes of interest are degree attainment within 6 years of initial college enrollment, and income and demographic outcomes measured relative to the year of initial college enrollment.

For the identification strategy in equation (4), we have 68,788 enrolled veterans in the four cohorts (2003, 2004, 2007, 2008).[20] We also implement the within-school strategy in an event study framework, interacting initial year of enrollment (cohort) with eligibility for each year between 2001 and 2010.

Finally, we again use the geographic variation in the generosity of BAH and tuition and fee benefits to identify the impacts of dollars of aid on persistence, graduation and earnings. In this within-school framework, we have a tight estimate of expected BAH and expected tuition benefits because we know the housing allowance and tuition benefit associated with the particular college of each enrolled veteran.[21] As in equation (4), veterans are assigned to colleges (and here benefits amounts) based off of the first institution in which a veteran is enrolled within 2 years of their Army separation. Identification comes from interacting the generosity measure with a dummy for post. We perform this analysis only on eligible veterans using the pre-post difference within schools.[22] We run regressions of the following form:

$$(5)\ Y_i = \alpha + \beta 1 * post_i * (\widehat{Benefits_C}) + \beta 2 * post_i + \gamma * \mathbf{X}_i + \delta * \mathbf{C}_i + \rho * \mathbf{Z}_i + \varepsilon_i$$

The coefficient on post and our measure of college-specific benefits, indicates the causal effect of an additional thousand dollars in benefits per year. As in our overall strategy, we also run an event study version of this specification. The key identifying assumption is that conditional on the set of observables, unobserved factors that affect persistence in school or labor market outcomes are not associated with the size of the benefit expansion within a college.

VI. Results

A. Overall Impacts of the Post 9/11 GI Bill

[20] As mentioned above, descriptive statistics for these veterans are in Table 1.

[21] Of course, a veteran may transfer to a new college or area. Our estimates should thus be thought of as an intent to treat effect.

[22] We do not have enough ineligible veterans across colleges to identify the slope of pre-post differences across colleges with any precision.

Validating the Empirical Approaches

We begin by asking whether the PGIB has a "first-stage" effect on total benefits received including both MGIB and PGIB benefits. Figure 2 through 4 show the impact of GI Bill eligibility on benefits received by separation year from equation (2), where the omitted category is 2002. Figure 2 shows that veterans separating in 2008-2010 received an additional $17,000 in total benefits relative to those separating in 2002. Tuition benefits received jumped by about $11,000 from 2002 to 2009 (Figure 3), and housing benefits received jumped by about $16,000 over the same time period (Figure 4). Notice that the earlier cohorts of 2003-2006 see some increases in benefits received; the 2002-2006 cohorts are in fact eligible for PGIB benefits though these benefits only exist as of 2009 and many veterans in the earlier cohorts may have exhausted their MGIB educational benefits before the PGIB arrives. However, there is a modest treatment effect on the earlier cohorts and as such our difference-in-differences estimates may understate the total effects of the PGIB.

Figure 5 provides a simple illustration of the relationship between our estimate of the generosity of PGIB benefits in a home of record and the total benefits received by veterans with corresponding homes of record. We group homes of record into $1,000 bins based on the average PGIB maximum benefit that would have been received if veteran pre-period enrollment had occurred in the post-period. We then plot the average difference in total benefits received in the post-period versus the pre-period within these bins, overlaid with a linear and fractional polynomial fit. This figure suggests a strong positive relationship between predicted and actual benefits received. The slope of 1.52 indicates that each $1,000 increase in predicted *annual* total benefits available is associated with an increase in *total* benefits received of $1,520.

One possibility is that these relationships are driven by changes in the composition of soldiers choosing to return to areas with high benefit levels under the PGIB. Of particular concern is that soldiers separating after the announcement of the new benefit structure and interested in enrolling might choose to return to an area with higher benefit levels. This does not appear to be the case. In Table 3 we present estimates from equation (3), indicating the relationship between $1,000 of additional benefits for a home of record and the change in the characteristics of eligible soldiers returning there. We see small and largely insignificant relationships between the benefits available and the change in the composition of soldiers returning there.

In Table 2, we present corresponding results from equations (1) and (3). In row (1), PGIB increases total benefits received by $12,100, tuition benefits received by $6,400, and housing benefits by $8,600. Rows (2)-(4) use equation (3) to estimate how benefits received responds to geographic variation in expected benefits among eligible veterans separating in the post- versus pre-period. We regress total benefits received on annual measures of expected maximum benefits. (This stock versus flow difference explains why our coefficients can exceed 1.) A $1000 increase in annual total benefits available raises cumulative benefits received by $1500 (column 3). Housing benefits received responds strongly to maximum expected housing benefits. If veterans from prior cohorts and from the same home zip code of record attended schools that would receive (in 2009) a $1000 higher BAH per year, total BAH dollars received rises by $2,128.

The magnitudes of the estimates, which rely on variation across veteran eligibility (row 1), are generally consistent with the magnitudes that rely on variation in generosity across geography (row 2). The average amount of maximum annual PGIB benefits is roughly $8,000 greater than the maximum annual amount available under the MGIB. When we multiply the coefficient in row 2 (1.46) by eight we get 11.68, roughly equivalent to our estimate in row 1.

Effects on Education Choices and Outcomes

Next, we examine the enrollment and graduation effects associated with these increased benefits. Figure 6 uses "ever enrolled" as the outcome, as measured using NSC data, and plots the coefficients on the interactions between eligibility status and separation year. The estimate for the 2009 cohort is that PGIB raised enrollment by 5 percentage points relative to the 2002 cohort. In Figure 7, we perform a similar exercise using data from Form 1098-T to measure enrollment across various windows post-separation. Using the largest window (within 6 years of separation), we again find enrollment impacts of about 5 percentage points for the 2009 cohort. In addition to confirming the estimates from the NSC data, this figure provides further support for treating the 2007 and prior cohorts as being in the pre-period. The vertical line in each panel indicate the first cohort whose enrollment could have been affected by the higher benefit levels. For example, in panel (a), enrollment within a year of separation could have been affected for those separating in 2008 (as the benefits were available in fall 2009), but would not have been affected for those separating in 2007. The figure illustrates that even though the 2007 and prior

cohorts were eligible for the PGIB benefits when they became available in 2009, there was no effect on their decision to enroll. This is consistent with the general pattern of post-separation enrollment and benefit use which tends to occur quickly after separation or not at all.

Figure 8 shows the effect on cumulative months of education benefits used. While there is a small increase in relative benefits used between 2002 and 2004 (perhaps as a result of the increase in MGIB generosity in 2003), the difference in months used rises more sharply between 2006 and 2009. The figure suggests an increase in months of benefits used between 2003/04 and 2008/09 of around 1.5 months.

The observed increases in enrollment and months of enrollment translate into modest increases in degree attainment. Figure 9 illustrates the effect of GI bill eligibility on earning a bachelor's degree within six years of separating from the Army, suggesting B.A. completion impacts of about 2 percentage points for the 2008 and 2009 cohorts. The implied effects for the 2010 cohort (which include potentially endogenous separation in response to PGIB) are larger at 3-4 percentage points. Figure 10 suggests Associates degree completion impacts of 0.5 to 1 percentage point.

Turning to our geographic variation strategy, Figures 11 through 17 present the relationship between predicted PGIB benefit levels within a soldier's home of record and the change in enrollment, months of benefit use, and BA attainment as the PGIB benefits became available. There appears to be a modest effect of additional benefits on enrollment and a much stronger effect on months of benefits used and eventual BA attainment. For example, in Figure 17, each 1,000 in predicted total benefits raises BA attainment by .5 percentage points. Thus an $8,000 increase in total predicted benefits (the sample mean) leads to a 4 percentage point increase in BA completion.

The top row of Table 4 presents difference-in-difference estimates for the impacts of PGIB on enrollment and graduations as measured in the NSC data. The sample is restricted to the cohorts of 2003, 2004, 2007 and 2008. The PGIB raises enrollment by 6.5 percentage points (from a base of about 50 percentage points) and raises months of benefits used by 1.94 months. Bachelor's degree attainment rises by 2.8 percentage points and associate's degree attainments rise by 0.6 percentage points. Rows 2-4 utilize variation in PGIB generosity (based on home of

record). In column 1, an additional $10,000 raises enrollment by 3.3 percentage points and benefit utilization by 2.7 months. Impacts of dollars of benefits on degree completion are positive and statistically significant. An additional $10,000 in annual total benefits raises bachelor's degree receipt by 4.6 percentage points. Given the overall increase in benefit generosity as the new benefits became available (of around $8,000), these estimates are generally consistent with the difference-in-differences estimates in row 1.

Table 5 presents analogous estimates using the 1098-T data to create our measures of enrollment; here we focus on enrollment occurring within two years of separation (overall and by sector). Panel A presents the difference-in-differences estimates, confirming the modest overall effect on enrollment in the NSC data. Columns (2)-(5) shift the outcome to any enrollment in a four year public, four year private, two year public, or for profit. Since a veteran may enroll in multiple school types, the institution type PGIB effects add up to more than the overall "any enrollment" effect. The PGIB-induced enrollments are tilted toward two-year and for-profit institutions, but there are also gains in enrollment at four-year private schools. Enrollment in a for-profit rises by 2.7 percentage points and enrollment in a two-year public college rises by 2.0 percentage points. In contrast, enrollment in a four-year private institution rises by .6 percentage points, while four-year public enrollment falls modestly. We are somewhat cautious in interpreting these difference-in-differences estimates given differences in the composition of eligible and ineligible veteran enrollment and weaker evidence of parallel trends for these outcomes. The corresponding estimates from our geographic variation strategy are in Panels B-D. These estimates are largely uninformative, with the exception of a consistent and large effect of benefits available on four-year private enrollment; an increase in annual benefits of $10,000 corresponds to an increase in four-year private enrollment of 2 percentage points (or 34 percent).

Along with shifting enrollments, the PGIB may also impact how veterans pay for college and the take-up of the federal education tax benefits. Because the MGIB is paid directly to veterans, it is not considered a direct reimbursement for tuition. Hence, under the MGIB veterans can claim the tuition and fee deduction even if their benefits were used for their tuition expenses. Under the PGIB, the VA remits the tuition and fee benefits directly to the institution in which a veteran is enrolled, and these amounts are not eligible for the tuition and fee deduction. This change in the method of payment should result in a reduction in the utilization of the tuition and fee

deduction. If the PGIB induces veterans into colleges that are more expensive than the maximum PGIB benefit amounts, then there could also be a corresponding increase in the utilization of education tax credits.[23]

This is precisely what we see in Figure 18 and the accompanying Table 6. In Figure 18, there is a two percentage point rise in take-up of education tax credits, with the average dollar amount of education tax credits taken rising by about $200.[24] In contrast, take-up of the tuition and fees deduction falls by six percentage points, and the average deduction taken falls by $150. The differences-in-differences specifications for these outcomes are shown in Table 6 columns (1), (2), (4) and (5). We also show in column (3) and (6) impacts on withdrawals from 529 Educational Savings plans; we see no effect on this outcome.

Subsequent Labor Market Outcomes

Turning to labor market outcomes, we examine the effect of the benefit expansion on subsequent wages and labor income. Figure 19 presents our standard event study for labor income measured seven years after separation, illustrating a reduction in labor income of about $1,000 for cohorts separating in 2008 and after. In Table 7, we show PGIB's impacts on wages, log wages, labor income, log labor income, and indicator variables for positive earnings and labor income, each measured seven years after separation from the Army. The PGIB has consistently negative impacts on wages and labor income for veterans. In Panel A, the PBIG reduces annual earnings seven years after separation by about $900. In the log wages specification (which exclude zeroes), the negative impact is roughly 2 percentage points. The impacts of the PGIB on whether a veteran "has W-2 wages" is small, negative and not statistically significant.

The geographic variation estimates (in Panels B-D) suggest a similar story. For total benefits, the effect on labor income is -$99, implying a reduction per $10,000 of benefits of $990 in annual labor income. These effects are driven by variation in the housing allowance, which is the form of the benefit that generated significant changes in enrollment, months of benefits used, and degree receipt. As the housing allowance is essentially a conditional cash transfer, one

[23] A related possibility is that PGIB eliminates the possibility of taking the Tuition and Fees Deduction for student vets (since tuition is paid directly) and hence student vets find a way to claim the education tax credit for non-tuition qualifying expenses.

[24] This includes zeroes for veterans who did not take a take credit.

potential explanation for the observed effects is that the veterans responding to this aspect of the PGIB may not have been motivated by the pursuit of education.

In Figure 20, we plot the difference in earnings between eligible and ineligible veterans at each year after separation, separately in the pre (2003/04) and post (2008/09) period. In other words, the vertical difference between each dot represents a difference-in-differences estimate at a different year after separation, with the difference at 7 corresponding to our estimate in Table 7. The figure shows that in both periods the earnings of eligible veterans are lower than that of ineligible veterans one year after separation, consistent with the higher post-separation enrollment of eligible veterans. In the pre-period, this gap closes and flips as eligible veterans transition into the labor market; by three years after separation eligible veterans earn between around $1,500 more per year than ineligible veterans. By six to seven years after separation, the difference flattens at around $5,000 to $6,000. While the post-period eligible veterans are also earning more than ineligible veterans by the second year after separation, the difference between their earnings is consistently smaller than in the pre-period. In other words, consistent with the additional enrollment generated by the PGIB, eligible veteran earnings are relatively lower during the years immediately after separation. However, this additional education does not appear to generate subsequent labor market returns. Even seven years after separation, the negative effect of the PGIB persists.

Figures 21 and 22 show event study impacts of PGIB on log earnings. In these two figures we identify the impacts using the geographic variation in changes in benefit sizes instead of the eligible-ineligible diff in diff approach. Figure 21 uses variation in total benefits offered per year and Figure 22 is for variation in Basic Housing Allowance offered per year. Total benefits and Basic Housing Allowance are scaled in tens of thousands of dollars per year. Each ten thousand dollars of additional BAH lowers earnings seven years after separation by 1.5 percentage points. The impact of Total Benefits is smaller though also mildly negative. This is consistent with the results reported in Table 7 column 3 which reports the result for the 2007-2008 cohorts relative to the 2003-2004 cohorts.

B. Impacts for Veterans Already Enrolled

As detailed above, the introduction of PGIB provides a relatively clean experiment on the impacts of giving additional subsidies to people who are already enrolled in college. For this part of the analysis, we use the sample of veterans who enrolled in college within two years of their separation from the Army and prior to the law change. Earlier cohorts (2003 and 2004) had completed most of their education, or used up most of their benefits via the MGIB prior the arrival of PGIB. The later cohorts of 2007 and 2008 have the new policy announced at the beginning of their college years.

For this subsample, we again find that PGIB has a large impact on dollars of benefits received. Table 10 column (1) shows that an additional $1,000 of BAH raises total benefits received by $650. An additional $1000 of total available benefits per year raises total benefits received (across all years) by $391. An additional $1,000 of BAH per year raises months of GI Bill benefits received by 0.24, whereas an additional $1000 of total benefits only raises utilization by 0.05 months. Additional benefits also raise months of GI Bill benefits received (results awaiting disclosure). Together, these findings suggest that enrolled veterans are highly responsive to the BAH; if the housing and living expenses for enrolled veterans rises, they are significantly more likely to remain in school. Recall that the BAH is paid directly to veterans while the tuition benefit is paid to schools.[25]

Figure 25 shows the impact of PGIB on total benefits used by each cohort, for the vets who were already enrolled at the time that the policy was enacted. The 2003 and 2004 cohorts do not show any increase in benefits used. The impacts then climb steadily for the 2005-2008 cohorts reach $10,000 per person in benefits for the 2008 cohort.

Table 12 reports impacts on BA attainment and earnings for the sample of veterans who were already enrolled at the time PGIB was passed. Column (1) shows small and statistically insignificant point estimates for the impact of PGIB on attaining a Bachelor's degree within six years. An additional thousand dollars of benefits raises attainment by 0 to 0.1 percentage points and we can rule out effects larger than .2 percentage points. Point estimates for the impacts on earnings are also small and negative. For example in Column (6), Panel C uses log wages as the outcome variable and reports the impact of a $1000 increase in total benefits. The estimated

[25] Table 11 shows that these results are not driven by changes in the composition of veterans enrolled.

effect is -0.002 and we can rule out effects on wages larger than .2 percent for a $1000 increase in benefits. Looking at column (5) Panel C, we can rule out effects larger than $67 per year stemming from a $1000 increase in total benefits.

Figure 26 and 27 presents impacts of the PGIB that rely in the eligible-ineligible difference across cohorts for identification. Again, we see no evidence of positive earnings impacts despite the increased use of benefits and persistence in college (Figure 27). Figure 26 shows the impact of PGIB on persistence for the already enrolled sample. The outcome variable is being enrolled in college four years after separation. In the 2005 cohort there is no impact, presumably because many veterans have completed educational investments prior to 2009. But the 2008 and 2009 cohorts are 5 percentage points more likely to be enrolled four years later as a result of the PGIB. This figure helps justify the use of the 2003 and 2004 cohorts as a control group since the already enrolled vets do not appear to adjust their persistence in response to PGIB.

Figures 28 and 29 repeat this exercise using civilians enrolled at the same school as controls. While perhaps less similar to eligible veterans than ineligible veterans, using civilians allows us to form a significantly larger (and equally distributed across colleges) set of control group individuals. These figures again suggest that the PGIB resulted in modest increases in educational attainment. However, they also indicate a large negative effect of the PGIB on labor income. The analogous estimates are presented in Table 13. The estimates suggest large negative effects on eligible veteran earnings, driven largely by a much higher likelihood of reporting no labor income.

VI. Discussion and Concluding Remarks

In this paper, we examine one of the largest and most generous post-secondary aid programs in the United States. The Post 9/11 GI Bill offers annual educational subsidies as large as $60,000 to eligible veterans for up to four years. We identify the effects of the PGIB using a variety of strategies that exploit the timing of the additional benefits, the substantial geographic variation in benefit generosity that was created by the new law, and the within-school, cohort-by-cohort variation for veterans that chose the same college prior the law's passage.

We find that the PGIB raises the educational attainment of veterans at both the B.A. and A.A. levels. Considering the "overall" impacts of PGIB, the policy raised B.A. attainment by 2 percentage points and associate's degree attainment by 0.4 percentage points. The impacts for already enrolled veterans are smaller in magnitude and may be zero. These impacts are not large given the generosity of the program and the responses found in studies of earlier GI Bills. Angrist (1993) found that veteran's benefits on average raised schooling by 1.4 years. We are finding average increases of 2 months! Angrist and Chen (2011) find that veteran status (appropriately instrumented) raises average years of schooling by 0.24 to 0.27 years, raises B.A. attainment by 5 percentage points and associate's attainment by 6 to 9 percentage points. Despite the large benefit amounts, PGIB delivers smaller educational gains than earlier GI Bills.

Given the increase in bachelors attainment of 2.75 percentage points and an average increase in benefits of $8600, this implies a cost per additional bachelor's degree of around $313,000. This calculation uses the differences in differences estimates. If we instead use the geographic variation to estimate impacts of total benefits used and increased bachelors attainment from a $1000 increase in annual benefits offered, we obtain $1460/.0046 = $317,000 per additional bachelor's degree. These estimates are on the higher end of the range of estimates summarized by Dynarski (2003) and Dynarksi Hyman Schazenbach (2013).

Our most remarkable findings are the negative impacts on labor income for the sample of veterans exposed to the program. Seven years after their separation from the Army, the PGIB lowered wages by about 1.8 percentage points. There are numerous possible explanations for this finding. One possibility is that this estimate constitutes a medium-term effect caused by the reduced labor market experience reflective of the schooling gains that we find. This is not our preferred explanation because the negative impacts survive all specification checks in which we control for years of experience, and the additional months of schooling are small relative to the average reduction in earnings.

Our hypothesis is that the negative earnings returns stem from (a) the low value-added of many of the schools chosen by veterans under the PGIB combined with (b) the generosity of the BAH, which may be inducing veterans to forego valuable labor market human capital accumulation in favor of very marginal school enrollments. By pursuing schooling opportunities of marginal value, veterans may be missing out on opportunities to build occupation- or firm-specific human

capital or to immediately put their Army-taught skills to work in the labor force. Admittedly, this is a more complex version of the experience story, rather than a rejection of the experience hypothesis. Our findings motivate ongoing work such as Barr et al, et al. (2019), who are providing additional information to separating veterans about the earnings returns to various frequently attended colleges and chosen majors.

The contrast between PGIB impacts and that of earlier GI Bills may be driven by the changing composition of the Army. The Korea and Vietnam era GI Bills studied by Angrist and Chen (2011) involved conscription, which likely included large groups of young men who were well suited to college-going and further education. The PGIB was implemented in an all-volunteer Army, and so is offered to a group of young women and men who have already chosen the military over college after leaving high school.

We do not find as consistently negative earnings impacts of PGIB for veterans who had already enrolled when the money truck arrived. We take this as partial confirmation of our heterogenous treatment effects story. There are likely a set of veterans who do benefit from the additional subsidies.

Ours is among the first study of long-run impacts from this very large and prominent educational subsidy program. Overall, we hope that our study contributes to a deeper understanding of how impacts of college subsidies and college-going can vary a great deal across individuals: returns can actually be negative on average for a large subset of those eligible for additional benefits.

References

Angrist, J. (1993): "The Effect of Veterans Benefits on Education and Earnings," Industrial and Labor Relations Review, 10, 637–652.

Angrist, J., and S. Chen (2011): "Schooling and the Vietnam-Era GI Bill: Evidence from the Draft Lottery," American Economic Journal: Applied Economics, 3(2), 96–118.

Barr, A. (2013): "From the Battlefield to the Schoolyard: The Short-term Impact of the Post-9/11 GI Bill," Discussion paper.

(2014): "Enroll or Enlist: Credit Constraints, College Aid, and the Military Enlistment Margin," Discussion paper.

Bettinger, E. (2004): "How financial aid affects persistence," Discussion paper, National Bureau of Economic Research.

Bettinger, E. P., B. T. Long, P. Oreopoulos, and L. Sanbonmatsu (2012): "The Role of Application Assistance and Information in College Decisions: Results from the H&R Block Fafsa Experiment*," The Quarterly Journal of Economics, 127(3), 1205–1242.

Bound, J., and S. Turner (2002): "Going to war and going to college: Did World War II and the GI Bill increase educational attainment for returning veterans?," Journal of Labor Economics, 20(4), 784–815.

Castleman, B. L., and B. T. Long (2013): "Looking beyond enrollment: The causal effect of need-based grants on college access, persistence, and graduation," Discussion paper, National Bureau of Economic Research.

Cellini, S. and N. Turner (2018): "Gainfully Employed? Assessing the Employment and Earnings of For-Profit College Students Using Administrative Data," *Journal of Human Resources,* 53(3).

Deming, D., and S. Dynarski (2010): "College aid," in Targeting investments in children: Fighting poverty when resources are limited, pp. 283–302. University of Chicago Press.

Dortch, Cassandria. "The Post-9/11 Veterans Educational Assistance Act of 2008 (Post-9/11 GI Bill): Primer and Issues." Congressional Research Service, Library of Congress, 2012.

Dynarski, S. (2003): "Does aid matter? Measuring the effect of student aid on college attendance and completion," American Economic Review, pp. 279–288.

Dynarski (2008): "Building the stock of college-educated labor," Journal of human resources, 43(3), 576–610.

Dynarski, S., and J. Scott-Clayton (2013): "Financial Aid Policy: Lessons from Research," The Future of Children, 23(1), 67–92.

Dynarski, S. M., S. W. Hemelt, and J. M. Hyman (2013): "The missing manual: Using National Student Clearinghouse data to track postsecondary outcomes," Discussion paper, National Bureau of Economic Research.

Fitzpatrick, M., and D. Jones (2012): "Higher Education, Merit-Based Scholarships and Post-Baccalaureate Migration," Discussion paper, National Bureau of Economic Research.

Greenberg, Milton. *The GI bill: The law that changed America*. Lickle Pub., 1997.

Harkin, T. (2014): "Is the New G.I. Bill Working?: For-Profit Colleges Inicreasing Veteran Enrollment and Federal Funds," Discussion paper, Health, Education, Labor and Pension Committee of the United States Senate.

Hout, M. (2012): "Social and economic returns to college education in the United States," Annual Review of Sociology, 38, 379–400.

Keys, B. J., D. G. Pope, and J. C. Pope (2014): "Failure to Refinance," Discussion paper, National Bureau of Economic Research.

Lemieux, T., and D. Card (2001): "Education, earnings, and the Canadian GI Bill," Canadian Journal of Economics/Revue canadienne d'´economique, 34(2), 313–344.
Lleras-Muney, A. (2005): "The relationship between education and adult mortality in the United States," The Review of Economic Studies, 72(1), 189–221.

Lochner, L., and A. Monge-Naranjo (2011): "Credit Constraints in Education," Discussion paper, National Bureau of Economic Research.

Mettler, Suzanne. *Soldiers to citizens: The GI Bill and the making of the greatest generation*. Oxford University Press on Demand, 2005.

Oreopoulos, P., and U. Petronijevic (2013): "Making college worth it: A review of the returns to higher education," The Future of Children, 23(1), 41–65.

Scott-Clayton, J. (2011): "On Money and Motivation A Quasi-Experimental Analysis of Financial Incentives for College Achievement," Journal of Human Resources, 46(3), 614–646.

Seftor, N., and S. Turner (2002): "Back to school: Federal student aid policy and adult college enrollment," Journal of Human Resources, pp. 336–352.

Simon, C., S. Negrusa, and J. Warner (2010): "Educational Benefits and Military Service: An Analysis of Enlistment, Reenlistment, and Veterans' Benefit Usage 1991-2005," Economic Inquiry, 48(4), 1008–1031.

Stanley, M. (2003): "College education and the midcentury GI Bills," The Quarterly Journal of Economics, 118(2), 671–708.

Steele, Jennifer L., Nicholas Salcedo, and James Coley. *Service members in school: Military veterans' experiences using the Post-9/11 GI Bill and pursuing postsecondary education*. RAND CORP SANTA MONICA CA, 2010.

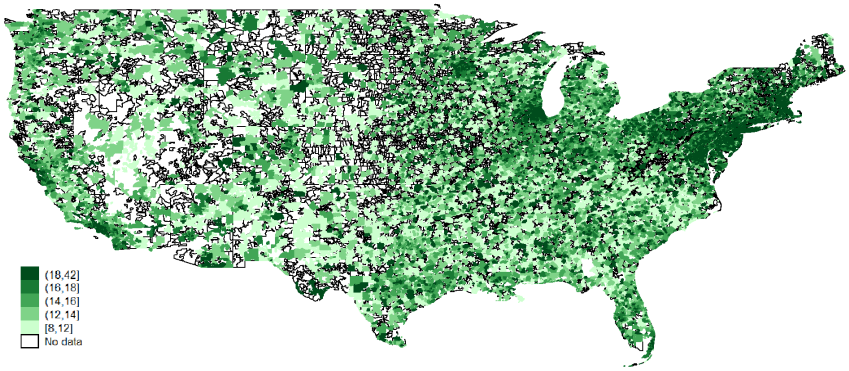
Stinebrickner, T., and R. Stinebrickner (2012): "Learning about Academic Ability and the College Dropout Decision," Journal of Labor Economics, 30(4), 707–748.
32

Turner, Sarah, and John Bound. "Closing the gap or widening the divide: The effects of the GI Bill and World War II on the educational outcomes of black Americans." *The Journal of Economic History* 63.1 (2003): 145-177.

Zhang, Liang. "Veterans Going to College: Evaluating the Impact of the Post-9/11 GI Bill on College Enrollment." *Educational Evaluation and Policy Analysis* 40.1 (2018): 82-102.

Figures

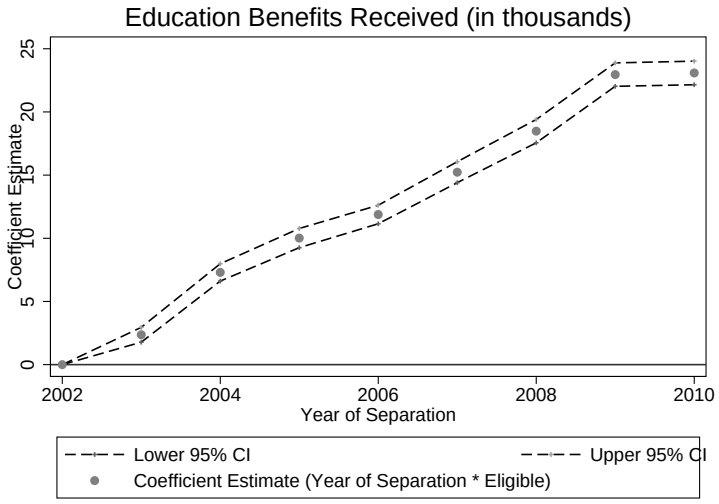
Figure 1: Post-9/11: Predicted Annual Average Benefit Level



$$Benefit_{hor} = 9 * \overline{BAH} + \overline{Tuition}$$

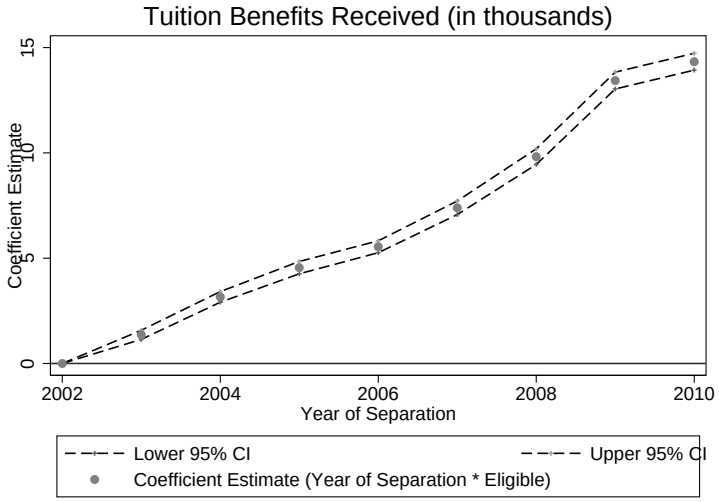
Note: Map illustrates predicted benefit in each home of record zip code. [UPDATE NOTE]

Figure 2: Event Study for Total Benefits Received



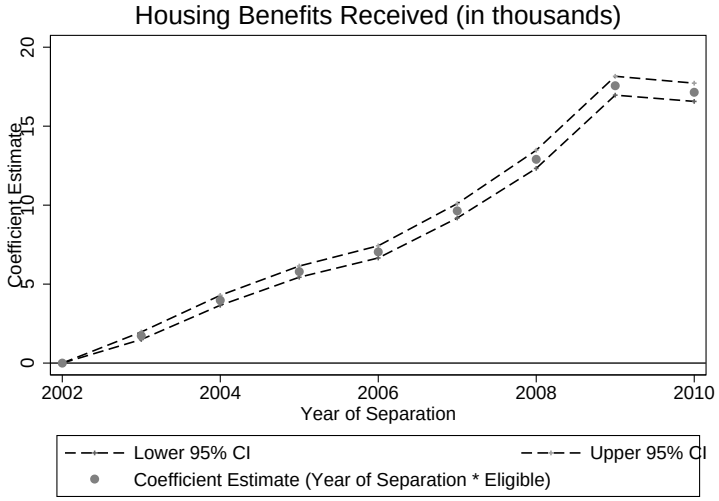
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is the total amount of GI Bill benefits received as of 2018.

Figure 3: Event Study for Tuition Benefits Received



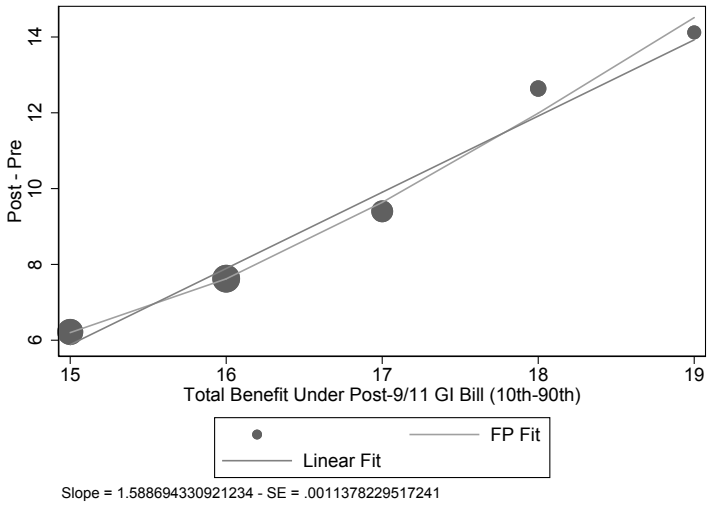
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is the total amount of GI Bill benefits received as of 2018.

Figure 4: Event Study for Housing Benefits Received



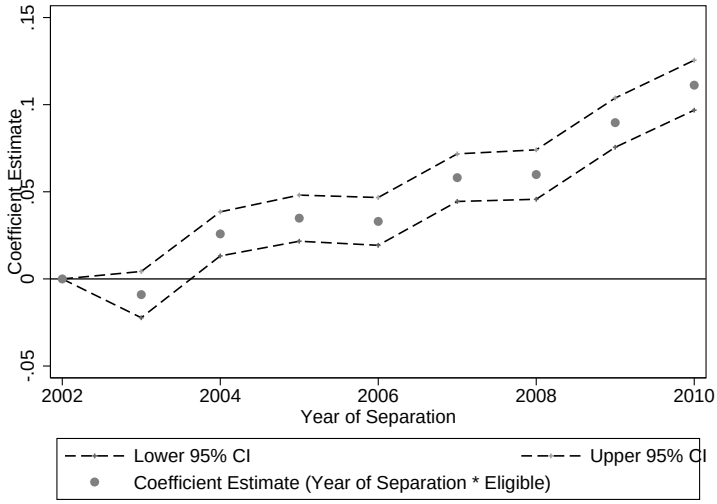
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is the total amount of GI Bill benefits received as of 2018.

Figure 5: Relationship between Total Benefits Received and Predicted



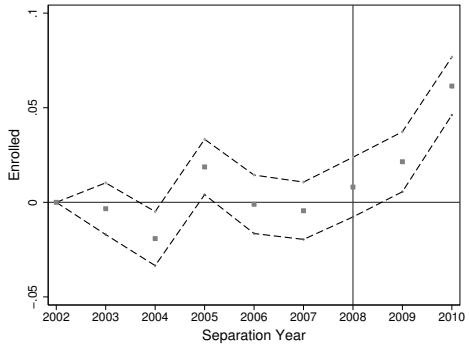
Note: Circles indicate difference in mean benefits received (including zeroes) between the post (2008/09) and pre (2003/04) period in $1,000 bins of predicted PGIB benefits based on 3-digit zip home of record. Restricted to homes of record with between the 10th and 90th percentile of predicted benefits.

Figure 6: Event Study for Ever Enrolled (NSC)

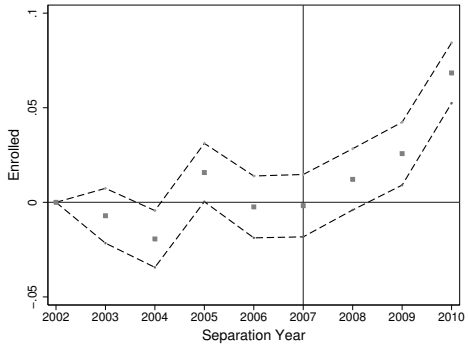


Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is whether a veteran is ever observed enrolled in the NSC data.

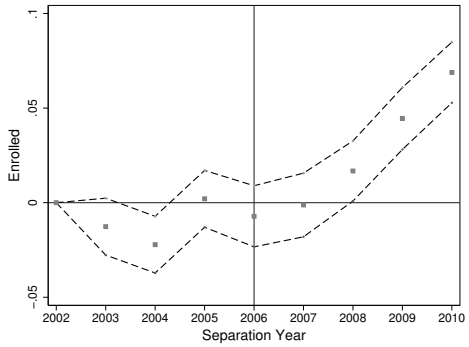
Figure 7: Impact of GI Bill on Overall Enrollment



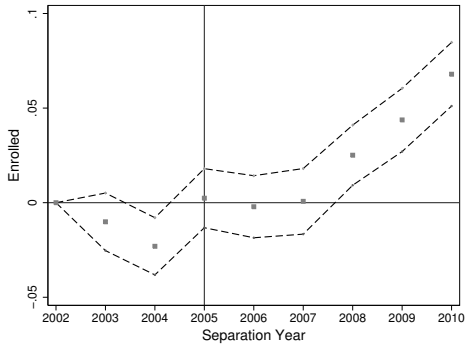
(a) Within 1 Year



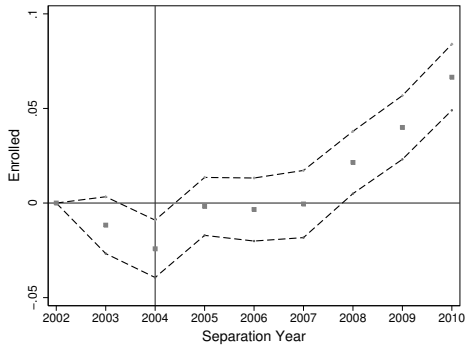
(b) Within 2 Years



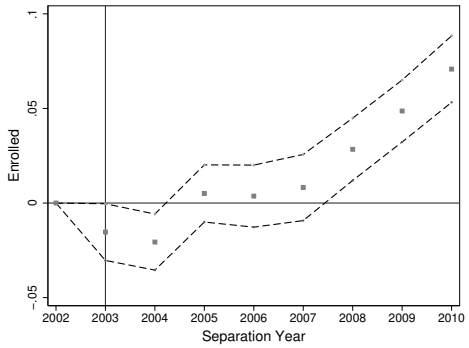
(c) Within 3 Years



(d) Within 4 Years



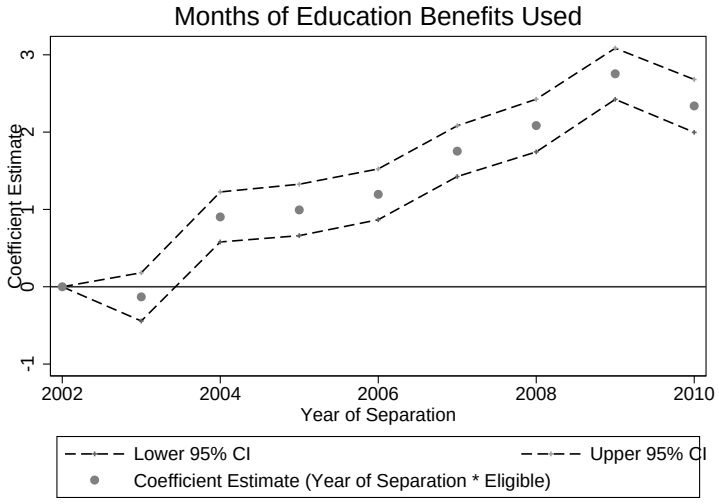
(e) Within 5 Years



(f) Within 6 Years

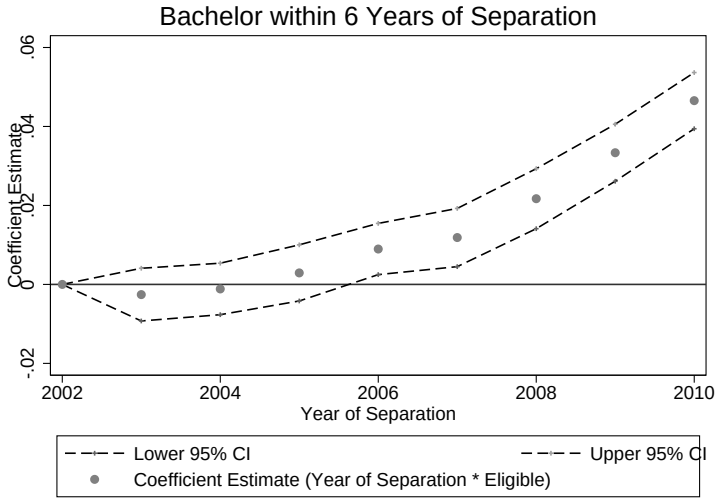
Note: The figures present estimated coefficients from difference-in-differences event study regression that includes eligible and ineligible veterans who separated from the Army between 2002–2010. Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level.

Figure 8: Event Study for Benefit Months Used



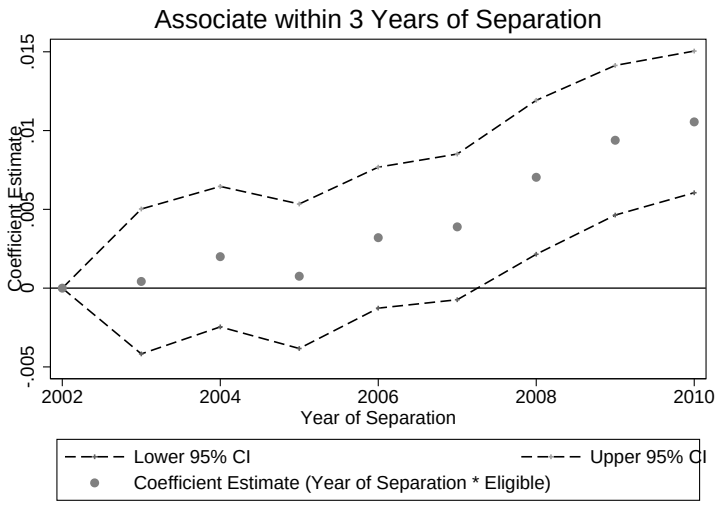
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is for total months of benefits used as of 2018.

Figure 9: Event Study for BA (within 6 years)



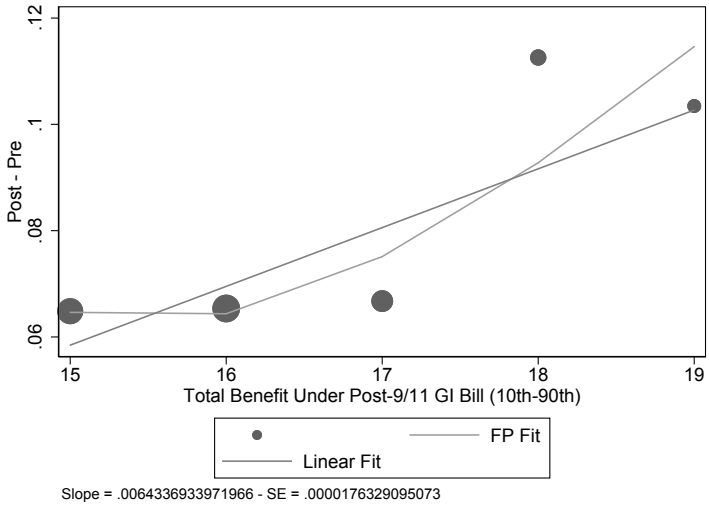
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is for BA receipt within 6 years of separation.

Figure 10: Event Study for AA (within 3 years)



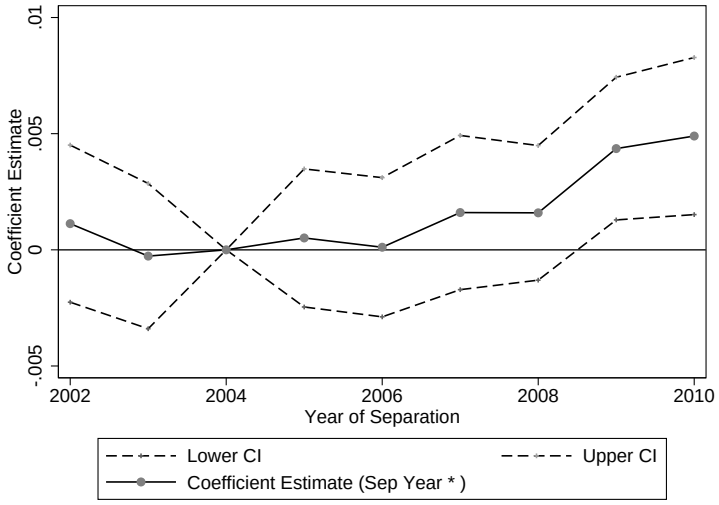
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is for AA receipt within 3 years of separation.

Figure 11: Relationship between Enrollment and PGIB Predicted Benefit Level



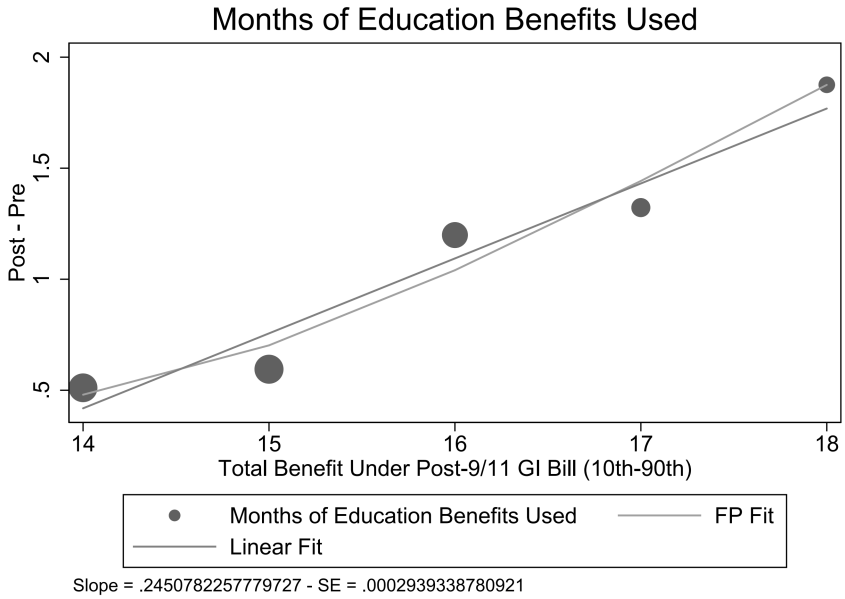
Note: Circles indicate difference in enrollment rates between the post (2007/08) and pre (2003/04) period in $1,000 bins of predicted PGIB benefits based on 3-digit zip home of record. Restricted to homes of record with between the 10th and 90th percentile of predicted benefits.

Figure 12: Geographic Variation Event Study for Enrollment: Total Benefits



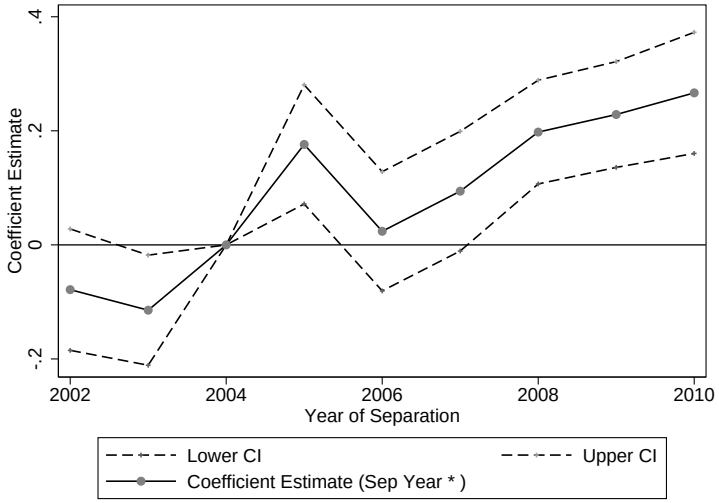
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with the generosity of a veteran's home of record predicted total benefits under the PGIB (see text for details). The 2004 interaction is omitted. The dependent variable is whether an individual is ever observed enrolled in the NSC data after the date of separation.

Figure 13: Relationship between Benefit Months Used and PGIB Predicted Benefit Level



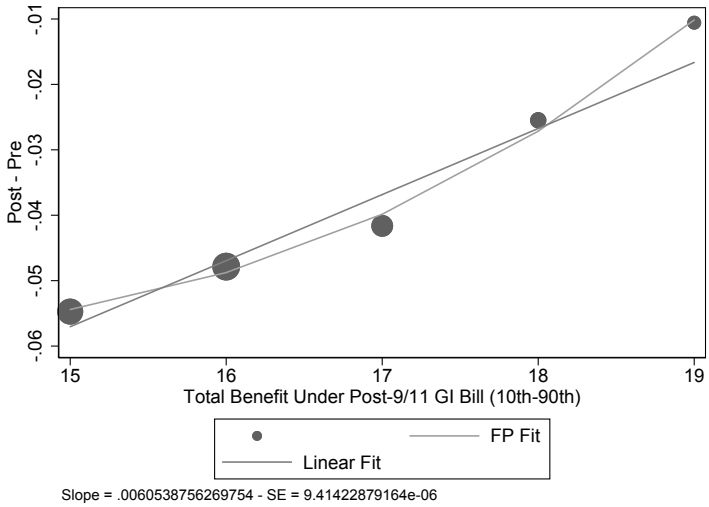
Note: Circles indicate difference in total benefit months used (as of 2018) between the post (2007/08) and pre (2003/04) period in $1,000 bins of predicted PGIB benefits based on 3-digit zip home of record.

Figure 14: Geographic Variation Event Study for Months of Benefits Used: Total Benefits



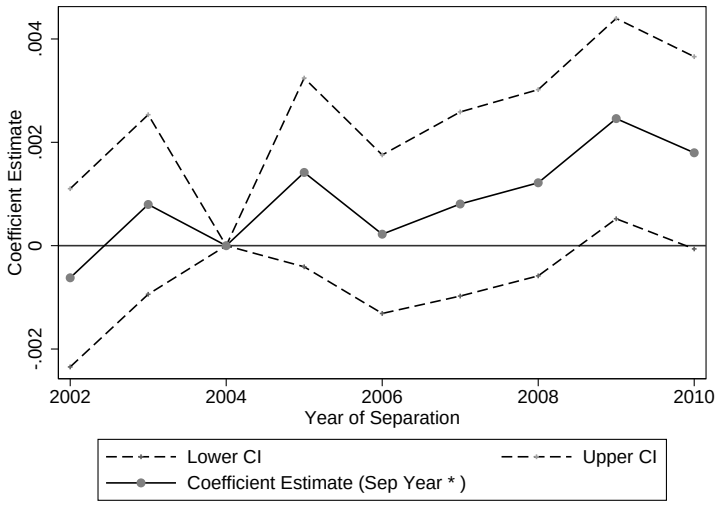
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with the generosity of a veteran's home of record predicted total benefits under the PGIB (see text for details). The 2004 interaction is omitted. The dependent variable is cumulative months of GI Bill benefits used as of 2018.

Figure 15: Relationship between BA Receipt and PGIB Predicted Benefit Level



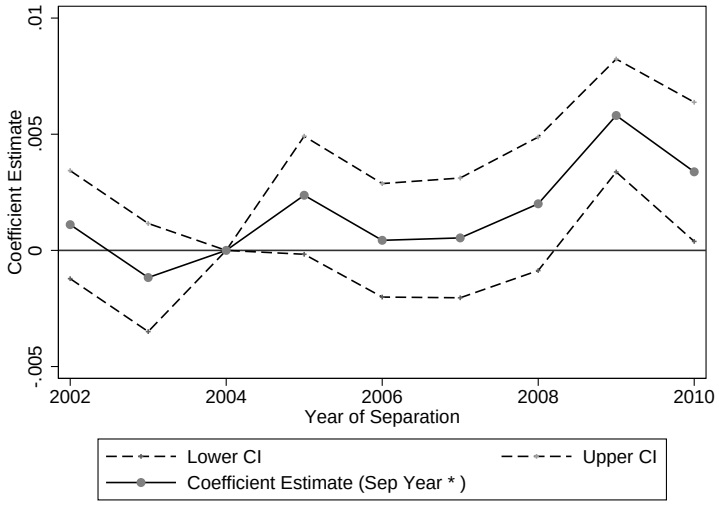
Note: Circles indicate difference in BA receipt in the post (2008/09) and pre (2003/04) period in $1,000 bins of predicted PGIB benefits based on 3-digit zip home of record.

Figure 16: Geographic Variation Event Study for AA Attainment: Total Benefits



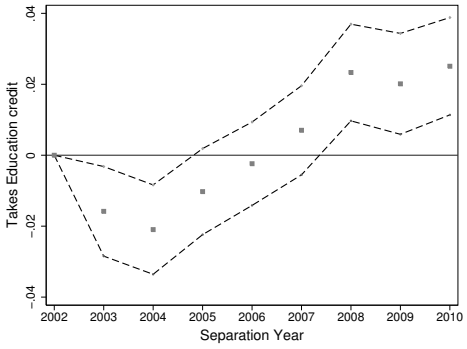
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with the generosity of a veteran's home of record predicted total benefits under the PGIB (see text for details). The 2004 interaction is omitted. The dependent variable is whether an individual obtains a AA within three years of separation

Figure 17: Geographic Variation Event Study for BA Attainment: Total Benefits

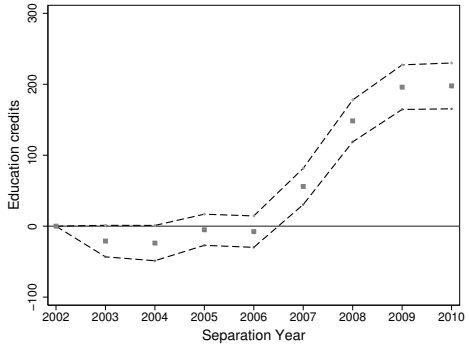


Note: Circles indicate coefficients on indicator variables for each year of separation interacted with the generosity of a veteran's home of record predicted total benefits under the PGIB (see text for details). The 2004 interaction is omitted. The dependent variable is whether an individual obtains a BA within six years of separation

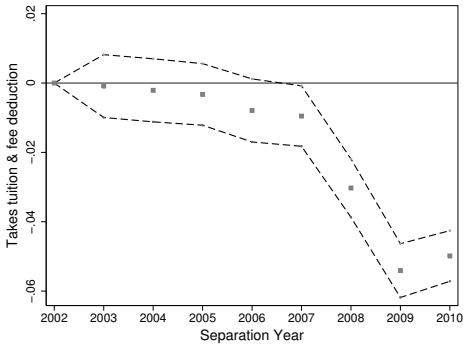
Figure 18: Impact of GI Bill on Federal Tax Benefits Within 2 Years of Separation



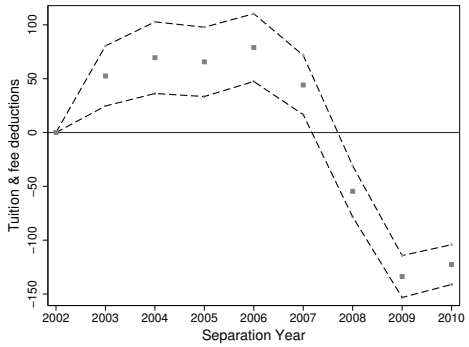
(a) Takes Ed Tax Credits



(b) Ed Tax Credits



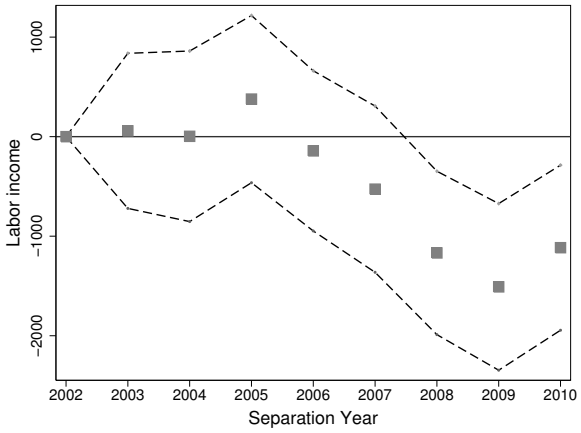
(c) Takes Tuition & Fee Deduction



(d) Tuition & Fee Deduction

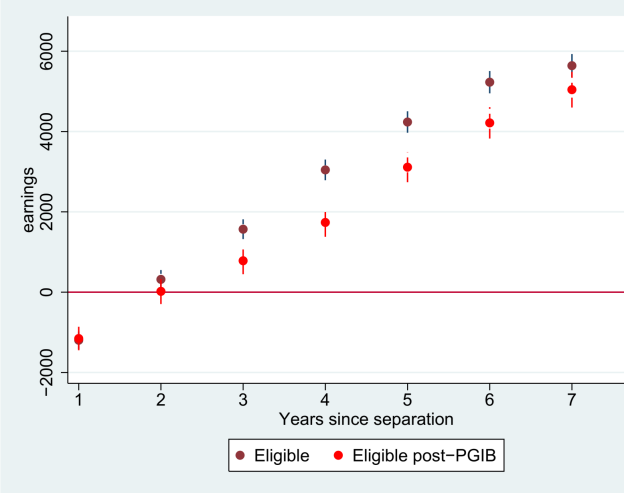
Note: The figures present estimated coefficients from difference-in-differences event study regression that includes eligible and ineligible veterans who separated from the Army between 2002–2010. Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level.

Figure 19: Event Study for Labor Income



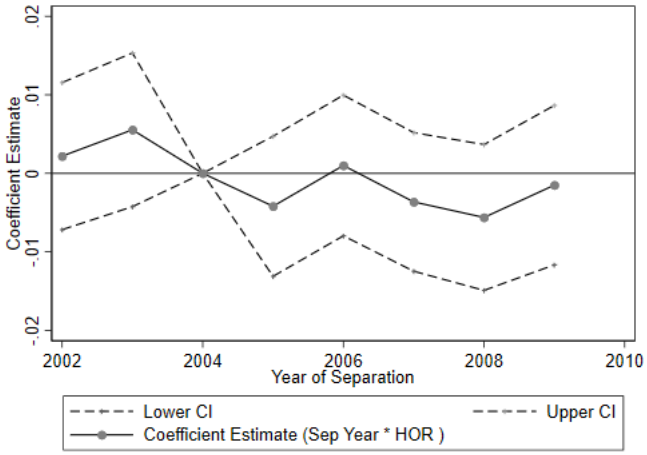
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with veteran eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is labor income 7 years after separation.

Figure 20: Effect on Earnings Profile



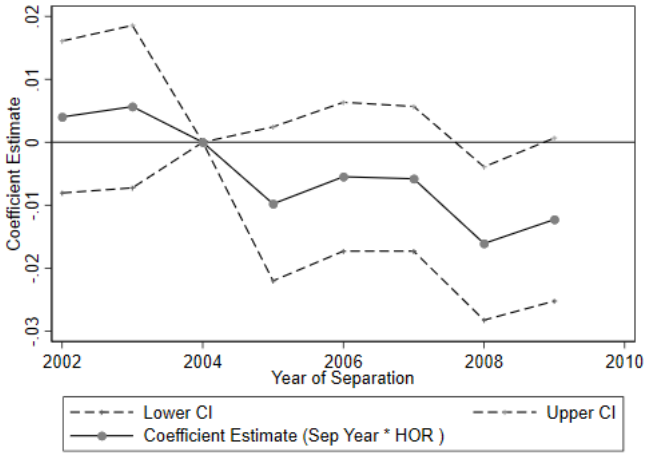
Note: [UPDATE NOTE]

Figure 21: Geographic Variation Event Study for Log Labor Income: Total Benefits



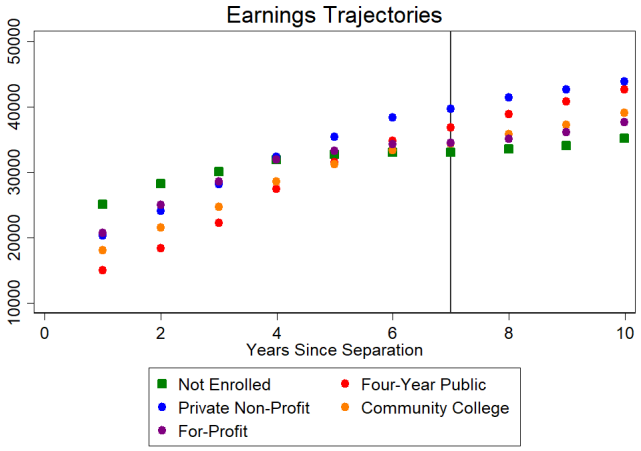
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with the generosity of a veteran's home of record predicted total benefits under the PGIB (see text for details). The 2004 interaction is omitted. The dependent variable is the log of labor income 7 years after separation.

Figure 22: Geographic Variation Event Study for Log Labor Income: BAH



Note: Circles indicate coefficients on indicator variables for each year of separation interacted with the generosity of a veteran's home of record predicted basic allowance for housing benefits under the PGIB (see text for details). The 2002 interaction is omitted. The dependent variable is the log of labor income 7 years after separation.

Figure 23: Earnings Profiles by College Type



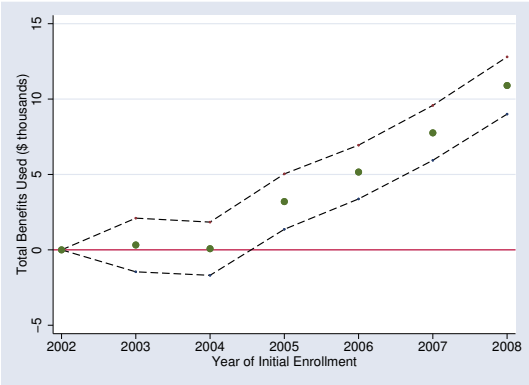
Note: [UPDATE NOTE]

Figure 24: Decomposition Figure

placeholder.pdf

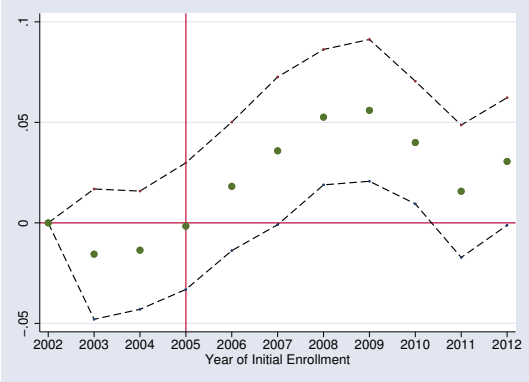
Note: [UPDATE NOTE]

Figure 25: Impact of the PGIB Expansion on Total Benefits Used (already enrolled)



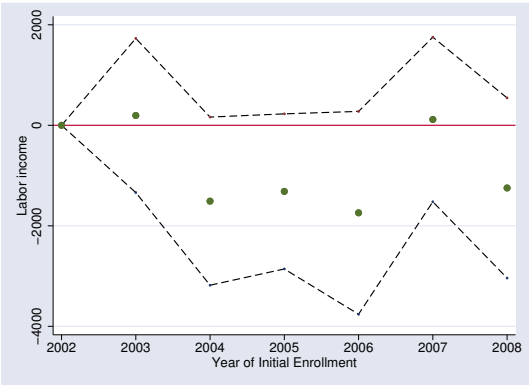
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is cumulative GI Bill benefits received as of 2018.

Figure 26: Impact of the PGIB Expansion on Enrollment Four Years after Initial Enrollment



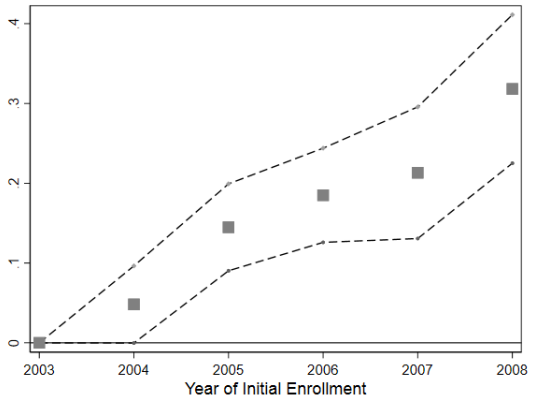
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is whether an individual is observed enrolled in the 1098-T data four years after the initial year of post-separation enrollment.

Figure 27: Impact of the PGIB Expansion on Labor Income Seven Years after Initial Enrollment



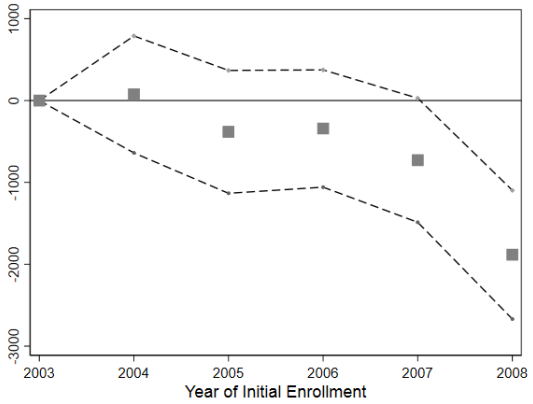
Note: Circles indicate coefficients on indicator variables for each year of separation interacted with eligibility for GI Bill benefits. The 2002 interaction is omitted. The dependent variable is labor income seven years after initial enrollment.

Figure 28: Impact of the PGIB Expansion on Years of Enrollment (civilian control)



Note: Circles indicate coefficients on indicator variables for each year of separation interacted with eligible veteran (relative to civilian). The 2002 interaction is omitted. The dependent variable is years of enrollment seven years after initial enrollment. Regressions include college fixed effects and indicators for age and gender.

Figure 29: Impact of the PGIB Expansion on Labor Income Seven Years after Initial Enrollment (civilian control)



Note: Circles indicate coefficients on indicator variables for each year of separation interacted with eligible veteran (relative to civilian). The 2002 interaction is omitted. The dependent variable is labor income seven years after initial enrollment. Regressions include college fixed effects and indicators for age and gender.

Tables

Table 1: Summary Statistics

	Separation Year Analysis				Enrollment Year Analysis			
	2002-2010		2003/4-2008/9		2002-2010		2003/4-2008/9	
Variable	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
Age at Separation	24.29	3.33	24.26	3.35	24.1	3.07	24.22	3.13
Male	0.81	0.39	0.81	0.4	0.76	0.43	0.77	0.42
Black	0.18	0.38	0.18	0.39	0.2	0.4	0.19	0.39
Married	0.35	0.48	0.36	0.48	0.33	0.47	0.34	0.47
Entry AFQT (percentile)	58.25	18.39	58.03	18.46	60.89	18.59	60.78	18.72
GED	0.15	0.36	0.16	0.36	0.1	0.3	0.11	0.32
High-school Dropout	0.01	0.1	0.01	0.1	0.01	0.1	0.01	0.1
High-school Degree	0.78	0.42	0.77	0.42	0.82	0.38	0.81	0.4
Some College	0.05	0.21	0.05	0.21	0.05	0.22	0.05	0.23
Eligible (for GI Bill)	0.74	0.44	0.73	0.45	0.83	0.38	0.83	0.37
PGIB/MGIB Benefits Used (000s)	22.64	31.94	22.52	30.47	31.6	33.09	33.3	35.53
PGIB Benefits Housing (000s)	6.78	12.62	6.78	12.64	6.48	11.69	8.89	13.87
PGIB Benefits Tuition (000s)	5.59	11.22	5.58	11.18	5.52	10.63	7.46	12.62
Enroll Four-Year Public	0.24	0.43	0.24	0.43	0.25	0.43	0.24	0.43
Enroll Four-Year Private	0.06	0.23	0.06	0.23	0.06	0.23	0.06	0.23
Enroll Two-Year Public	0.44	0.5	0.44	0.5	0.46	0.5	0.45	0.5
Enroll For-Profit	0.25	0.43	0.25	0.43	0.23	0.42	0.24	0.43
Ever Bachelor	0.15	0.35	0.15	0.35	0.26	0.44	0.25	0.43
Ever Associate	0.52	0.5	0.52	0.5	0.55	0.5	0.53	0.5
Education Tax Credit Amt.	291	568	300	578	220	454	282	553
Tuition and Fees Deduction Amt.	656	70,176	533	1,234	932	1,524	1,052	96,369
Took Education Tax Credit	0.31	0.46	0.31	0.46	0.28	0.45	0.31	0.46
Took Tuition and Fee Deduction	0.09	0.28	0.09	0.28	0.12	0.33	0.09	0.29
Savings in 529 Plan	18,606	7,408	18,085	7,247	18,683	6,625	18,419	6,958
Log Earnings 7 Yrs Out	10.11	1.19	10.09	1.2	10.1	1.19	10.11	1.19
Has Earnings 7 Yrs Out	0.84	0.37	0.84	0.37	0.84	0.36	0.84	0.37
Wage Amount 7 Yrs Out	48,112	34,913	47,746	34,976	47,679	34,832	48,076	34,870
C Corp Profit/Loss 7 Yrs Out	-6,702	3,827	-6,959	4,285	-6,296	3,652	-6,632	3,834
Unemp. Comp. 7 Yrs Out	557	2,385	610	2,547	643	2,643	565	2,408
Total Income 7 Yrs Out	-68	4,244	-83	4,751	-89	4,202	-67	4,213
Adjusted Income 7 Yrs Out	-103	4,282	-115	4,777	-112	4,254	-102	4,251
Married 7 Yrs Out	0.49	0.5	0.48	0.5	0.48	0.5	0.49	0.5
Number of Kids 7 Yrs Out	1	1.16	0.99	1.16	1	1.15	1	1.16
Has Kids 7 Yrs Out	0.45	0.5	0.44	0.5	0.45	0.5	0.45	0.5
Observations	325723		141239		73108		172468	

Note: Sample restricted to individuals who separated between 2002 and 2010. We exclude all Army veterans who already had a B.A. upon entering or who earned one while on active duty. We limit the sample to veterans who served at least 1 year and at most 6 years and who were age 39 or younger at the point of separation.

Table 2: Effects of PGIB on Benefits Received

VARIABLES	(1) Total Benefits Used	(2) Total Benefits Used	(3) Total Benefits Used
Post * BAH	2.128***		
	(0.156)		
Post * TF		0.661***	
		(0.233)	
Post * Benefits			1.460***
			(0.120)
Observations	100,617	100,617	100,617
R-squared	0.147	0.144	0.146
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Note: The table presents estimated coefficients from regressions that include eligible veterans who separated from the Army in 2003/04 (pre) or 2008/09 (post). Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level.

Table 3: Balance Between Treatment and Baseline Covariates

	(1) AFQT	(2) Black	(3) Male	(4) Age	(5) Married	(6) GED	(7) HSD	(8) HSG	(9) SMC
				Panel A: Basic Allowance for Housing, 2003/4–2008/9					
Post * BAH	0.229***	-0.003	-0.003*	-0.012	-0.002	0.000	0.000	-0.001	0.001
	(0.066)	(0.002)	(0.001)	(0.013)	(0.002)	(0.001)	(0.000)	(0.002)	(0.001)
Observations	101,055	102,032	102,032	102,032	102,032	102,032	102,032	102,032	102,032
R-squared	0.268	0.312	0.318	0.152	0.083	0.098	0.034	0.078	0.055
				Panel B: Tuition & Fee, 2003/4–2008/9					
Post * TF	0.103	-0.011***	0.002	0.028*	0.004*	0.001	-0.001	0.001	-0.001
	(0.077)	(0.002)	(0.002)	(0.016)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Observations	101,055	102,032	102,032	102,032	102,032	102,032	102,032	102,032	102,032
R-squared	0.268	0.312	0.318	0.152	0.083	0.098	0.034	0.078	0.055
				Panel C: Total Benefits, 2003/4–2008/9					
Post * Benefits	0.170***	-0.006***	-0.001	0.004	0.000	0.000	-0.000	0.000	-0.000
	(0.049)	(0.002)	(0.001)	(0.011)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Observations	101,055	102,032	102,032	102,032	102,032	102,032	102,032	102,032	102,032
R-squared	0.268	0.312	0.318	0.152	0.083	0.098	0.034	0.078	0.055

Note: The table presents estimated coefficients from regressions that include eligible veterans who separated from the Army in 2003, 2004, 2008, and 2009. Panels A–C report parameter estimates for regressions using separation cohorts in 2003/2004 (pre-period) and 2008/2009 (post-period). Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level. Standard errors are clustered at the 3-digit zip code level.

Table 4: Effects of PGIB on Educational Attainment

	(1)	(2)	(3)	(4)
Dependent Variable	Ever Enrolled	Months Used	BA Degree	AA Degree
Eligible * Post	0.0653***	1.937***	0.0275***	0.0061***
	(0.0053)	(0.122)	(0.0027)	(0.0018)
Post * BAH	0.0049***	0.459***	0.0067***	0.0024***
	(0.0017)	(0.0507)	(0.0020)	(0.0009)
Post * TF	0.0015	0.0143	0.0019	0.0003
	(0.0021)	(0.0634)	(0.0016)	(0.0009)
Post * Benefits	0.0033***	0.265***	0.0046***	0.0015**
	(0.0001)	(0.0361)	(0.0010)	(0.0006)

Note: The table presents estimated coefficients from regressions that include eligible veterans who separated from the Army in in 2003/2004 (pre-period) and 2008/2009 (post-period). Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level.

Table 5: Impact of the PGIB Expansion on Enrollment

	(1) Enroll	(2) 4-Yr Pub.	(3) 4-Yr Priv.	(4) Comm. College	(5) For-profit
	Panel A: Eligible vs. Ineligible, 2003/4–2008/9				
Eligible * Post	0.033***	-0.008**	0.006***	0.020***	0.027***
	(0.006)	(0.004)	(0.002)	(0.005)	(0.005)
Observations	138,798	138,798	138,798	138,798	138,798
R-squared	0.154	0.145	0.056	0.107	0.063
	Panel B: Basic Allowance for Housing, 2003/4–2008/9				
Post * BAH	0.000	0.001	0.002**	-0.000	0.000
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Observations	100,617	100,617	100,617	100,617	100,617
R-squared	0.112	0.140	0.058	0.102	0.069
	Panel C: Tuition & Fee, 2003/4–2008/9				
Post * TF	0.004*	0.002	0.002*	0.000	-0.001
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Observations	100,617	100,617	100,617	100,617	100,617
R-squared	0.112	0.140	0.058	0.102	0.069
	Panel D: Total Benefits, 2003/4–2008/9				
Post * Benefits	0.002	0.002	0.002***	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	100,617	100,617	100,617	100,617	100,617
R-squared	0.112	0.140	0.058	0.102	0.069

Note: The table presents estimated coefficients from regressions that include eligible veterans who separated from the Army in 2003/2004 (pre-period) or 2008/2009 (post-period). Panel A includes veterans who are eligible for benefits (honorable service characterization) and those who are ineligible. Panels B–D report parameter estimates for regressions using separation cohorts in 2003/2004 (pre-period) and 2008/2009 (post-period). Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level. Standard errors are clustered at the 3-digit zip code level.

Table 6: Impact of the PGIB Expansion on Tax Benefits

	(1) Takes Education Tax Credit	(2) Takes Tuition & Fee Deduct.	(3) Withdraws from 529 Plan	(4) Education Tax Credits	(5) Tuition & Fee Deduct. Amount	(6) 529 Plan Withdrawals
			Panel A: Eligible vs. Ineligible, 2003/4–2008/9			
Eligible * Post	0.043***	-0.045***	0.001*	192.642***	-164.219***	7.836
	(0.005)	(0.003)	(0.001)	(11.707)	(10.487)	(4.922)
Observations	138,798	138,798	138,798	138,798	138,798	138,798
R-squared	0.110	0.066	0.029	0.106	0.069	0.040
			Panel B: Basic Allowance for Housing, 2003/4–2008/9			
Post * BAH	0.000	0.001	0.000	7.608	6.320	0.731
	(0.002)	(0.001)	(0.000)	(5.436)	(4.783)	(3.382)
Observations	100,617	100,617	100,617	100,617	100,617	100,617
R-squared	0.086	0.064	0.037	0.094	0.070	0.060
			Panel C: Tuition & Fee, 2003/4–2008/9			
Post * TF	0.002	-0.000	0.000	17.098***	-11.737**	0.628
	(0.002)	(0.002)	(0.000)	(5.866)	(5.289)	(2.410)
Observations	100,617	100,617	100,617	100,617	100,617	100,617
R-squared	0.086	0.064	0.037	0.094	0.070	0.060
			Panel D: Total Benefits, 2003/4–2008/9			
Post * Benefits	0.001	0.001	0.000	10.982***	-1.026	0.658
	(0.001)	(0.001)	(0.000)	(3.976)	(3.448)	(2.413)
Observations	100,617	100,617	100,617	100,617	100,617	100,617
R-squared	0.086	0.064	0.037	0.094	0.070	0.060

Note: The table presents estimated coefficients from regressions that include eligible veterans who separated from the Army in 2003/2004 (pre-period) or 2008/2009 (post-period). Panel A includes veterans who are eligible for benefits (honorable service characterization) and those who are ineligible. Panels B–D report parameter estimates for regressions using separation cohorts in 2003/2004 (pre-period) and 2008/2009 (post-period). Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level. Standard errors are clustered at the 3-digit zip code level.

Table 7: Impact of the PGIB Expansion on Longer-Run Outcomes

	(1) W-2 wages	(2) Log W-2 wages	(3) Has W-2 inc.	(4) Labor income	(5) Log labor inc.	(6) Has labor inc.
			Panel A: Eligible vs. Ineligible, 2002–2010			
Eligible * Post	-902.281***	-0.017	-0.007	-892.778***	-0.018	-0.010*
	(294.299)	(0.020)	(0.006)	(334.792)	(0.019)	(0.006)
Observations	138,798	109,824	138,798	138,798	112,385	138,798
R-squared	0.168	0.134	0.053	0.155	0.130	0.052
			Panel B: Basic Allowance for Housing, 2003/4–2008/9			
Post * BAH	-159.589	-0.014***	0.002	-278.455**	-0.017***	0.002
	(110.486)	(0.004)	(0.002)	(124.884)	(0.005)	(0.002)
Observations	100,617	80,903	100,617	100,617	82,592	100,617
R-squared	0.153	0.118	0.063	0.144	0.117	0.063
			Panel C: Tuition & Fee, 2003/4–2008/9			
Post * TF	122.523	0.007	-0.001	147.139	0.008	-0.001
	(127.540)	(0.006)	(0.002)	(143.233)	(0.006)	(0.002)
Observations	100,617	80,903	100,617	100,617	82,592	100,617
R-squared	0.153	0.118	0.063	0.144	0.116	0.063
			Panel D: Total Benefits, 2003/4–2008/9			
Post * Benefits	-42.109	-0.005	0.001	-99.547	-0.006*	0.000
	(84.775)	(0.003)	(0.001)	(100.442)	(0.004)	(0.001)
Observations	100,617	80,903	100,617	100,617	82,592	100,617
R-squared	0.153	0.118	0.063	0.144	0.116	0.063

Note: The table presents estimated coefficients from regressions that include eligible veterans who separated from the Army in 2003/2004 (pre-period) or 2008/2009 (post-period). Panel A includes veterans who are eligible for benefits (honorable service characterization) and those who are ineligible. Panels B–D report parameter estimates for regressions using separation cohorts in 2003/2004 (pre-period) and 2008/2009 (post-period). Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enlistment year, military grade at separation, separation month, PMOS interacted with enlistment year, and 3-digit zip code. Standard errors are clustered at the 3-digit zip code level. Standard errors are clustered at the 3-digit zip code level.

Table 8: Placebo Impact of the PGIB Expansion on Longer-Run Outcomes (civilian)

	(1) Wages	(2) Has Wages	(3) Personal Income	(4) Has Income	(5) Employed
	Panel A: Basic Allowance for Housing, 2009/10 2015/16				
Post * BAH	172.352**	0.001**	172.038**	0.001**	0.002***
	(79.732)	(0.001)	(85.424)	(0.000)	(0.001)
Observations	761,960	761,960	761,960	761,960	761,960
R-squared	0.042	0.001	0.048	0.002	0.005
	Panel B: Total Benefits, 2009/10 2015/16				
Post * Benefits	40.043	0.001	30.618	0.001	0.001*
	(55.012)	(0.000)	(58.661)	(0.000)	(0.000)
Observations	761,960	761,960	761,960	761,960	761,960
R-squared	0.042	0.001	0.048	0.002	0.005

Note: The table presents estimated coefficients from regressions that include individuals in 2010, 2011, 2015, and 2016. Regressions include controls for gender and age and standardized PUMA fixed effects. Standard errors are clustered at the PUMA level.

Table 9: Oaxaca Decomposition Table

Table 10: Effects of PGIB on Benefits Received (already enrolled)

	(1)	(2)	(3)
Post * BAH	0.650***		
	(0.123)		
Post * TF		0.345***	
		(0.080)	
Post * Benefits			0.391***
			(0.056)
Observations	39,147	39,147	39,147
R-squared	0.181	0.181	0.182

Note: The table presents estimated coefficients from regressions that include eligible veterans who initially enrolled in college in 2003/04 or 2007/08 and enrolled within two years of separation. Regressions include controls for gender, race, age at separation, educational attainment at enlistment, marital status at enlistment, AFQT score interacted with enrollment year, military grade at separation, separation month fixed effects, PMOS x enlist year, enrollment year, and institution fixed effects. Standard errors are clustered at the institution level.

Table 11: Balance Between Treatment and Baseline Covariates (already enrolled)

	(1) AFQT	(2) Black	(3) Male	(4) Age	(5) Married	(6) GED	(7) HSD	(8) HSG	(9) SMC
				Panel A: Basic Allowance for Housing, 2003/4 2007/8					
Post * BAH	0.022	0.001	0.000	-0.014	-0.002	-0.000	0.000	-0.000	0.001
	(0.044)	(0.001)	(0.001)	(0.010)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Observations	39,343	39,936	39,936	39,936	39,936	39,936	39,936	39,936	39,936
R-squared	0.343	0.287	0.403	0.195	0.163	0.114	0.077	0.121	0.124
				Panel B: Tuition & Fee, 2003/4 2007/8					
Post * TF	-0.026	0.001	-0.001	-0.001	0.001	0.001	0.000	-0.002***	0.001**
	(0.036)	(0.001)	(0.001)	(0.007)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Observations	39,343	39,936	39,936	39,936	39,936	39,936	39,936	39,936	39,936
R-squared	0.343	0.287	0.403	0.195	0.163	0.114	0.078	0.121	0.125
				Panel C: Total Benefits, 2003/4 2007/8					
Post * Benefits	-0.007	0.001	-0.000	-0.005	-0.000	0.000	0.000	-0.001**	0.001**
	(0.026)	(0.001)	(0.001)	(0.006)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Observations	39,343	39,936	39,936	39,936	39,936	39,936	39,936	39,936	39,936
R-squared	0.343	0.287	0.403	0.195	0.163	0.114	0.077	0.121	0.125

Note: The table presents estimated coefficients from regressions that include eligible veterans who initially enrolled in college in 2003/04 or 2007/08 and enrolled within two years of separation. Panels A – C report parameter estimates for regressions, where $Post = 1$ for those who first enrolled in college in 2007 or later. Regressions include PMOS x enlist year, enrollment year, and institution fixed effects. Standard errors are clustered at the institution level.

Table 12: Impact of the PGIB Expansion on Longer-Run Outcomes (already enrolled)

	(1) Earns B.A.	(2) W-2 wages	(3) Log W-2 wages	(4) Has W-2 inc.	(5) Labor income	(6) Log labor inc.	(7) Has labor inc.
			Panel A: Basic Allowance for Housing, 2003/4 2007/8				
Post * BAH	0.001	-45.131	0.000	-0.001	-20.046	-0.002	0.001
	(0.001)	(81.103)	(0.003)	(0.001)	(84.121)	(0.003)	(0.001)
Observations	39,147	39,147	32,875	39,147	39,147	33,551	39,147
R-squared	0.232	0.179	0.153	0.104	0.175	0.155	0.106
			Panel B: Tuition & Fee, 2003/4 2007/8				
Post * TF	0.001	-28.826	-0.002	-0.000	-32.584	-0.003	0.000
	(0.001)	(53.197)	(0.002)	(0.001)	(60.007)	(0.002)	(0.001)
Observations	39,147	39,147	32,875	39,147	39,147	33,551	39,147
R-squared	0.236	0.179	0.153	0.104	0.175	0.155	0.106
			Panel C: Total Benefits, 2003/4 2007/8				
Post * Benefits	0.001	-30.091	-0.001	-0.000	-24.334	-0.002	0.000
	(0.001)	(39.510)	(0.002)	(0.001)	(44.400)	(0.002)	(0.001)
Observations	39,147	39,147	32,875	39,147	39,147	33,551	39,147
R-squared	0.234	0.179	0.153	0.104	0.175	0.155	0.106

Note: The table presents estimated coefficients from regressions that include eligible veterans who initially enrolled in college in 2003/04 or 2007/08 and enrolled within two years of separation. Panels A – C report parameter estimates for regressions, where $Post = 1$ for those who first enrolled in college in 2007 or later. Regressions include PMOS x enlist year, enrollment year, and institution fixed effects. Standard errors are clustered at the institution level.

Table 13: Impact of the PGIB Expansion on Longer-Run Outcomes (already enrolled, civilian control)

	(1) W-2 wages	(2) Log W-2 wages	(3) Has W-2 inc.	(4) Labor income	(5) Log labor inc.	(6) Has labor inc.
			Panel A: Eligible vs. Civilian, 2003/4 2007/8			
Veteran * Post	-2,056.589***	-0.010	-0.057***	-1,678.446***	-0.009	-0.055***
	(536.766)	(0.026)	(0.007)	(584.514)	(0.026)	(0.007)
Observations	268,307	232,251	268,307	268,307	236,604	268,307
R-squared	0.088	0.059	0.022	0.085	0.059	0.022

Note: The table presents estimated coefficients from regressions that include eligible veterans who initially enrolled in college in 2003/04 or 2007/08 and enrolled within two years of separation. $Post = 1$ for those who first enrolled in college in 2007 or later. Regressions include gender and age fixed effects. Standard errors are clustered at the institution level.