Working Paper:

Marching Across Generations? An Analysis of the Benefits Transfer Provision of the Post-9/11 GI Bill

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The post-9/11 GI Bill provides a unique form of deferred compensation in which soldiers receive generous education benefits that can be transferred to a family member in exchange for additional military service. We model the transfer provision as an economic dilemma, in which the soldier weighs the intrafamily benefits of transfer against ongoing service in a hazardous profession. We provide descriptive evidence on transfer patterns and causal evidence on the impact of the transfer provision on retention within the Army. Descriptive analysis confirms predictions from our model, revealing clear socioeconomic differences in patterns of transfer: utilization rates are highest among senior service members who earn higher wages and are near or beyond pension eligibility, and lowest among low-wage junior soldiers. Leveraging variation across cohorts in eligibility for the transfer provision, we find evidence that the transfer policy had a modest stabilizing effect on Army retention, indicating some willingness of parents to extend hazardous careers in exchange for intergenerational educational benefits.

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I. Introduction

Various public and private policies encourage employees to incur additional labor in the near term for financial benefits in the future. For instance, workers may qualify for a defined-benefit (DB) pension, accumulate stock options by choosing to remain with the same firm for an extended period, or spend more time with a firm to vest their matched contributions in a retirement plan; similarly, aging workers can draw higher Social Security payments later in life by working more or delaying the timing of their initial benefits claim. From the firm perspective, deferred compensation plans reduce personnel turnover, encourage worker effort, and regulate retirement flows (Gustman, Mitchell, and Steinmeier, 1994; Lazear, 1979, 1990). From a public policy perspective, programs such as delayed social security receipt may increase labor force participation and reduce present strain on social welfare programs (Diamond and Gruber, 1999). According to the 2017 National Compensation Survey, 70% of US employees have access to employer-sponsored retirement benefits, a common form of deferred compensation. In a number of firm settings where the costs of firm-specific training and/or the risks faced by employees are high (e.g., emergency response, the military), deferred compensation programs may be particularly necessary.

For the individual, however, these benefits programs and policies pose an economic dilemma: the worker must weigh the value of the benefit against the opportunity cost of the additional time spent working—and in hazardous professions, ongoing risk of injury or death. On the one hand, these policies offer workers the opportunity to accumulate additional expected financial benefits for themselves or their families. On the other hand, such policies induce workers both to forego the benefits of other employment opportunities and to potentially take on additional hazard. Existing research across general occupations shows that workers covered by

pension plans have lower turnover rates than workers without pensions (Gustman and Steinmeier, 1993; Ippolito, 1987) and that a small but non-trivial fraction of workers delays social security benefits receipt (Coile et al, 2002; Shoven and Slavov, 2012). Studies of retention in the military confirm the prominent role of retirement benefits in stay-or-leave decisions faced by service members (Daula and Moffitt, 1995; Ausink and Wise, 1996). The literature on the role of deferred compensation in retention in hazardous occupations and the public sector more broadly, is otherwise limited.[1]

In the current paper, we examine a new form of deferred compensation introduced in the post-9/11 GI Bill that allows currently serving military service members to transfer a generous post-secondary educational benefits package to a spouse or child. A similar use of education as deferred compensation occurs in universities that seek to reduce turnover by offering free/reduced tuition to the children of staff or faculty.[2] In the setting that we study, the service member must already have at least six years of service and agree to serve four more years on active duty in order to transfer the education benefits to a family member. The transfer policy's implementation in August 2009 – near the height of US involvement in ground combat in Afghanistan and Iraq – amplifies the dilemma for service members weighing benefits transfer against continued service in a hazardous profession. We model this dilemma as a multi-period household optimization problem and test predictions from the economic model using rich administrative data that includes transfer decisions made by hundreds of thousands of US Army service members. We also estimate, using a difference-in-differences estimation strategy, whether the transfer policy led to an increase in retention for eligible soldiers with dependents

[1] Numerous authors document the positive relationship between present-time compensation – measured by wages – and hazardous work conditions. See, for instance, Garen (1988), Kniesner and Leeth (1991), Dorman and Hagstrom (1998), and Schnier, Horrace, and Felthoven (2009).

[2] See Siegfried and Getz (2006) for a discussion.

relative to a variety of comparison groups who were either ineligible for the transfer benefit or less likely to be responsive to its provisions.

Our work makes important contributions to the existing literature. First, we provide a theoretical model for individual transfer decisions and rich descriptive evidence supporting its predictions. Our model highlights the inherent tradeoffs in the transfer decision and predicts that transfer will be more likely for those with higher levels of education, more occupational experience, and lower prior hazard exposure. Our reduced form estimates support these predictions thereby providing important initial evidence on whether groups who appear to benefit more from the transfer policy utilize it at high rates, or whether information frictions and hassle costs may impede use of the policy for certain groups. Second, using plausibly exogenous variation in benefit eligibility, we present causal evidence on how deferred compensation policies that trade an intrafamily benefit for additional labor affect retention in a very large firm with hazardous employment.

Our analysis reveals that the GI Bill transfer provision is most highly utilized by senior service members who earn higher wages, have tenure near or beyond pension eligibility, and have already completed their education. Takeup rates among eligible soldiers are lowest for junior enlisted service members who earn the lowest wages and typically have completed only a high school education. We find that the transfer provision had a modest but positive retention effect for midcareer enlisted soldiers in the years immediately following program implementation, indicating some willingness of parents to extend hazardous military careers in exchange for future educational benefits for their children.

The remainder of the paper proceeds as follows. In the next section, we provide background information on the GI Bill and the military personnel system. We summarize our

economic model of benefits transfer in Section III. The next sections describe the data and present our main descriptive findings on who transfers benefits. We then detail our empirical strategy for estimating a causal retention effect in Section VI and present those results in Section VII. Finally, we interpret and discuss the results in Section VIII.

II. Background

A. The GI Bill in the American Military

The GI Bill is an education benefits program that has for decades facilitated the retraining and reintegration of American military service members into society and the workforce. Although Congress has updated the GI Bill numerous times since its inception in 1944, the focus on education and retraining has remained unchanged. The first GI Bill of Rights was signed into law as the Servicemen's Readjustment Act of 1944 by President Franklin D. Roosevelt on June 22, 1944. He assigned the Veterans Administration (VA) responsibility for implementing its key provisions: education and training, loan guaranty for homes, farms, or businesses, and unemployment pay. [3] By the time the first GI Bill ended in 1956, nearly half of the 16 million returning World War II veterans had used its educational or training benefits in some form.[4]

There have been two significant updates to the GI Bill in the four decades since the US moved to an all-volunteer force in 1973. First, in 1984, former Mississippi Congressman Gillespie V. "Sonny" Montgomery revamped the GI Bill and it has borne his last name ever since as the Montgomery GI Bill (MGIB). This program was opt-in, requiring the service member to forego $100 in monthly pay the first twelve months of active duty, and mandated

[3] The impetus for the bill was the perceived mismanagement of millions of US veterans returning home from World War I decades earlier; many received only $60 allowance and a train ticket home, with the mass of returning veterans linked to high unemployment on return from service. Nevertheless, there was intense debate in Congress about how and when to implement a program of veterans' benefits.

[4] See "Education and Training: History and Timeline," U.S. Department of Veterans Affairs website, available at www.benefits.va.gov/gibill/history.asp.

completion of continuous active duty service for at least two years in order to gain benefit eligibility. Second, under the Veterans Educational Assistance Act of 2008, or post-9/11 GI Bill (PGIB), benefits become more generous in several dimensions. Notably, the baseline benefit increased to 36 months paid tuition at the most expensive public university in the state home of record (or its monetary equivalent at a private institution) in addition to a monthly housing allowance and stipend for books and supplies. The law also extended benefits to commissioned officers for the first time. The primary objectives of the new legislation were to update benefits comprehensively in light of rising costs in higher education and to bring parity for reservist and active duty servicemember benefits. Secondary goals were to support military recruiting goals and to increase service member retention through the transfer provision.[5]

Most relevant for our analyses, as of August 1, 2009, the post-9/11 GI Bill additionally authorized all active-duty service members with six or more years of service the option to transfer educational benefits to a spouse or child. Service members are required to commit to serving four more years on active duty in order to transfer benefits. An eligible service member can transfer up to 36 months of benefits and distribute them among multiple dependent family members. To initiate transfer, the service member need only transfer at least one month of benefits[6] to one family member; he can subsequently change the recipients and distribution.

The GI Bill has been the subject of multiple academic studies given how it relates to the important topics of educational subsidy, veterans welfare, and public finance. Numerous studies of the early GI Bills have found positive effects on college enrollment or attainment for veterans,

[5] See Dortch (2012), which is a Congressional Research Service report that summarizes the debate over the framing of the new legislation, including its founding objectives, and also presents other issues related to the bill.
[6] Many service members transfer only one month of benefits to one recipient, knowing that they can re-allocate the full 36 months at a later date. The observed data therefore reflect a downward bias in the amount of benefits transferred. As a result, we focus on the extensive margin of transfer (initial transfer of any benefit) and do not address the intensive margin (how much was transferred and to whom).

see for instance: Bound and Turner (2002) and Angrist and Chen (2011). A more recent paper by Simon, Negrusa, and Warner (2010) focuses on veterans who separated after 1990 and finds small effects from the enhanced benefit levels of the MGIB relative to older bills. Barr (2015) finds that the higher level of benefits introduced with the post-9/11 GI Bill increased college enrollment of veterans by as much as 20 percent, while also encouraging more enrollments in four-year educational institutions.[7]

B. Key Features of the Military Personnel System

We briefly review several unique features of the military personnel system relevant to this study. Enlisted members serve on contracts of fixed length, typically of three or four years; when the current contract ends, the soldier must reenlist to continue serving on active duty. A soldier with an expiring contract must be in good standing in order to be eligible for reenlistment.[8] For an eligible soldier, the reenlistment opportunity window (ROW) typically opens 15 months before the end date of the current contract and closes three months before the end date of that contract (see Figure 1). The soldier must make a retention decision in this 12 month window; if he decides not to reenlist, he leaves active duty 90 days later at the contract end date.[9] Our analysis will rely on variation in the timing of ROWs relative to transfer provision implementation (August 2009) in order to estimate a policy-induced retention effect.

[7] In a non-peer reviewed technical report, Wenger et al. (2017) review and analyze the effects of some military education benefits (including the post-9/11 GI Bill) on recruiting and retention. Our empirical strategy for identifying the effects of the transfer provision on retention is similar to theirs and we find similar results. Relative to their report, we provide more theoretical motivation for the use and study of deferred compensation benefits and important reduced form empirical evidence on transfer behavior consistent with the model. These descriptive analyses highlight important disparities in transfer use across service member sub-groups, and motivate additional areas for research on information frictions and behavioral biases that may prevent higher rates of transfer.

[8] For the purpose of reenlistment eligibility, good standing with the military entails satisfactory job performance, meeting health and physical conditioning requirements, and avoiding major disciplinary infractions (such as general misconduct, drug use, or abuse of alcohol).

[9] A service member attempting to reenlist after the ROW can submit an exception to policy request through the first Colonel in the chain-of-command; the Army's Human Resources Command must then approve the request. This process is rare and occurs for less than 2 percent of the soldiers considered in this study.

Officers are appointed as lieutenants upon commissioning from either a military academy, ROTC program, or Officer Candidate School. Depending on source of commission, officers have an initial active duty service obligation ranging from three to five years (normally, with some additional time in the reserves). After that time, they may remain on active duty but typically do not have a contractual obligation to serve for a minimum amount of additional years. Nearly all officers have already finished college upon commissioning; those who have not must complete a bachelor's degree within three years in order to be competitive for promotion.

Recall that the military pension has a large influence on the retention behavior of service members. Perhaps unsurprisingly, the effect is strongest for senior service members. The current system features a cliff-vested defined benefit pension; service members only become pension eligible after 20 years of active duty service.[10] Since GI Bill transfer requires a commitment to four more years on active duty, it is useful to consider service members' willingness to serve that extra time in the absence of the benefit. We plot in Figure 2 conditional four-year continuation rates for those on active duty in the Army in 2005.[11] We are interested in the probability that a service member is still on active duty in 2009, because a hypothetical benefits transfer in 2005 would have required continued active service until at least 2009. Figure 2 shows that conditional continuation rates increase steadily (for those still on active duty) after the first contract ends, are greater than 80 percent after 10 years, and approach 100 percent as the service member nears 16 years, decreasing thereafter. The structure of the military pension system clearly influences this behavior, consistent with theories of deferred compensation and

[10] Starting in 2016, the military is phasing in a new pension system with 401(k)-like contributions for more junior service members and a smaller defined benefit for those who serve until retirement. All officers and enlisted considered in this study were subject to the all-or-nothing pension scheme described in the body of the paper.
[11] We choose 2005 for this exploration because 2005 is the last year for which conditional 4-year continuation rates would be unaffected by the new GI Bill and associated benefits transfer provision.

the research cited above. This suggests that we are unlikely to see a transfer-induced retention boost for service members with 10+ years of service, since their likelihood of continued service is already very high. We return to the discussion of retention behavior below.

III. Economic Model of the Transfer Dilemma

We model the tradeoffs inherent in benefits transfer using a simple multi-period household binary choice model in the spirit of Becker and Tomes (1986) and Acemoglu and Pischke (2001). Our household is unitary, containing one parent and one child, and it has a standard multi-period utility function. Workers can choose a college degree and earn the high wage or forego college and earn the low wage.

There are exactly three periods in the model, which starts with the service member parent eligible to transfer benefits (still on active duty, 6+ years of service, has a child). In period 1, the parent decides whether to transfer benefits or not and then either continues in the Army or starts a civilian career. In period 2, if the parent did not transfer the benefits, she may pay tuition for the child. The parent dies at the end of period 2. The household consumes in periods 1 and 2 based on the parent's wage earnings; in period 3, the child consumes wage earnings ($\widehat{w}$) based on their education. Using δ to discount utility over time, the household's expected utility is:

$$E(U) = E[u(w_1) + \delta_1 * u(\mathrm{w}_2) + \delta_2 * u(\widehat{w})] \quad (1)$$

In the model, the parent must first decide whether to transfer benefits ($x = 1$) or not ($x = 0$). If she transfers, the parent commits to staying in the Army through the end of period 1 and incurs the cost of military service (CMS). The vector $c(\boldsymbol{Z})$ that defines CMS includes years of service, career field, rank, recent deployment history, and the unobserved personal taste for service. Next, a parent who does not transfer benefits chooses to pay tuition for the child ($t = 1$) or not ($t = 0$) in period 2. The tuition cost is T. Finally, the uneducated parent chooses to use

the GI Bill benefit ($e = 1$) or not ($e = 0$) for herself. The key economic tradeoff in our model is the parent incurring the CMS (i.e., additional active duty time) in order to transfers benefits to the child versus providing a college education for the child without having to pay tuition (T). We consider college-educated versus non-college-educated parents separately since the uneducated parent must also decide whether or not to use the GI Bill education benefit herself.

For simplicity, we present the model and its solution for the educated parent, who has completed college and will earn the high wage. For binary transfer (x) and tuition (t) choices, the parent faces:

$$\max_{\substack{x=0,1 \\ t=0,1|x=0}} E_{ed} \begin{Bmatrix} u(w_h) + \delta_1 * u(w_h) + \delta_2 * u(w_l), \\ u(w_h) + \delta_1 * u(w_h - T) + \delta_2 * u(w_h), \\ u(w_h) - c(\boldsymbol{Z}) + \delta_1 * u(w_h) + \delta_2 * u(w_h) \end{Bmatrix} \tag{2}$$

Solving the model, the parent will transfer benefits only when the following conditions hold:

$$-c(\boldsymbol{Z}) + \delta_2 * (u(w_h) - u(w_l)) > 0 \tag{2.1}$$

$$-c(\boldsymbol{Z}) + \delta_1 * u(w_h) > \delta_1 * u(w_h - T) \tag{2.2}$$

The first condition requires that the discounted present value of the college premium for the child is higher than the cost of military service, and the second requires that the parent prefers to pay for the child's education with continued military service rather than out-of-pocket tuition.

The transfer decision is more complicated for the uneducated parent because she must also consider own use of the benefit. This model version requires us to construct and solve two additional utility sequences as in (2) and the solution suggests that the parent may well forego transfer in order to use the education benefit and increase own wage earnings in period 2.[12]

Our model generates straightforward and intuitive predictions about patterns of benefits transfer. First, less educated parents are less likely to transfer benefits since there are additional

[12] Full exposition of the model and transfer conditions for the uneducated parent are available on request.

reasons (like increasing own wage earnings in period 2) why transfer might not occur. Second, parents with a higher cost of military service are less likely to transfer benefits, regardless of education level. While we cannot fully characterize these costs, we predict – based on the compensation structure and requirements of the military – that benefits transfer is more likely for parents with higher rank, more years of service, and less-intense deployment experiences. We provide reduced form descriptive evidence on these predictions later in the paper.

IV. Data

The principle data for this project comes from four sources. First, the enlisted and officer master files, provided by the US Army's Office of Economic and Manpower Analysis, contain rich soldier-level demographic, financial, and occupational data from entry into the service through subsequent military assignment. Second, the Army pay file contains information on receipt of hazardous fire pay, which allows us to observe how many months each year the service member served on a combat tour. Third, we have information on military families from the Defense Enrollment Elibility Reporting System (DEERS). The DEERS data are annual snapshots and include the date of marriage to a spouse and number of children by age range. Fourth, we have data on individual service member benefits transfer, including the date of initial benefits transfer from the Veteran's Administration (VA). Combining these data sources at the level of service member by year, we have an annual panel that depicts the details and timing of military career events, family size, and GI Bill benefits transfer (if applicable) for more than 1 million active-duty Army service members.

In the analysis that follows, we classify all service members, whether enlisted or officer, by cohort of initial eligibility to transfer benefits (i.e., 2009-2015). As depicted in Figure 3, many service members in the first eligibility cohort (2009) are either high-ranking officers or

senior enlisted soldiers who had exceeded the six years of service required for eligibility on August 1, 2009. Subsequent cohorts are much smaller and also more junior in their military tenure. In these subsequent cohorts, midcareer and junior enlisted soldiers account for more than 75 percent of the service members gaining transfer eligibility.[13]

In Table 1, we compare eligibility cohort 2009 to the smaller cohorts that followed. We treat the former as standalone because of its size and uniqueness and also focus on cohort 2012 because it is representative of the smaller and younger cohorts that followed. Summary statistics in Table 1 show that the 2009 cohort is different both from the pooled 2010-2015 cohort group and 2012 as a standalone. Panel A reveals that those in the initial cohort are much more likely to have already served 10 years or more, have higher levels of education, and are more likely to have high-school-aged children. The initial eligibility group has also transferred benefits at much higher rates (Panel B); the marginal annual transfer rates for the 2009 cohort are nearly twice those of the 2012 cohort for every year of comparison. The marginal annual transfer rate is the percentage of eligible cohort members in that year who transferred benefits. To be eligible for transfer, the service member must still be on active duty and have not yet transferred benefits.

V. Descriptive Results

We test predictions from our simple analysis of the benefits transfer dilemma by examining detailed summary statistics of transfers made by the 2009 and 2012 eligibility cohorts.[14] Descriptive analysis confirms many of our predictions. Figure 4 shows that officers from the 2009 cohort have cumulative and marginal transfer rates that are strictly higher than enlisted

[13] Throughout the analysis, we collapse military rank into five broad categories. Senior officers are in the rank of major (O-4) or above and have 10 or more years of service as commissioned officers. Junior officers are lieutenants (O-1/O-2) and captains (O-3). Senior enlisted are high-ranking sergeants (E-7 and above) with typically 15+ years of service. Middle enlisted are junior sergeants (E-5/E-6). Junior enlisted are soldiers in the rank of E-1 to E-4.
[14] We focus our main text discussion to eligibility cohort 2009; descriptive analysis of the transfer behavior of eligibility cohort 2012 shows similar patterns. See Appendix A for more details.

members.[15] By the end of 2015, more than 33,000 officers out of 54,037 from cohort 2009 had transferred benefits (greater than 60 percent. Transfer rates for enlisted members are significantly lower: by the end of 2015, about 54,000 out of more than 140,000 initially eligible had transferred benefits (39 percent).

The decision to transfer benefits is strongly related to the education level and time in service of the parent. More educated parents – whether officer or enlisted – are more likely to transfer benefits, as shown in Panel A of Figure 5. By 2015, nearly 70 percent of eligible individuals with college degrees had transferred benefits whereas only 30 percent of those with only a high school education had transferred benefits. Panel B of Figure 5 shows that transfer likelihood increases with time in service. More than 50 percent of eligible service members with 10+ years of service upon gaining eligibility had transferred benefits by 2015; fewer than 30 percent of those with less than 10 years had transferred in that same time period. This pattern is nearly identical for transfer rates by level of military rank (results not shown).[16] Taking these results together, it is easy to see that there are clear differences in transfer behavior by socioeconomic status: eligible parents who are higher SES are more likely to transfer benefits. For instance, a representative senior officer is a lieutenant colonel with 19 years of service, a graduate education, and wages in 2010 of nearly $8000 per month; his likelihood of transfer if eligible was 25 percent in 2010. In contrast, a typical middle enlisted soldier is a sergeant with 8

[15] We plot marginal transfer rates in Figures 4 and 5 rather than empirical survivor functions (of the option to transfer) because service members who leave active duty forfeit the ability to transfer GI Bill benefits to a family member. Many eligible individuals leave without transferring benefits; for example, more than half of the enlisted service members from the 2009 eligibility cohort with only a high school education left the service before 2015 without transferring benefits. We address this topic again in the final section of the paper.

[16] The "up-or-out" promotion system in the military influences the strong correlation between rank and time in service; those who continue to serve must be promoted at certain intervals which forces rank and tenure to move in near concurrence.

years of service, high school education, and wages in 2010 of about $2800 per month; his likelihood of transfer was about 6 percent.[17]

The noticeable kinks in marginal transfer rates in 2013 that appear in Figures 4 and 5 are due to a policy change enacted that year affecting the senior service members typical of the 2009 cohort. Prior to 2013, service members who were very close to or beyond 20 years (pension eligibility) could transfer GI Bill benefits without incurring the full four-year service requirement. The 2013 policy change mandated a four-year contract for every transfer, regardless of time in service, but the policy was well publicized before the change date (August 1, 2013).[18] Thus, there was a predictable surge during 2013 in "free" transfers by senior officers and enlisted who had not yet transferred benefits. We discuss the implications of this unusual spike in transfers in the final section of the paper.

There are some additional insights that emerge from the initial descriptive analysis. First, we find differences in transfer behavior related to observed family structure (recall that our model assumes a unitary household with only one parent and one child). There are actually some educational transfers – to a spouse – when no children are present. However, this occurrence is uncommon and we observe that transfer is much more likely to occur when there is even one child in the family. Transfer is also more likely when the military parent has more than one child. Age of the child also appears to be important in the decision making process: transfer is far more likely when the parent has a child who is between the ages 14-17, where the higher educational expenses facing the family are likely to be more salient. Finally, one prediction from

[17] The wages reported in this example are only military base pay; service members also receive a housing allowance, family health care plan, and other benefits that markedly increase total compensation.
[18] See for instance, "Change to Army Post-9/11 GI Bill transfer policy takes effect Aug 1," US Army Official Website, July 8, 2013, www.army.mil, or "Troops nearing retirement can't transfer GI Bill benefits without giving 4 more years," Stars and Stripes Newspaper, June 25, 2013, www.stripes.com.

the economic tradeoffs discussion is not supported by the data: we find only small differences in transfer behavior based on recent deployment history.[19] One plausible explanation for the non-finding here is that there are differences in (unobservable) taste for military service for individuals with repeated deployments relative to other soldiers and that these differences influence the decision to transfer benefits and incur additional service.

To complete the descriptive analysis, we run linear regressions that analyze transfer behavior for the 2009 and 2012 cohorts – these results appear in Table 2.[20] The binary outcome in the regressions is whether the service member made an initial benefits transfer within some specified time period. We see confirmation in Table 2 of many model predictions and trends revealed in the preceding graphical analysis. First, there is a strong association between transfer likelihood and being a senior service member. This relationship is most evident in column 1, which considers transfers made by the 2009 cohort within that group's first three years of eligibility.[21] Conditional on education, service characteristics and family structure, senior personnel – whether officer and enlisted – are 20 percentage points (pp) more likely to transfer benefits than junior enlisted personnel, whose baseline transfer rate is approximately 15 percent. This strong result holds across cohorts and time horizons for all regressions in Table 2. Having a college education or graduate degree is also strongly associated with transfer: this is the main source of differential behavior for senior officers versus senior enlisted.[22] For instance, among the 2009 cohort, those with a graduate degree are 17 pp more likely to transfer within 3 years

[19] We measure recent deployment history by the number of months receiving hostile fire pay in the last 3 years. For the 2009 eligibility cohort, the mean value is 7.4 months (out of 36) upon gaining transfer eligibility.
[20] Results are similar for survival model specifications, wherein the hazard event is the parent's initial transfer of benefits.
[21] Given the unprecedented nature of the transfer provision (and the potential information problems near implementation), it is practical to consider at least some transfer time horizons longer than one year. As such, we use 3-yr time horizons for the transfer regressions that appear in columns 1 and 4 of Table 2.

than soldiers with just a high school education. Tenure in the military is another prominent predictor of transfer, with transfer likelihood increasing by 0.5 to 1 pp for every additional year on active duty. Unsurprisingly, the coefficients on both senior enlisted and senior officer are large and statistically significant for transfers in the year 2013 (columns 3 and 5 in Table 2), when many high-ranking service members made "free" benefits transfers just ahead of the policy change already discussed. Finally, we observe that having a high-school-aged child increases the likelihood of benefits transfer. For cohort 2009 across the first 3 years (column 1), the magnitude of the increased transfer likelihood is approximately 10 pp. Having a high-school-aged child is likewise a positive and significant predictor of benefits transfer in the other regressions that appear in Table 2 (columns 2-5).

VI. Empirical Strategy for Retention Analysis

A. The Causal Inference Challenge

In the remainder of the paper, we estimate the effects of the transfer provision on military retention. Since officers do not typically serve on contracts once they have fulfilled the commissioning obligation, we focus this analysis on enlisted service members. Identifying the causal impact of the transfer provision is challenging in the first order because of its universal rollout in August 2009. Moreover, many of the soldiers who became eligible for transfer at policy implementation would have chosen to stay in the Army anyways. This is particularly true for the 2009 cohort – which accounts for nearly 75 percent of the total transfers made as of late 2015 and contains many senior service members who were very near or had already attained pension eligibility. As we show in Figure 2, senior service members with 10-16 years of service are highly likely to serve four or more years in order to qualify for the Army pension.

These points raise the question of which soldiers' retention decisions were likely to be affected by the introduction of the transfer provision. As noted, the existing all-or-nothing pension system leads senior service members to a nearly inelastic labor supply as they approach 20 years. At the other end of the career spectrum, first-term soldiers have the lowest retention rates – and so potentially could be influenced to stay by the right incentive – yet these soldiers are not even eligible for the transfer program until they have both started families and reached 6 years of service. It is unlikely that a single soldier would be influenced by benefits transfer given the hazard risk entailed by continued military service in this time period (repeated combat deployments to Afghanistan and Iraq) and the uncertainty of future family formation. Furthermore, for a new soldier on a typical initial contract of 3 or 4 years, he must make a first reenlistment (usually 3 to 5 more years) just to remain on active duty through the 6 year mark. As this second term is expiring, he is typically at 6-9 years of service and potentially influenced by the transfer provision to reenlist again. It is precisely at this near-midcareer juncture where we expect to detect a transfer-related retention effect, if at all.

B. Sample

We mark eligible enlisted soldiers by the last month of their reenlistment opportunity window, or ROW end month (which is three months prior to the end of the current contract, as depicted in Figure 1). Based on established reenlistment procedures, the ROW end month is the deadline by which an eligible soldier must decide whether or not to reenlist. The years 2008-2011 are the focus of this analysis since the benefits transfer provision was implemented in the middle of this time period. The sample consists of 308,223 reenlistment-eligible Army soldiers in 48 ROW end months, from January 2008 thru December 2011.

Summary statistics for the reenlistment-eligible sample appear in Table 3. In Panel A, we present demographic and Army career characteristics; eligible soldiers who have children are slightly older and more senior both in rank and years of service than service members who do not. Panel B shows mean reenlistment rates by family type and years of service band. Eligible service members with 3-5 years of service and no dependents are 55 percent likely to reenlist. Contrastingly, those who are 10+ years of service and have a child are 95 percent likely to reenlist, also with no difference before and after the transfer policy implementation. In between these extreme values, we note that reenlistment likelihood increases monotonically both in family composition and years of service.

C. Difference-in-Differences

To address the challenges articulated above and attempt to identify a causal retention effect, we adopt a difference-in-differences framework. We compare the change in retention behavior of service members with a child between eligible and ineligible cohorts versus the concurrent changes for soldiers with no dependents between eligible and ineligible cohorts in order to isolate the effects of the GI Bill transfer provision.

Specifically, we estimate the following model:

$$R_{it} = \alpha + \varphi * post_t + \theta * children_i + \gamma * post_t * children_i + X_{it} * \beta + \tau_t + \varepsilon_{it} \quad (3)$$

In equation (1), R_{it} takes the value 1 if soldier i reenlists when facing a retention-related decision at time t. $post_t$ is an indicator variable for facing a decision after August 1, 2009, and $children_i$ is an indicator variable for whether the service member had a child (or multiple children) at the time of the retention decision. X_{it} is a vector of control variables with information on the service member (including aptitude, education level, career field, etc.) and τ_t are calendar month fixed effects that account for cyclicality in retention. γ is the DD parameter that measures the change

in retention for service members with at least one child who faced a retention decision after GI Bill transfer became an option. The identifying assumptions in this model are: 1) that the implementation date of the GI Bill transfer provision is unrelated to the timing of the service member's retention decision, and 2) that service members without dependents capture what the trends in retention would have been for service members with a child over the time period of our analysis, in the absence of the transfer provision (parallel trends). In all specifications, we compute robust standard errors.

To address the first DD assumption, we examine the timing of the policy implementation relative to densities by family type (single soldier versus soldier with dependents) to see whether individuals might have manipulated the timing of their contract end dates in response to the policy implementation date. We see no discernible shift in these densities around the time of GI Bill transfer implementation (see Figure A1 in the Appendix), indicating that soldiers did not manipulate their contract end dates to be on the other side of program implementation.

The second DD assumption requires that single soldiers are an appropriate comparison control group for soldiers with a child. While the two groups are clearly different, this assumption requires that their retention behaviors trend similarly. In Figure 6, we see that the reenlistment rates for the two groups move together over time prior to the policy implementation, with the reenlistment rate for those with a child always higher but following parallel trends.

Finally, consistent with the reasoning at the beginning of this section, we compare DD estimates for groups of soldiers at different points in their careers – expecting to observe results for midcareer soldiers, if at all. Accordingly, we differentiate among subgroups of reenlistment-

eligible service members with 3-5 years of service (no effect expected), 6-9 years of service (potentially an effect), and 10+ years of service (no effect expected).[23]

VII. Results for Retention Analysis

A. Main Results

In Panel A of Figure 6, which pools all soldiers by years of service, we observe parallel reenlistment trends for soldiers with a child versus single soldiers but no visible change in that trend difference after policy implementation. However, for the subset of soldiers in the 6-9 years of service range (Panel B), we see graphical evidence that the introduction of the transfer provision may have stabilized retention.[24] Specifically, the retention rates for single soldiers dipped in the years 2010-2011 while there was no such decline for soldiers with a child. The transfer provision appears to have incentivized midcareer soldiers with children to remain in the service during this time when those without children were more likely to get out.

Table 4 presents regression estimates of equation (3) that confirm the graphical trends observed in Figure 6. As expected, we see no retention effect for the 3-5 years or 10+ years of service groups; the coefficient estimates for these populations are statistically insignificant (columns 2 and 4). However, a midcareer military parent facing a retention decision after transfer provision implementation is 1.80 percentage points more likely to reenlist on a baseline of 70 pp (column 3). The stability of these results to the inclusion of individual characteristics

[23] This approach is suggestive of a triple-difference (DDD) methodology. For ease of exposition and to enable comparisons by career point, we present our model and the associated results as difference-in-differences (DD) – as in equation (3) – but we run separate regressions by years of service band. See Table 3.

[24] In both plots that appear in Figure 6, we adjust the monthly reenlistment rates for seasonality by controlling for calendar month fixed effects. In the raw plots, the seasonality is most pronounced for eligible cohorts with ROW end month in July, which is 90 days prior to the start of the new fiscal year and the associated release of funding for retention. Importantly, that seasonality impacts both the treatment and control groups both before and after policy implementation. The calendar month fixed effects also appear in the regression analysis that follows. We gratefully acknowledge author conversations with Deputy Chief of Staff of the Army, G-1 (Personnel), and especially MAJ Brian Miller's assistance, in understanding the cause of the reenlistment trends.

(demographics, military career, education, and calendar month fixed effects) increases our confidence in the estimates. This regression result also matches what we observe in the reenlistment rates graph in Figure 6 and in comparisons of group reenlistment means in Panel B of Table 3. Thus, we see evidence of a stabilizing effect on retention for midcareer enlisted members with at least one child. Since more than 70 percent of the eligible soldiers in the 6-9 years group choose to reenlist, this 2 pp retention increase is, however, a modest result - approximately a 3 percent increase relative to baseline. Nonetheless, this finding provides evidence that the deferred compensation inherent in the benefits transfer provision has the expected effect of reducing personnel turnover.

B. Robustness Checks

The decision in equation (3) to compare service members with a child against those with no dependents excludes service members who have a spouse but no children at the time of the reenlistment decision. As a robustness exercise, we re-estimate equation (3) for the 6-9 years group but using the full reenlistment-eligible sample, so that we now include the soldiers with a spouse but no children. There is a question, however, of how to classify this soldier-family type with respect to treatment status. Since a service member can transfer benefits to a spouse, we reframe the specification in (3) so that the treatment condition is having any *dependent* (spouse or child); accordingly, the spouse-only soldiers are in the treatment group.[25] In this case, the difference-in-differences parameter is very close to the original estimate: 1.70 pp. This regression result appears in column 3 of Table 5.

[25] When we use the DD model exactly as specified in (1), the spouse-only soldiers are in the control group (because the treatment condition is having a child). The results from adding these soldiers to the control group are as expected: the DD coefficient is smaller (0.8 pp) and only marginally significant. See column 2 of Table 5.

Another possible concern with our DD specification lies in how we define the indicator variable $post_t$, which we define based on the timing of the soldier's reenlistment opportunity window (ROW) relative to program implementation (for $post_t = 1$, the ROW ends after August 1, 2009). Figure 1 shows that a soldier who does not reenlist during the 12-month ROW stays on active duty for 90 days before the contract ends. In our study, soldiers whose ROW ends in the summer of 2009 comprise a margin of interest because their ROW expires just prior to program implementation yet they remain on active duty through program implementation. Recall that there is an administrative process for such a soldier to request an exception to policy and reenlist during the final 90 days of the current contract, but this occurrence is rare. We find that about 1.5 percent of our sample from the summer 2009 population reenlist "late" in this manner; these individuals cross over from *before* status to *after* status. In the 6-9 years eligible population, there are 88 such individuals out of more than 5600 soldiers across ROW end cohorts June 2009, July 2009, and August 2009. Our main retention results are robust to excluding these 88 service members from the analysis (1.77 pp, SE=0.602, p=0.003, full results not shown).

Next, to explore more rigorously that separating timeframe, we consider cutoffs other than August 1, 2009, that might define before-and-after timeframes for the DD estimation. Even though service members could not transfer benefits prior to August 2009, it could be that *anticipation* of program implementation also affected behavior, like service member retention. To explore this possibility, we present in Figure 7 Google search trends by month for the phrase "GI Bill transfer." The vertical axis measures search intensity and shows that the top value, indexed to 100, occurs in July 2013, just before the policy change affecting senior members who had not yet transferred benefits. August 2009 – the implementation date for benefits transfer – shows the next highest index value at 88. However, there is also a noticeable spike in the early

summer leading up to August 2009 (seen by index 62 in May 2009). Thus, we consider May 2009 as a potential treatment cutoff date. When we re-estimate equation (3) with May 2009 as the cutoff date, the transfer-induced retention effect is 1.27 pp, as seen in column 4 of Table 5. This result is similar to that with August 2009 as the cutoff date but smaller, suggesting that anticipation of program implementation did not play a large role in retention decisions.

As a final robustness check, we add monthly data on two important macro factors that might affect the individual soldier's retention decision – the U.S. unemployment rate and the total number of U.S. troops deployed in Iraq and Afghanistan. In our sample period, the unemployment rate ranged from 4.9 percent to 10 percent while the total troop deployment number spanned 95,000 to 182,000. Although these factors are presumably unrelated to the timing of transfer provision implementation, we add these data as a robustness check because they are potentially relevant to the individual's stay-or-leave calculus. Our estimate for the retention effect is robust to inclusion of these controls: the DD retention effect is 1.99 pp ($p=0.001$), as shown in column 5 of Table 5. While the troop deployment number is not a significant predictor, the unemployment rate results are statistically significant and intuitive: reenlistment for soldiers with 6-9 years of service is 1.3 pp more likely for each percentage point increase in the unemployment rate. Our preferred specification uses August 2009 as the treatment boundary date and provides the 2 pp retention effect using all covariates.

VIII. Discussion

In this paper, we examine a provision of the post-9/11 GI Bill that allows service members to transfer generous education benefits to a family member in exchange for continued service on active duty. GI Bill transfer is both a complex economic decision for the service member as well

as a potentially influential means of deferred compensation that encourages employees with firm-specific experience and skills to provide ongoing labor.

Our analysis reveals clear socioeconomic differences in likelihood of benefit usage, with takeup rates highest among senior service members who: earn higher wages, are near or beyond pension eligibility, and have already completed their education. These descriptive findings align with predictions from our economic model of benefits transfer. We also find that the transfer provision had a modest stabilizing effect on Army retention in the years immediately following program implementation, in spite of generally low takeup and possible information frictions that could have limited visibility of the transfer provision.

At the heart of this paper is the question of how individuals resolve the tradeoff between securing intrafamily education benefits and providing continued labor in a hazardous profession. We see that higher-earning, more-educated parents are more likely to transfer benefits, even though the program has the potential to change intergenerational trajectories for other families in which one or both parents have only basic education and lower earnings potential. This outcome resonates with findings from other studies (Bertrand, Mullainathan, and Shafir, 2004; Currie, 2006) in which those who might benefit most from a program are often least likely to participate.

Even for the higher-earning populations that are most likely to transfer benefits, there is still evidence of a real dilemma. The spike in "free" benefits transfer in 2013 bears out this point. Recall that senior service members who had not yet transferred benefits rushed to make use of the provision before August 2013 in order to avoid incurring the extra four-year service obligation. This result shows that while the education benefits package is undoubtedly valuable, it does not provide unlimited utility to the household (otherwise senior personnel would have been indifferent about taking it up in 2012 or 2014). Second, the mass transfers in 2013 are a

tangible reminder of the significant costs of military service, particularly as experienced soldiers considered the prospect of four more years on active duty when there were still regular deployments to the wars in Afghanistan and Iraq.

Another important dimension of this work lies in the size and policy relevance of the group that has faced or will face the transfer dilemma. In the Army alone, nearly 200,000 parents gained immediate transfer eligibility in 2009, with about 30,000 newly eligible per year thereafter (as shown in Table 1). Accordingly, by the year 2020, nearly 500,000 soldier-parents will have faced the benefits transfer decision. This figure exceeds 1 million if we also consider the other service branches (Air Force, Navy, Marines). Thus, the transfer provision has clear policy relevance in the manning and future sustainability of the current volunteer military, and more generally, for an important segment of the US adult population.

There are several topics for future research that emerge from our analysis. First, another potential source of differential transfer behavior by socioeconomic status – left unexplored in the current paper – could relate to information problems. Researchers have noted that a lack of visibility of opportunities likely constrains participation both in higher education (Castleman, 2015; Hoxby and Turner, 2015) and in social benefits programs (Bhargava and Manoli, 2015). In the current setting, some service members might not appreciate the benefits (and costs) of college and so might not be making optimal intergenerational decisions; at the extreme, some might not even know about the option to transfer benefits. It could be that the most junior and lowest-educated service members – who transfer benefits at the lowest rates – are disproportionately affected by informational barriers, although it could also be that these soldiers are simply retaining the educational benefits for their own use and/or are not willing to take on the additional workplace hazard.

Second, the transfer provision could have measureable impacts on educational attainment for military children and even intergenerational mobility within military families. A meaningful number of benefits transfers were made by midcareer or senior enlisted with only high school educational attainment (and that educational demographic is increasingly more represented in the newer eligibility cohorts). Such service members are transferring a generous education benefits package that should make college completion more likely for their dependents. These dependents might thereby attain an educational level that at least one parent never did. As such, GI Bill transferability could significantly impact intergenerational educational mobility. Moreover, given the classroom and behavioral challenges faced by military children due to parental absence (Lyle, 2006) and frequent military moves (Chandra et al, 2010), transferrable education benefits could have an equalizing effect for these children while providing an important compensating wage differential for their military parents.

A related question concerns cost-benefit analysis (CBA) of the benefits transfer provision, which has important ramifications for defense and broader public policy. Both the benefits and costs sides of this calculation would clearly be heavily impacted by dependent use of the GI benefits to pursue postsecondary education, and their success outcomes conditional on doing so. We are currently in the process of obtaining dependent-level college enrollment data for the cohorts included in this paper. A future paper will both investigate causal impacts of the transfer policy on intergenerational educational attainment, and will provide a cost-benefit analysis of the transfer provision.

Finally, it remains an open question whether and to what extent the findings from this paper might generalize to civilian settings. As noted above, the use of education benefits as deferred compensation already occurs in some university settings. Additionally, and similar to

the military, professions like emergency response invest heavily in firm-specific training and unavoidably subject their employees to frequent hazard. It is reasonable to expect that these professions may at times experience retention challenges. Transferrable educational benefits like those from the GI Bill might be a fruitful form of deferred compensation that results in decreased personnel turnover overall or more selective retention targeting to personnel most likely to respond to these benefits. This is another topic worthy of future research.

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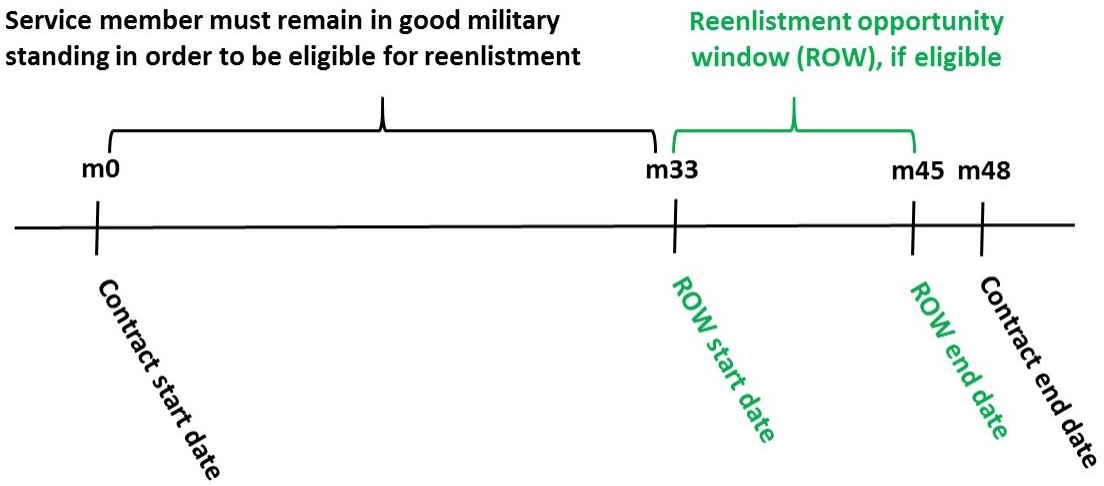
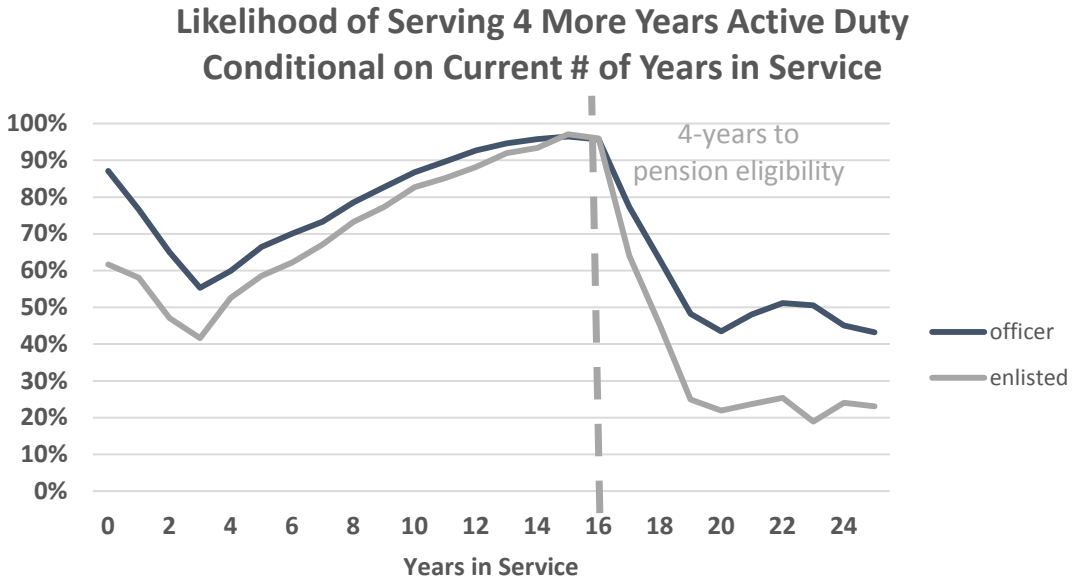
Figure 1: Sample Timeline for Military Enlistment Contract



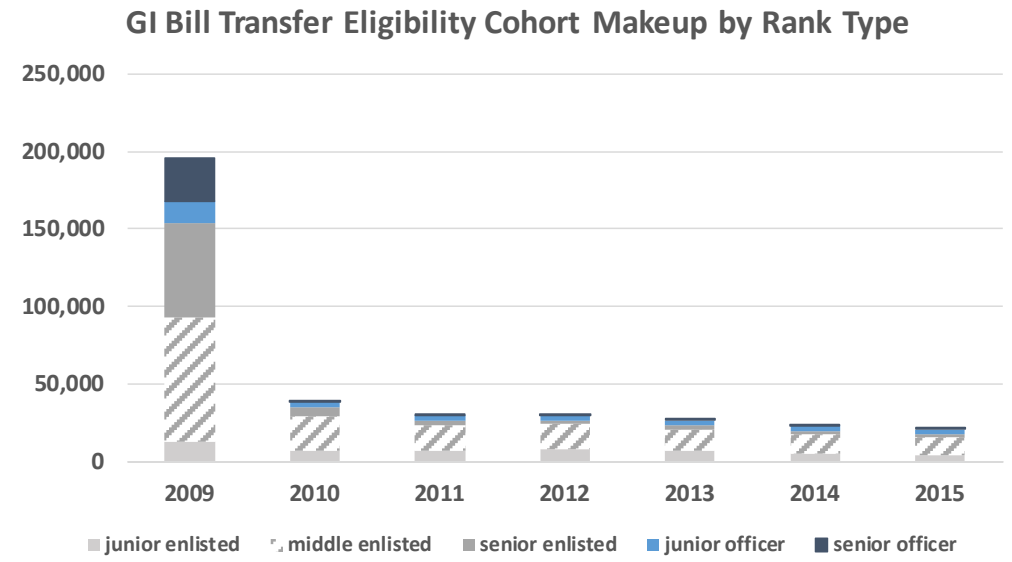
Note: Time is measured in months (m). Timeline is for a typical 4-year enlistment contract.

Figure 2: Conditional Continuation in the Active Duty US Army



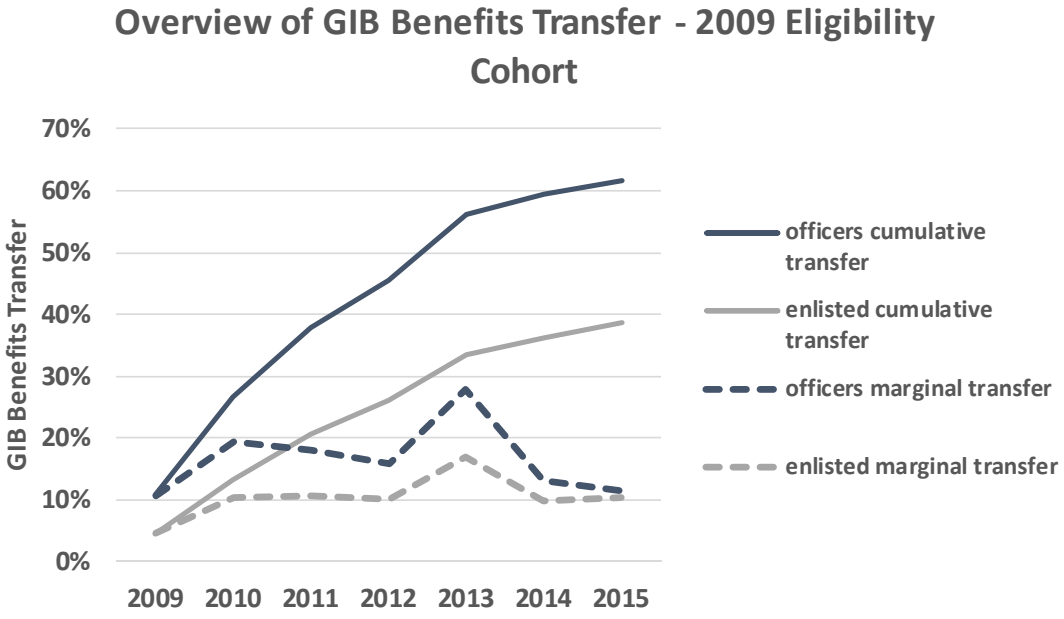
Note: Authors' calculations, data provided by Office of Economic and Manpower Analysis. We measure the probability of serving on active duty thru 2009 conditional on having served x number years by 2005. Results show that individuals near pension eligibility (i.e. – 12 to 19 years of service) are likely to serve four more years. We exclude officers and soldiers who left active duty between 2005-2008 due to death or disability. Sample includes all active duty US Army with 0-25 years of service as of 2005, n=532,934.

Figure 3: GI Bill Eligibility Cohort Makeup by Rank Type



Note: DoD data. We assign individuals to year cohorts based on when they first gained eligibility to transfer GI Bill benefits (6+ years active duty, has a dependent who can be the recipient). The large size of the 2009 cohort is due to policy implementation that year and the grandfathering in of senior personnel who were easily eligible for benefit.

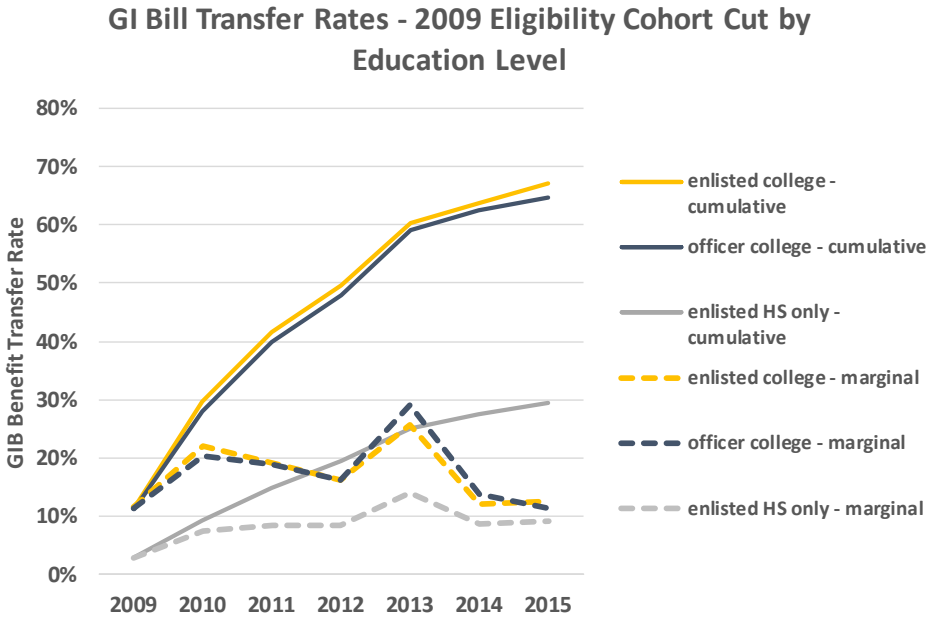
Figure 4: Overview of GI Bill Benefits Transfer – 2009 Eligibility Cohort



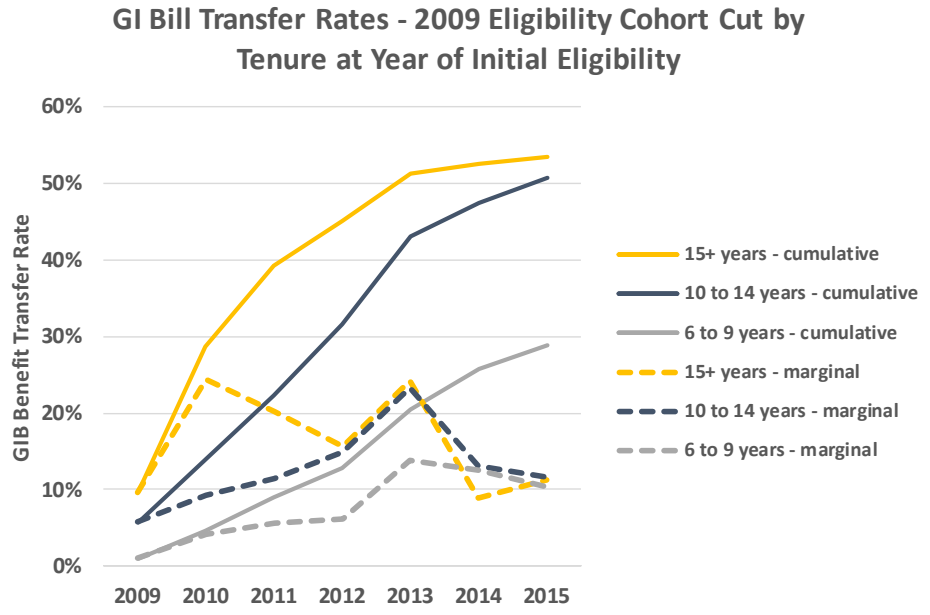
Note: DoD data. Graph tracks initial transfer of benefit by year. Cumulative rates are based on the whole eligibility cohort; marginal rates are based on cohort members who were eligible and had not yet transferred as of that year.

Figure 5: GI Bill Transfer Rates – 2009 Eligibility Cohort

A. Education Level



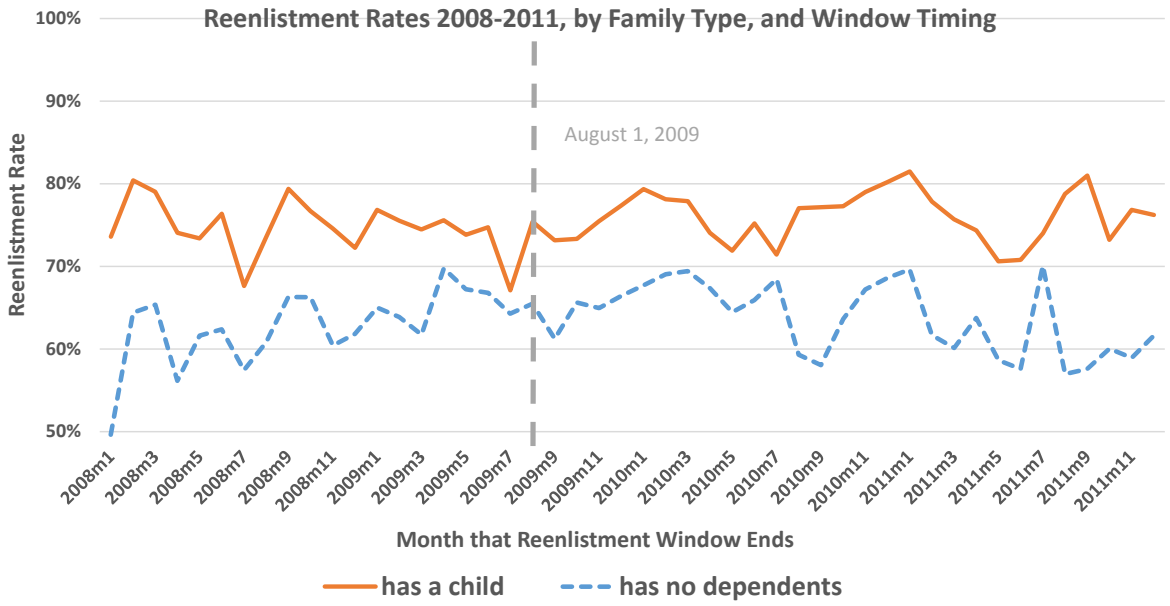
B. Tenure in the Military



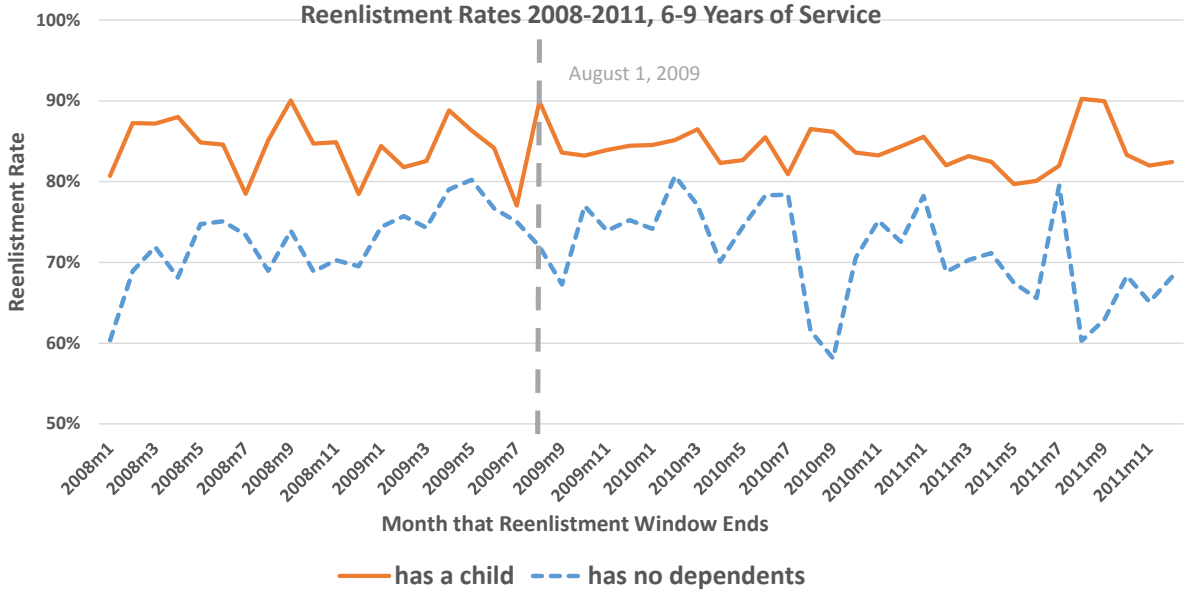
Note: DoD data. Graphs track initial transfer of benefit. Cumulative rates are based on the whole eligibility cohort; marginal rates are based on cohort members who were eligible and had not yet transferred as of that year. In Panel B, tenure in the military is measured at year of initial eligibility (2009).

Figure 6: Reenlistment Rates by Family Type for Eligible US Army Enlisted, 2008-2011

A. All Personnel, Grouped by Timing of Reenlistment Opportunity Window (ROW)

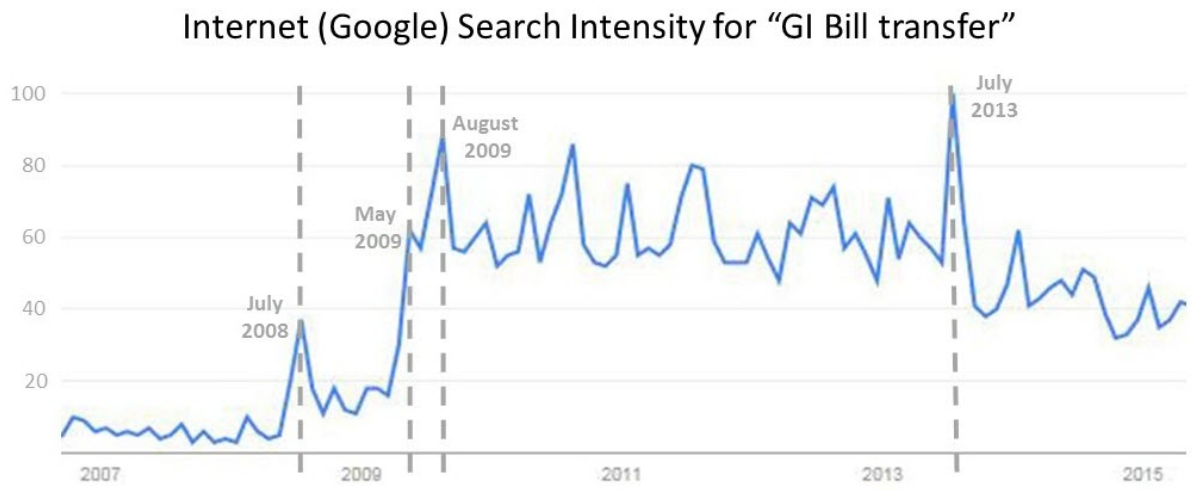


B. Eligible Personnel with 6-9 Years of Service, Grouped by Timing of ROW



Note: DoD data. Reenlistment is a binary choice. We assign individuals to a reenlistment decision month – the horizontal axis – based on the final month of the reenlistment opportunity window (ROW). The dashed gray line marks transfer policy implementation. Panel A documents more than 240,000 reenlistment decisions made by soldiers across different career points (i.e. – years of service); Panel B more than 79,000 such decisions made by midcareer soldiers. Monthly reenlistment rates are adjusted for seasonality, as described in the text.

Figure 7: Search Intensity by Month for Transfer Provision of the GI Bill



Note: Figure reports Internet search intensity on google.com for the phrase "GI Bill transfer" by month from 2007-2015. Intensity is measured by an index appearing on the vertical axis, where the maximum intensity (indexed to 100) occurred in July 2013, just before the policy change affecting benefit transfer by senior service members. Values for all other months are relative to the intensity recorded in July 2013. For instance, in August 2009, when transfer implementation occurred, the search intensity index was 88. This value is nearly 90 percent of the July 2013 value. Source: www.google.com/trends.

Table 1: Summary Statistics for Transfer-Eligible Cohorts

	2009 elig cohort		2010-2015 cohorts		2012 elig cohort	
Panel A. Demographics and Career Information Upon Gaining Transfer Eligibility						
	mean	SD	mean	SD	mean	SD
n	195,365	n/a	173,979	n/a	30,586	n/a
senior officer	0.140	(0.346)	0.029	(0.169)	0.026	(0.160)
junior officer	0.073	(0.260)	0.120	(0.325)	0.113	(0.317)
senior enlisted	0.310	(0.462)	0.098	(0.297)	0.076	(0.266)
middle enlisted	0.412	(0.492)	0.533	(0.499)	0.520	(0.500)
junior enlisted	0.066	(0.248)	0.220	(0.414)	0.264	(0.441)
graduate degree	0.129	(0.335)	0.051	(0.220)	0.044	(0.205)
college degree	0.145	(0.352)	0.135	(0.342)	0.122	(0.327)
some college	0.234	(0.423)	0.174	(0.379)	0.160	(0.366)
high school only	0.479	(0.500)	0.631	(0.483)	0.667	(0.471)
20+ years service	0.159	(0.366)	0.024	(0.154)	0.016	(0.127)
15-19 years service	0.222	(0.416)	0.042	(0.202)	0.032	(0.176)
10-14 years service	0.274	(0.446)	0.089	(0.285)	0.070	(0.256)
6-9 years service	0.344	(0.475)	0.841	(0.366)	0.880	(0.325)
age	35.7	(6.76)	30.2	(5.47)	29.8	(5.23)
3+ children	0.254	(0.435)	0.159	(0.366)	0.156	(0.363)
2 children	0.312	(0.463)	0.237	(0.425)	0.237	(0.425)
1 child	0.238	(0.426)	0.279	(0.448)	0.283	(0.451)
no children	0.195	(0.396)	0.325	(0.468)	0.324	(0.468)
oldest child 14-17 yo	0.249	(0.433)	0.083	(0.276)	0.073	(0.260)
combat specialty	0.234	(0.423)	0.233	(0.423)	0.256	(0.436)
logistics specialty	0.429	(0.495)	0.479	(0.500)	0.457	(0.498)
other specialty	0.337	(0.473)	0.288	(0.453)	0.287	(0.452)
# mos depl last 3 years	7.40	(6.51)	6.87	(5.89)	7.98	(5.96)
Panel B. Annual Transfer Behavior						
	# xfer	xfer rate	# xfer	xfer rate	# xfer	xfer rate
year 1	12,203	0.062	7,305	0.043	913	0.031
year 2	21,092	0.129	7,364	0.058	1,695	0.066
year 3	16,412	0.127	5,595	0.067	1,020	0.055
year 4	11,849	0.116	4,416	0.086	907	0.064
year 5	15,908	0.198	2,454	0.086	n/a	n/a
year 6	5,858	0.011	1,212	0.094	n/a	n/a
year 7	4,429	0.105	n/a	n/a	n/a	n/a

Source : DOD Data. This table provides summary statistics by cohort of officers and soldiers that gained eligibility to transfer GI Bill benefits. The 2009 cohort is the first such cohort; the middle columns pool the remaining cohorts that gained eligibility. 2012 is representative of the smaller more junior cohorts. that subsequently gained eligibility.

Table 2: Descriptive Regressions for Benefits Transfer, Cohorts 2009 and 2012

Dependent variable is indicator variable for initial benefits transfer in specified time period.
Explanatory variables are characteristics of the transfer-eligible service member.

	(1)	(2)	(3)	(4)	(5)
eligibility cohort	2009	2009	2009	2012	2012
transfer time period	w/in 3 yrs	in 2010	in 2013	w/in 3 yrs	in 2013
# eligible to transfer	195,274	163,947	64,458	30,557	25,562
share who transfer	0.320	0.129	0.247	0.185	0.073
senior officer	0.238***	0.016***	0.113***	0.146***	0.055***
	(0.007)	(0.006)	(0.010)	(0.025)	(0.021)
junior officer	0.097***	-0.040***	0.041***	0.108***	0.014
	(0.006)	(0.005)	(0.011)	(0.014)	(0.011)
senior enlisted	0.185***	0.039***	0.105***	0.195***	0.075***
	(0.004)	(0.003)	(0.006)	(0.014)	(0.011)
middle enlisted	0.072***	0.004**	0.042***	0.072***	0.019***
	(0.003)	(0.002)	(0.005)	(0.004)	(0.003)
graduate degree	0.172***	0.139***	0.146***	0.175***	0.102***
	(0.006)	(0.006)	(0.009)	(0.020)	(0.016)
college degree	0.080***	0.061***	0.071***	0.053***	0.036***
	(0.004)	(0.004)	(0.006)	(0.012)	(0.010)
some college	0.050***	0.021***	0.050***	0.043***	0.019***
	(0.003)	(0.002)	(0.004)	(0.007)	(0.005)
years of service	0.011***	0.010***	0.006***	0.005***	0.005***
	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.001)
age	-0.002***	0.000	-0.001	0.005***	0.002***
	(0.0003)	(0.000)	(0.0003)	(0.001)	(0.001)
# children 14-17	0.098***	0.026***	0.036***	0.061***	0.017***
	(0.002)	(0.002)	(0.002)	(0.008)	(0.006)
other controls	Yes	Yes	Yes	Yes	Yes
R^2	0.14	0.08	0.05	0.08	0.04

Heteroskedasticity-robust standard errors in parentheses. Columns 1 and 4 consider whether a service member made any initial transfer within the first 3 years of eligibility. Columns 2,3, and 5 examine marginal transfer rates for the year specified. To be counted as eligible for marginal transfer, the service member must have not yet transferred benefits and still be on active duty. Other controls include race, gender, and number of non-HS-aged children by their age range. 91 individuals from cohort 2009 and 29 individuals from cohort 2012 are missing the years of service variable.
* p<0.10, ** p<0.05, *** p<0.01

Table 3: Summary Statistics for Retention Sample

Active duty Army, eligible to reenlist, years 2008-2011. Soldiers are grouped by family type.

	no dependents		**spouse only**		**has children**	
Panel A. Demographics and Career Information at Start of Reenlistment Eligibility						
	mean	SD	mean	SD	mean	SD
n	116,087	n/a	55,132	n/a	137,004	n/a
senior enlisted	0.033	(0.178)	0.029	(0.169)	0.074	(0.261)
middle enlisted	0.535	(0.499)	0.560	(0.496)	0.658	(0.475)
junior enlisted	0.432	(0.495)	0.410	(0.492)	0.269	(0.443)
college degree	0.046	(0.210)	0.045	(0.208)	0.041	(0.199)
some college	0.133	(0.339)	0.118	(0.323)	0.159	(0.366)
high school only	0.810	(0.393)	0.826	(0.379)	0.785	(0.411)
10+ years service	0.120	(0.325)	0.102	(0.303)	0.270	(0.444)
6-9 years service	0.274	(0.446)	0.304	(0.460)	0.383	(0.486)
3-5 years service	0.605	(0.489)	0.594	(0.491)	0.348	(0.476)
age	27.1	(4.67)	27.1	(4.59)	29.9	(5.07)
3+ children	0	n/a	0	n/a	0.263	(0.440)
2 children	0	n/a	0	n/a	0.357	(0.479)
1 child	0	n/a	0	n/a	0.381	(0.483)
no children	1	n/a	1	n/a	0	n/a
combat specialty	0.256	(0.437)	0.309	(0.462)	0.253	(0.435)
logistics specialty	0.504	(0.500)	0.444	(0.497)	0.481	(0.500)
other specialty	0.240	(0.427)	0.247	(0.431)	0.266	(0.442)
# mos depl last 3 years	8.9	(6.11)	9.22	(6.02)	8.270	(6.30)
Panel B. Mean Reenlistment Rates						
	mean	SD	mean	SD	mean	SD
all						
pre-Aug 1, 2009	0.643	(0.479)	0.716	(0.451)	0.851	(0.356)
post-Aug 1, 2009	0.650	(0.477)	0.715	(0.451)	0.849	(0.358)
3-5 years service						
pre-Aug 1, 2009	0.554	(0.497)	0.654	(0.476)	0.762	(0.426)
post-Aug 1, 2009	0.552	(0.497)	0.645	(0.479)	0.749	(0.434)
6-9 years service						
pre-Aug 1, 2009	0.760	(0.427)	0.791	(0.406)	0.876	(0.330)
post-Aug 1, 2009	0.730	(0.444)	0.774	(0.418)	0.861	(0.346)
10+ years service						
pre-Aug 1, 2009	0.902	(0.297)	0.926	(0.262)	0.951	(0.215)
post-Aug 1, 2009	0.904	(0.295)	0.917	(0.277)	0.952	(0.214)

Source : DOD Data. This table presents summary statistics on soldiers eligible to reenlist in years 2008-2011.

Table 4: Difference-in-Differences Estimates of the Retention Effect Due to GI Bill Transfer Provision

Active duty enlisted Army, eligible to reenlist, years 2008-2011.
Sample includes soldiers who have at least one child or who have no dependents.
Dependent variable is indicator variable for reenlisting during opportunity window.

		Regressions by years of service (yos) bands		
	all	3-5 yos	6-9 yos	10+ yos
	(1)	(2)	(3)	(4)
Constant	0.345***	0.642***	0.699***	0.848***
	(0.006)	(0.011)	(0.012)	(0.011)
Post (Aug 2009 - Dec 2011)	0.021***	0.020***	-0.008	0.009*
	(0.003)	(0.004)	(0.005)	(0.005)
Children	0.177***	0.209***	0.117***	0.048***
	(0.003)	(0.005)	(0.005)	(0.005)
Post * Children	-0.004	-0.009	0.018***	0.003
	(0.004)	(0.006)	(0.006)	(0.006)
Demographics	Yes	Yes	Yes	Yes
Military career	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
ROW Month Fixed Effects	Yes	Yes	Yes	Yes
Observations	241045	113021	79930	48094

Heteroskedasticity-robust standard errors in parentheses. Regression is the baseline difference-in-differences specification that tests for a retention effect from the transfer provision. Sample includes all reenlistment-eligible soldier who have at least one child (treatment) or who have no dependents (control). Post indicates that the reenlistment opportunity window (ROW) closes for that soldier after transfer provision implementation. Demographic controls include gender, race, and age. Military career controls include career field and recent deployment history. Education controls include AFQT and education level. ROW fixed effects are by calendar month and account for cyclicality in Army retention behavior.
* p<0.10, ** p<0.05, *** p<0.01

Table 5: Robustness Checks for DD Regression for 6-9 Years of Service Population

Active duty enlisted Army, eligible to reenlist, years 2008-2011, 6-9 years of service.
Dependent variable is indicator variable for reenlisting during opportunity window.

	(1)	(2)	(3)	(4)	(5)
are spouse-only families included?	no	yes	yes	no	no
treatment *trait*	has child	has child	has child or spouse	has child	has child
post boundary	Aug 2009	Aug 2009	Aug 2009	May 2009	Aug 2009
Constant	0.699***	0.711***	0.673***	0.695***	0.551***
	(0.012)	(0.011)	(0.011)	(0.012)	(0.026)
Post	-0.008	0.002	-0.008	-0.001	-0.029***
	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)
Trait	0.117***	0.107***	0.097***	0.120***	0.117***
	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)
*Post * Trait*	0.018***	0.008	0.017***	0.013**	0.020***
	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
Demographics	Yes	Yes	Yes	Yes	Yes
Military career	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
ROW Month FE	Yes	Yes	Yes	Yes	Yes
Unempl Rate	No	No	No	No	Yes
Total Deployed	No	No	No	No	Yes
Observations	79930	95970	95970	79930	79930

Heteroskedasticity-robust standard errors in parentheses. Column 1 presents the original DD specification from Table 4. Columns 2 and 3 analyze the full reenlistment-eligible sample - which includes soldiers with a spouse but no children - but with a different treatment trait for each regression. Column 4 considers May 2009 as a boundary date for program implementation based on Google trends search results that appear in Figure 9. Column 5 adds monthly data on the US unemployment rate and on the total number of US troops deployed to Iraq and Afghanistan.
* p<0.10, ** p<0.05, *** p<0.01

Appendix A: Descriptive Analysis of Transfer Behavior for Cohort 2012

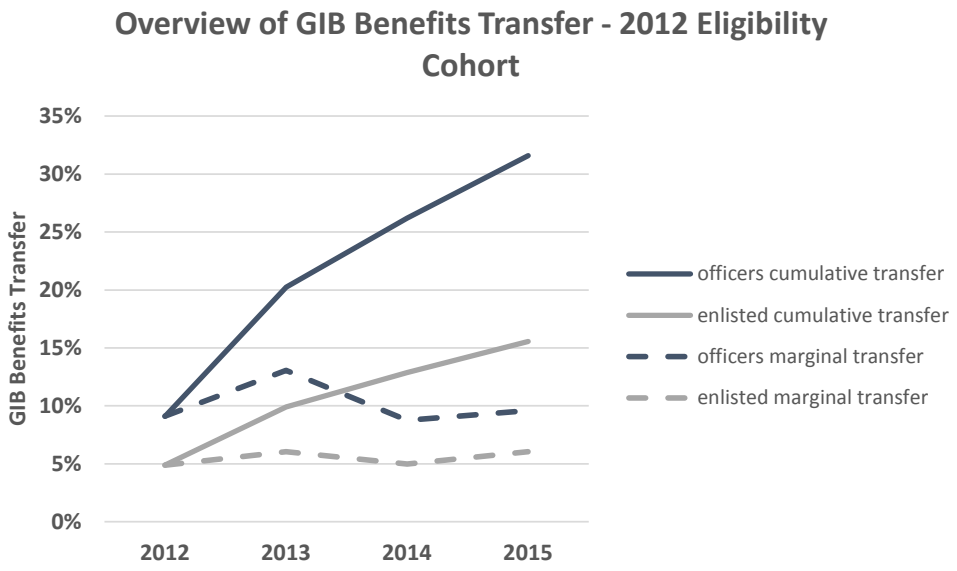
This appendix offers a brief descriptive analysis of transfer behavior made by the 2012 cohort, which shows similar patterns to the 2009 cohort. Officers in this newer cohort are more likely than enlisted to transfer GI Bill benefits, as are parents who are more educated, higher in military rank, and longer tenured in the military. For brevity, we present only the overview of transfer behavior for 2012 - see Figure B1. Even though this later cohort has patterns of cumulative and marginal transfer that are similar to those of the earlier cohort, the overall levels of transfer are lower at every comparable point. One key difference is that the 2012 cohort by percentage shows more transfers by midcareer and junior enlisted soldiers who have attained only a high school education. This result, of course, is mechanical because there are more such individuals in these later cohorts (as shown in Figure 3). This distinction is important because future cohorts will look much more like the 2012 group than the 2009 group. There is also an important opportunity in this high-school educated subpopulation in general because the transfer recipient – usually a child – has received a valuable education benefits package that encourages her to pursue an education level (college) that at least one parent never has. This finding suggests that the transfer provision could affect college enrollments and perhaps intergenerational educational attainment.

Appendix B: Densities of Soldiers by Family Type at Policy Implementation

In order to address the first DD assumption of exogenous policy timing, we plot densities by ROW end date of soldiers with children versus those with no dependents. We see no discernible shift in these densities around the time of GI Bill transfer implementation, as shown in Figure C1. This result is important but unsurprising given that reenlistment window and end of contract timing for 2009 were determined by enlistment and reenlistment decisions made back in 2005

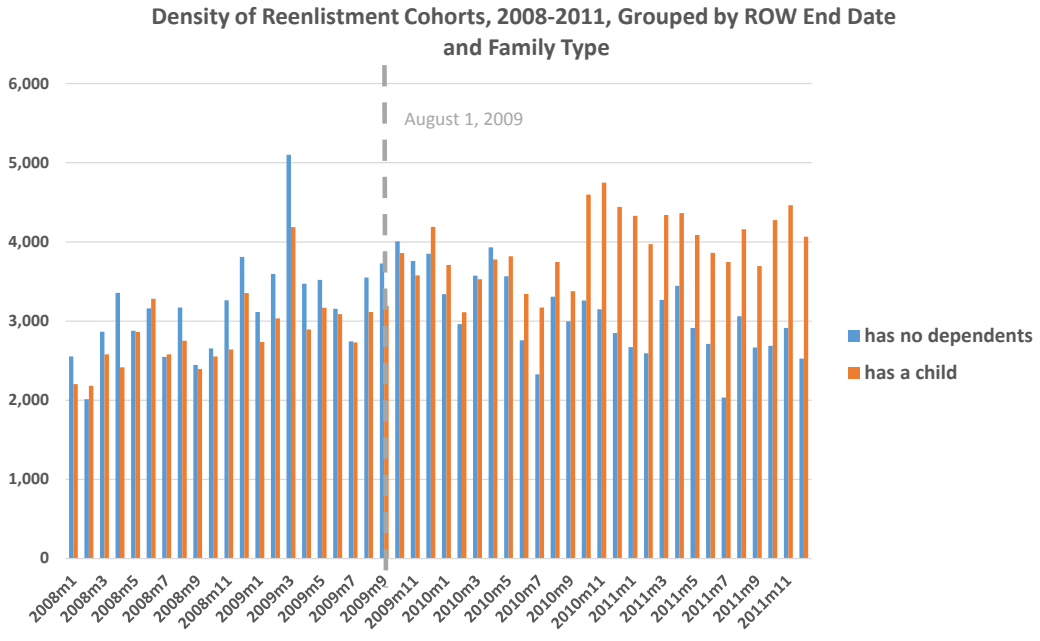
(for a typical 4-year contract). In contrast, the earliest Congressional discussion of a new GI Bill with a benefits transfer provision did not occur until January 2008.

Figure A1: Overview of GI Bill Benefits Transfer – 2012 Eligibility Cohort



Note: DoD data. Graph tracks initial transfer of benefit. Cumulative rates are based on the whole eligibility cohort; marginal rates are based on cohort members who were eligible and had not yet transferred as of that year.

Figure B1: Active Duty US Army Personnel Eligible for Reenlistment, 2008-2011



Note: DoD data. Individuals are assigned to a reenlistment decision month based on the final month of the reenlistment opportunity window (ROW). The dashed gray line marks transfer policy implementation.