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ABSTRACT

Veteran Educators or For-Profiteers? Tuition Responses to Changes in the Post 9/11 GI Bill*

In 2010, Congress reauthorized the Post-9/11 GI Bill by changing reimbursement rates from widely-varying by-state maximums to a nationwide limit. This policy created exogenous variation in the changes in reimbursement rates in direction and magnitude for veterans at private universities. We leverage this variation to examine for-profit college responses to changes in reimbursement rates. We detect tuition responses only for for-profit colleges, where we estimate a one percent pass-through rate. This for- profit response is driven by colleges in states that saw decreased benefits, colleges with higher concentrations of veterans, and colleges whose pre-change tuition was above the state maximum but below the since-increased nationwide level; the last group has a pass-through rate of eight percent. This policy also caused declines in non-veteran populations showing a substitution towards veteran students.

JEL Classification: I23, I28, H52, H56

Keywords: for-profit colleges, Post 9/11 GI Bill, price discrimination

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1 Introduction

The rapidly increasing cost of college and the pricing behavior of colleges (and in particular, for-profit institutions) is of concern to policymakers, college administrators, and the public. Many factors are cited as potential cost-drivers; examples include decreases in state-level support for higher education, including financial aid(Webber, 2017), an increase in the focus on obtaining outside funds, an increase in the number and proportion of administrators employed (Griffith and Rask, 2016), and potential push-back about faculty salaries and teaching loads (Ehrenberg, Rizzo and Jakubson, 2007).

Policymakers have suggested ways of alleviating the effects of increasing college costs, including increasing the level and availability of financial aid. However, financial aid has the potential to increase the "sticker price"–or published tuition–before financial aid.[1] William J. Bennett, former United States Secretary of Education, suggested that when governments increase the amount of publicly funded financial aid, universities have an incentive to increase their tuition to capture this new aid as a form of price discrimination (Bennett, 1987). While this behavior would increase tuition revenues for the university, it may not be optimal for the student or public; encompassing a transfer from tax-payers to universities, and would at least partly defeat the goals of providing additional financial aid.

One public entity that distributes large amounts of financial aid is the Veterans' Administration (VA), via the various iterations of the GI Bill. The Post 9/11 GI Bill (PGIB) is the most recent iteration of this policy.[2] In this study, we leverage an unanticipated change in the by-state maximum tuition reimbursement rates for private colleges, and we use this variation to estimate the effect of changes in financial aid on sticker price tuition, in partic-

[1] Many students, especially at schools with higher sticker prices, do not pay full price due to a combination of merit-based and need-based financial aid.

[2] The PGIB, passed in 2008 and enacted in 2009, is the latest in a series of educational benefits designed to ease service members' transitions into civilian life. The PGIB is, on average, considerably more generous than the previous bill (the Montgomery GI Bill, MGIB). The PGIB also includes a unique feature; those who serve for a sufficient amount of time may transfer some or all of their benefits to a spouse or child.

ular, in the case of for-profit colleges. Initially, the Departments of Defense (DoD) and VA allocated maximum tuition reimbursement rates for colleges based on the maximum tuition and fees at the most expensive public post-secondary schools in each state. As a result, there was wide variation across states in the maximum benefits. Then, in 2011, Congress instituted a uniform maximum tuition rate that applied across all private institutions nationally,[3] while public institutions remained fully funded for in-state residents, even if the tuition exceeded the national maximum. Since 2011, the national tuition maximum has increased by a modest percentage each year since the single maximum was established.[4]

This policy created exogenous variation across states, both in direction and magnitude of the change in benefits. This policy change had the potential to create incentives for for-profit colleges to change the price of their tuition in response to the change in aid. The policy change also created variation *within* a state because public colleges were not affected, and for-profit colleges with higher veteran populations had more to gain from price discrimination. We anticipate effects to be stronger at for-profit colleges because, in general, they have greater flexibility and incentive to change tuition in response to such policy changes (Deming, Goldin and Katz, 2012; Gilpin, Saunders and Stoddard, 2015).

For-profit colleges are of great concern to the Departments of Defense (DoD) and VA. In the first year of the PGIB, nearly 36.5 percent of all PGIB benefits were claimed by students at for-profit universities, although such universities enrolled 23.3 percent of PGIB beneficiaries[5] (Health, Education, Labor and Pensions Committee, 2010; Deming, Goldin and Katz, 2012). For-profit schools must follow the "90-10 rule" requiring that no more than 90 percent of their revenue come from Title IV (Department of Education) sources. However, PGIB funds (as well as DoD Tuition Assistance programs) are exempted from

[3]The PGIB also includes funds for other educational expenses, including a generous stipend that varies depending on local costs of living. However, we focus on the payments to private schools for tuition and fees as the relevant policy change impacted only this portion of the PGIB.

[4]See `http://www.benefits.va.gov/GIBILL/resources/benefits_resources/rate_tables.asp`

[5]An enrollment rate that is almost double that of the non-veteran population

this rule and thus do not count against the 90 percent limit(Hefling, 2016).[6] In 2014, 70 percent of for-profit schools' overall revenues came from Title IV sources; non-profit schools derived 30 percent of their revenues from Title IV sources. Approximately twenty percent of for-profit schools receive between 85 and 90 percent of their revenue from Title IV sources, demonstrating their reliance and thus likely responsiveness to financial aid changes (Cellini and Koedel, 2017). Veteran benefits, such as the GI Bill, become attractive targets for for-profit colleges given the relatively large number of schools who are at or approaching the 90 percent cutoff.

Despite concerns from various federal agencies, very little is known about how for-profit or traditional non-profit private universities respond to plausibly exogenous shocks in veterans' benefits. If the sticker price increase is less than the increase in benefits and these institutions enroll more veterans, then the DoD and VA will be fulfilling their mission to re-train military members transitioning to civilian life and labor markets, albeit through higher payments to for-profit colleges. If for-profit colleges respond to an increase in the maximum benefit by simply increasing sticker price tuition without an accompanying increase in enrollment, then the increase in tuition costs are not accompanied by any social gain[7] (assuming quality at the schools remains unchanged); the schools are simply capturing additional revenue through price discrimination. Meanwhile, increased sticker price is likely to lead to lower non-veteran enrollments, shifting the share of veteran enrollments and potentially pricing out non-veteran students who may have benefited from the college. Al-

[6]This requirement stems from a VA requirement established after World War II; for-profit schools have been included in the rule explicitly since the 1992 Higher Education Act although at that point the rule was 85-15. The 90-10 ratio was established in the 1998 reauthorization of the Higher Education Act.

[7]This study focuses on the cost side of attending a for-profit college. However, the previous literature shows that the returns to for-profit education is quite low. For example, Deming et al. (2016) and Darolia et al. (2015) conduct audit studies of fictitious resumes and find that applicants with a for-profit degree do no better than those at community colleges and could actually be harmed, receiving fewer callbacks. Cellini and Turner (2019) use treasury data and find that graduates of for-profit colleges earn less than similar community college students and have no statistically significant wage premium over students that attend no college.

ternatively, it may lead to a shift of these students from for-profit to non-profit institutions. The social benefit of these programs is thus a complex problem since for-profit institutions claim that they can more easily tailor their education experience to meet the needs of veterans and other working adults such as flexibility in course taking and subject content with more "real-world" applications (Gilpin, Saunders and Stoddard, 2015). In this study, we use the plausibly exogenous variation in changes to the PGIB benefit across states to examine how for-profi colleges adjust their sticker price tuition, and whether these changes can be explained by shifts in demand (enrollments) or price discrimination.

For traditional colleges, the evidence of manipulating prices given a change in financial aid is mixed. Long (2004) examines changes in Georgia colleges and universities given the introduction of the HOPE scholarship and finds that four-year institutions did increase tuition pricing after the introduction of the HOPE;[8] however, Cornwell, Mustard and Sridhar (2006) find that the HOPE scholarship also increased the number of students attending Georgia colleges and universities. Singell and Stone (2007) use panel data to examine variations in financial aid policies and find that public universities (whose tuition prices are generally regulated by a state board) do not respond to increases in aid; however private universities and non-resident tuition pricing do respond to these changes. Kelchen (2019) and Kelchen (2020) use variation in the Grad Plus loan program and find no effect in law schools or graduate business and medical programs respectively. Turner (2012) shows that universities decrease merit aid when students report using tax breaks for college education. Turner (2017) uses a regression kink identification and finds that colleges respond to increases in Pell Grants by lowering institutional merit aid, thus capturing a portion of those Pell Grant dollars. The author finds a pass through rate of 11-20 percent.

For-profit universities are a relatively new area of research in this domain. Cellini

[8]Authorized in 1993, HOPE scholarship is a lottery funded scholarship in Georgia that provides students with a significant portion of in-state tuition at a state college or university. Students need to graduate with at least a 3.00 GPA from a Georgia high school to be eligible.

and Goldin (2014) compare for-profit colleges that are eligible for federal financial aid to those institutions that are just below the eligibility cutoff. The authors find that for-profit universities that are eligible for federal funds have higher sticker price tuition as compared to those colleges not eligible for programs like subsidized student loans or Pell Grants. Cellini (2010) finds that the number of for-profit institutions that entered in a given county increased when certain aid programs such as Pell Grants, Cal Grants, and GI Bill were also increased in California.

Despite the large numbers of beneficiaries and resources spent on the program, there is surprisingly little research done on the effects of changes in veteran financial aid on tuition pricing and student enrollment; this is likely due to the new and evolving nature of this benefit. However, Barr (2015) finds that the PGIB increased college enrollment of veterans by fifteen to twenty percent and increased the number of veterans enrolled at (relatively expensive) four-year institutions. On a related note, Barr (2016) shows that increased state merit aid programs reduced military enlistments, thus showing an interesting trade-off between college enrollment and military enlistments.

This study contributes to all of these strands of the literature by being the first paper to examine the relationship between expanded veterans' education benefits and the pricing behavior of for-profit colleges, and by investigating potentially asymmetric responses to shifts in financial aid generosity in the PGIB as well as effects on enrollment in for-profit institutions. We find that only for-profit institutions responded with tuition changes. There, we find an overall statistically significant pass-through rate of around one percent; that is, for each additional hundred dollars of increase in benefits to veterans, overall sticker-price tuition increased by around one dollar. Given that the PGIB only affects veterans, the effective pass-through rate would be considerably higher for schools with a higher veteran population. The pass-through rate for schools with no Army veterans before the change is small and not statistically significant. However, institutions with at least one Army veteran prior to the change had pass-through rates that were statistically significant and twice the magnitude of those in schools with no Army veterans. The effect is larger still for schools with 10 percent of students as veterans.

We also estimate a triple difference model for schools in states that saw a decrease in benefits versus those with an increase, compared against public institutions as our control group (since they were unaffected by the policy); these results suggest that our estimate is largely driven by schools in states where the benefit decreased. Given the overall falling tuition prices over the sample period, this implies that amongst schools that saw a decrease in benefits, for-profit schools in states with smaller decreases had smaller decreases in tuition than schools with larger decreases in benefits. We find the largest pass-through rate at institutions whose tuition was above the state maximum before the policy change but below the state maximum afterwards. We estimate a pass through-rate of eight percent.

We also estimate the effect that changes in the PGIB had on fall headcount enrollment and find no significant effects, although high-veteran schools see a decrease in overall enrollment, perhaps in response to higher tuition rates. The negative, non-significant effects on enrollment suggest that for-profit colleges may have used price discrimination to retain additional PGIB tuition funds without increasing enrollment of recipients.

The structure of the paper is as follows: Section 2 introduces background information regarding the PGIB. Section 3 provides a simple theoretical framework and derives the hypotheses of interest. Section 4 discusses the data. Section 5 describes the empirical strategy and models. Section 6 presents results, Section 7 conducts various robustness checks, and Section 8 concludes.

2 Background

Figure 1 presents a timeline of events surrounding the passage of PGIB and its amendment of concern for this paper. In January 2007, Senator Jim Webb introduced the PGIB that was signed into law by President George W. Bush in June 2008. The PGIB went into effect in August 2009 and is one of the largest expansions of financial aid benefits within the last few decades. The PGIB automatically enrolls all service members that meet basic enlistment standards (primarily, completion of a modest amount of service).[9] Unlike PGIB's previous GI Bill iterations, the PGIB pays tuition directly to the institutions, does not require payment by the service member for eligibility, and does not require service members to "opt-in" to the program at the beginning of their service. In the first few years, the maximum benefit differed depending on the maximum in-state tuition and fees at any public university in the state. This initial policy led to wide variation across states in the amount of maximum tuition aid that private institutions could recoup. Then in 2010, Congress revised the PGIB, effective August 2011, changing the state level maximum tuition for private colleges to a national maximum tuition rate of $17,500 while leaving aid for public institutions unchanged.[10] The large variation in prior maximums led to large variation in the direction and magnitude of the *change* in the maximum tuition benefit. For example, before the policy change, the maximum payment in Delaware was only $665, while in Colorado the maximum allowable tuition was set at $43,035.[11] After 2011, both of these states shifted to $17,500.

Figure 2 displays whether a given state saw an increase or decrease in maximum

[9]The amount of tuition reimbursement is determined by the length of service. For example, if an individual served more than 90 days and less than six months, then the she is eligible for 40 percent of the maximum benefit. To be eligible for 100 percent, the service member needs to serve for 36 months, or the typical term of service for enlistees.

[10]There were a few states that had grandfathered maximum tuition rates through 2013 for service members already enrolled prior to the change. These states are Arizona, Michigan, New Hampshire, New York, Pennsylvania, South Carolina, and Texas.

[11]See `http://www.benefits.va.gov/GIBILL/resources/benefits_resources/rate_tables.asp` for a list of maximum tuition rates by year.

tuition for private colleges under PGIB given the policy change. Thirteen states saw a decrease in the the maximum, with the remaining 37 states receiving an increase. Note that there is no apparent pattern of whether a state's benefits were increased given the state's geography, political leaning, or culture. Figure 3 presents the by-state trends in the maximum. Before the 2011 policy change, we might expect that for-profit institutions had an incentive to increase veteran enrollment, and/or increase tuition costs in high-maximum tuition states, and alternatively to decrease enrollment, and/or decrease tuition costs in low-maximum tuition states.

3 Conceptual Framework

We lay out a simple economic model of for-profit universities maximizing profits through optimal sticker price while facing two student populations with different resulting prices (veterans and non-veterans). We demonstrate that given certain assumptions, the profit maximizing behavior will lead to the optimal sticker price increases with an increase in the subsidy to one group (the pass-through behavior).

The underlying theory of behavior of the for-profit institutions is relatively straightforward: in an attempt to maximize profits, institutions will attempt to capture increases in subsidization via financial aid changes through increases in tuition prices. This pricing behavior is possible because veterans are unable to retain any unspent portions of the benefit, and have no financial incentive to seek a school that has lower sticker prices as long as those tuition costs are covered by PGIB. Also, for-profit schools must recruit new students to succeed as a business. Steinerman, Volshteyn and McGarrett (2011), in a 2009 survey of for-profit schools, found that on average 11 percent of revenue was spent on advertising, and the average student costs around $4,000 to recruit, which can be quickly recaptured in tuition. Veterans are part of a more appealing recruitment pool to be systematically pursued because of their access to generous financial aid availability, and veterans are five times more likely to enroll at a for-profit than non-profit institution (Steele, Buryk and McGovern, 2018).

Given that institutions have to post tuition prices prior to the market clearing, we model the decision of colleges' profit maximization by selecting price instead of quantity. The quantity of students is then a function of the sticker price they set, p. From this, there is a supply of non-veteran students $q_{NV}(p)$ and veteran students $q_V(p-s)$, where s is the subsidy veterans receive such that the price they face is $p-s$. For simplicity, we assume that universities face a constant cost of educating a single student (irrespective of veteran status) of c. Their profit-maximizing condition is given by

$$\max_p \pi = (p-c)(q_V(p-s)) + q_{NV}(p)) \tag{1}$$

The first order condition with respect to price is given by

$$q_V(p-s)) + q_{NV}(p) + (p-c)\left(\frac{\partial q_V(p-s)}{\partial p} + \frac{\partial q_{NV}(p)}{\partial p}\right) = 0 \tag{2}$$

$$\Rightarrow p^* - c = -\frac{q_V(p-s)) + q_{NV}(p)}{\frac{\partial q_V(p-s)}{\partial p} + \frac{\partial q_{NV}(p)}{\partial p}} \tag{3}$$

This first order condition yields a condition that the optimal price is always set at or above the marginal cost of educating the student to maximize profits, which is sensible: on the right hand side, the numerator is always positive, and the denominator (assuming downward sloping demand curves) is always negative, so that the ratio, multiplied by the leading negative sign, is positive.

With some algebraic manipulation, we can rewrite this equation as

$$p^* - c = -\left(\theta_V(p,s)\frac{\frac{\partial q_V(p-s)}{\partial p}}{q_V(p-s)} + (1-\theta_V(p,s))\frac{\frac{\partial q_{NV}(p)}{\partial p}}{q_{NV}(p)}\right)^{-1} \tag{4}$$

Where $\theta_V(p, s)$ is the fraction of students that are veterans. Note that if all students faced the same effective price, e.g. $s = 0$, then we could write

$$p^* - c = -\left(\frac{q(p)}{\frac{\partial q(p)}{\partial p}}\right) = \left(\frac{\frac{\partial q(p)}{\partial p}}{q(p)}\right)^{-1} \tag{5}$$

Thus, (4) is a weighted average between the optimal price if all students were veterans and if all were non-veterans, with the weight given by the fraction of students in each group.

How does the sticker price change with a shift in the subsidy? To investigate that, we take the derivative of equation (4) with respect to s. Doing so, with some algebraic manipulation, yields[12]

$$\frac{\partial p^*}{\partial s} = \frac{1}{(p^* - c)^2}\left(\frac{\partial \theta_V(p, s)}{\partial s}\left(\frac{\frac{\partial q_V(p-s)}{\partial p}}{q_V(p-s)} - \frac{\frac{\partial q_{NV}(p)}{\partial p}}{q_{NV}(p)}\right) + \theta_V(p, s)\left(\left(\frac{\frac{\partial q_V(p-s)}{\partial p}}{q_V(p-s)}\right)^2 - \frac{\frac{\partial^2 q_V(p-s)}{\partial p^2}}{q_V(p-s)}\right)\right) \tag{6}$$

There are two dynamics that happen with an increase in the subsidy: the first captures the shift in the fraction of students that are veterans along with the fact that the optimal price is a weighted average of the optimal price for veterans and non-veterans, with the price for veterans being higher given the subsidy. The second dynamic captures the fact that, conditional on the proportion of veteran students that they have at the institution, the increase in benefits allows them to charge an even higher sticker price. Both dynamics work to increase the sticker price of tuition.

The first dynamic, expressed in the first element of the inner summation of (6), calculates how the price increases due to an increase in the share of students that are veterans, and the fact that the optimal price if all students were veterans (with some educational benefits above what non-veterans have available) exceeds the optimal price if all students

[12] Note that $\frac{dq_V(p-s)}{ds} = -\frac{dq_V(p-s)}{dp}$, and as a result, $\frac{d}{ds}\left[\frac{\partial q_V(p-s)}{\partial p}\right] = -\frac{\partial^2 q_V(p-s)}{\partial p^2}$, substitutions we employed.

are non-veterans. $\frac{\partial\theta_V(p,s)}{\partial s}$, the change in the proportion of students that are veterans with an increase to the subsidy, can be shown to be positive with no additional assumption than downward-sloping demand. Given equation (5), $\frac{\frac{\partial q_V(p-s)}{\partial p}}{q_V(p-s)} - \frac{\frac{\partial q_{NV}(p)}{\partial p}}{q_{NV}(p)}$ captures the difference in the optimal price if all students were veterans versus if all students were non-veterans. The price for veterans is assumed to be higher because of the subsidy that they receive. However, our model does not require this in order for the combination of the two dynamics to be net positive, as an alternative specification that takes the derivative with respect to equation (3) can show. This first dynamic implies that the pass-through due to an increase in veteran subsidies is larger if the optimal price to veterans exceeds the optimal price to non-veterans by more (given the subsidy), and the degree to which that affects the price increase is positively related to the fraction of students that are veterans.

The second dynamic is captured in the second element of the summation. This represents how the optimal price shifts with an increase in the subsidy if all students were veterans, and scales it by the fraction that are veterans.[13]

While more ambiguous, we would expect that the marginal increase in sticker price due to increased veteran benefits–the pass-through rate of this program–is larger for schools with a higher share of veterans. This can be seen by taking the derivative of equation (6) with respect to $\theta_V(p,s)$. While we will not provide the details here, our result requires either that $\frac{\partial^2\theta_V(p,s)}{\partial s^2}$ is non-negative (unclear if this would be true), or that the first-order effects of how much they should increase prices for veterans from the subsidy given the fraction of veterans in the school (second element of equation (6)) dominate the second-order effects of

[13]This does require an additional assumption to establish a positive pass-through, namely that the second derivative $\frac{\partial^2 q_V(p-s)}{\partial p^2}$ is non-negative, i.e. constant or decreasing sensitivity to shifts in tuition price such that there is larger decrease in enrollment for an increased tuition from a lower starting tuition than for an identical tuition increase starting from a higher initial tuition price. This is then divided by a positive number (the quantity) for a negative overall ratio. $\left(\frac{\frac{\partial q_V(p-s)}{\partial p}}{q_V(p-s)}\right)^2$ is strictly positive due to the squaring, such that we have a positive number minus a negative number, for a net positive value. Thus, an increase in the subsidy is expected to lead to an increase in the sticker price.

the shift in the fraction of veterans (which may be smaller for higher-share veteran schools if our assumption that $\frac{\partial^2 \theta_V(p,s)}{\partial s^2}$ is non-negative is incorrect).

The effect of changes in the subsidy on net student enrollment are ambiguous. Given the increase in sticker price, enrollment of non-veteran students is predicted to decrease, given q is a decreasing function with respect to p. The number of veteran students will increase as long as the pass-through rate is less than one (such that the de facto price the veterans face has decreased) and not all tuition costs are covered before and after (if so, there would no expected change in veteran enrollment). The net effect on enrollment then depends on which group of students' enrollments dominate, which is determined on the elasticities of demand of the two groups and the share of each group of students.

It further is not clear whether institutions that have more veterans prior to the change will have a more positive/less negative marginal effect of increased benefits on enrollment than low-veteran institutions. On one hand, the marginal effect of increased benefits on enrollment is more positive/less negative for veterans than non-veterans, given non-veterans only face increased tuition prices, while veterans face at worst a lower increase in tuition prices (if the pass-through rate exceeds 100%), or a decrease in tuition. Thus, high-veteran institutions will be more weighted towards the more positive marginal effect of increased tuition on enrollment than low-veteran institutions. On the other hand, schools with lower veteran shares are expected to have a smaller pass-through rate and thus lower increase in tuition, which means that they will experience less of a decrease in non-veteran students, all else equal. While it is unclear which effect would dominate, we would hypothesize that the first effect would be larger, and thus that the change in enrollment would be more positive in high-veteran institutions with a change in veteran benefits.

The changes in enrollment would have uncertain effects on social welfare. Gilpin, Saunders and Stoddard (2015) and Gilpin and Stoddard (2017) argue that for-profit colleges tend to serve underrepresented populations, are more responsive to market needs, and are more flexible to working adults' schedules. Even if there is a desire to increase enrollment in the face of increased benefits, a program such as PGIB may instead change the distribution of veteran and non-veteran students, and may displace non-veteran disadvantaged students from higher education.

The resulting hypotheses we will investigate in the data are

1. An increase in veteran benefits should lead to an increase in sticker prices across all institutions (positive pass-through)

2. The pass-through should be higher in institutions with a higher fraction of veteran students.

   In addition to these two testable hypothesises, we also investigate whether the change in benefits affects the overall (i.e. non-veteran) enrollment. We also investigate whether changes in the Post 9/11 GI Bill affects overall investment differently given the veteran fraction of the student body.

4 Data

Our primary source of data is the Integrated Postsecondary Education Data System (IPEDS). IPEDS contains data collected from the universe of higher education institutions that participate in federally funded assistance programs (Title IV), e.g. Pell Grants, subsidized loans, and, relevant to this paper, PGIB. Institutions must report several statistics annually as part of their qualification for federal funds. We combine these data derived from the U.S. Census and American Community Surveys for demographic controls.

We acquired IPEDS data from 2003 to 2013. These data span before and after the 2011 changes in PGIB benefits. For most of the analysis, we limit to the period between 2009 to 2013, given this allows us to abstract away from the very different MGIB benefits prior to 2009. We adjust all variables for inflation to 2014 dollars. Table 1 displays summary statistics of dependent variables we investigate as well as the primary independent variable of interest, the change in maximum benefits. These summary statistics show that there is a significant degree of heterogeneity within both the non-profit and for-profit sectors.

Figure 4 shows the average tuition, by school-type. Average tuition rates at non-profit schools generally trended upwards across the years covered by our data, while average tuition rates at for-profit schools increased slightly leading up to 2009, and then trended downwards somewhat thereafter. Figure 5 shows the average tuition, for states that saw and increase in veterans benefits due to the shift to a national maximum, relative to those that saw a decrease. The first vertical dotted line is the introduction of PGIB. The second vertical dotted line is when there was a change from state-level variation in maximum benefits to national. Non-profit institutions show steady increases in sticker price tuition across these periods, regardless of if they are in a decreasing or increasing tuition benefit state. On the other hand, for-profit institutions had been experiencing decreases since the Great Recession. However, for-profit institutions in states that saw negative changes to maximum tuition kept on decreasing, while for-profits in states that saw positive changes leveled out somewhat. This figure preludes our findings, namely that increases in benefits lead to higher (or less negative) changes in sticker price tuition in for-profit institutions. Further, given our difference-in-difference design, we also note evidence of parallel trends in these groups prior to the reimbursement rate shifting to one national level.

Figure 6 shows total enrollment across all institutions within a category. For readability, given how large the four-year non-profit sector is, and given it is not the focus of the paper, we omit it from Figure 6.[14] Enrollment in for-profit four-year schools peaked in 2009,

[14]Calculations from Table 1's report of number of institutions and average enrollment shows that non-profit four-year degrees account for approximately half of all the students in the overall data. In certain years, our data included enrollment ranges rather than counts. We imputed the enrollment counts for these years. In the years for which we have the counts of enrollees, we also have the ranges. We use these data to estimate the average number of students within each range, and assign this predicted interior point to a

and decreased between 2009 and 2013. Two-year and less than two-year for-profit schools saw similar declines since 2009, as did non-profit two-year schools. Meanwhile, non-profit less than two-year schools saw relatively stable total enrollment from 2003 to 2013, while non-profit four-year schools (not shown) has steadily increased total enrollment across this period.

Finally, Figure 7 plots the residualized average changes in the sticker price tuition at the state level against the change in the maximum allowed tuition reimbursement for colleges in that state. The first panel shows the scatter-plot for the for-profit universities. If we anticipate that for-profit universities will change their sticker price tuition in response to changes in the GI Bill, then the bulk of the observations will be locked in the off-diagonal quadrants (i.e. positive change in tuition for positive change in benefit and negative change in tuition for a negative change in benefit). In accordance with our hypothesis, we find that the majority of states are located in these quadrants, and that a linear trend line is upward sloping, suggesting positive increases in tuition in response to higher benefits.

The second panel shows our results for public colleges which can serve as a helpful control group for this natural experiment. For public colleges, there does not appear to be any clear pattern, in fact the trend line seems to lie along the horizontal axis. These results shows that while there does appear to be a strong association for for-profit colleges, public universities do not seem to respond to the PGIB changes. These results makes sense considering that tuition at public colleges remained fully reimbursable and the policy change only affected private colleges.

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school in any year in which we have the range but not the exact counts.

5 Econometric Models

We base our identification on the plausibly exogenous changes in maximum reimbursement rates, from the maximum state-level to the single national level. This policy change allows for a dosage style difference-in-differences estimator leveraging the amount of change, where the first difference is across time (before and after the maximum reimbursement changes) and the second difference is across amount of benefits induced by variation across states (differences between the original reimbursement rate and the flat rate that began in 2011). The 2011 policy change created variation in both the direction and magnitude of the change since the maximum reimbursement rate as all states had to conform to the initial $17,500 cap. Thus we estimate the following specification:

$$Y_{jst} = \alpha + \beta \Delta Benefit_s \times Post2011_t + \gamma_t + \delta_j + \xi X_{jst} + \varepsilon_{jst} \tag{7}$$

where Y_{jst} is the outcome ("sticker price" tuition rate in both levels and logs, as well as enrollment rates) for institution j in state s in year t. $\Delta Benefit_s$ is the change in the generosity in the PGIB in state s and in year t, and is the exogenous variation used for identification (the change from 2010 to 2011 in Figure 2). $Post2011_t$ is an indicator for whether the observation was from after the policy change took effect in 2011. We include year fixed effects (γ_t) which account for the common changes year-to-year in the outcome; institution fixed effects (δ_j) control for fixed institution characteristics; X_{jst} is a vector that includes various state and institution controls such as whether the institution is degree granting and several county-level demographic time-varying variables, such as the population, the demographic make-up, the unemployment rate, and income levels. β is the coefficient of interest, since it represents the change in the outcome in states with an increase in benefit after the policy change, comparing the years before the change to after. We cluster our standard errors at the state level.

We extend our analysis by investigating asymmetry of effects in two separate triple difference models. The first uses public institutions as a control group. Since veterans using the PGIB benefits at a public institution were not affected by the policy change, we can assume that public institutions did not change their sticker price tuition rates in response to the policy. A true "Bennett Hypothesis" effect would imply that sticker price tuition follows the direction of financial aid. Here, we use an indicator for whether the institution was in a state that saw an increase or decrease in maximum tuition benefits with the policy change, instead of the continuous amount of change. This triple difference regression essentially estimates the treatment effect that is present in Figure 5 where for-profit institutions and public institutions in states where benefits are cut or boosted are on parallel trends before the policy change, but diverged in the for-profit sector after the change depending on the direction of the change in maximum benefits. Second, we estimate the primary specification but interact the difference-in-differences estimator with whether the institution was in a state with a positive or negative change, to evaluate the same question of asymmetry of effects.

We also extend our analysis by conducting two robustness checks. We first examine differences in responses depending on what level the pre-change tuition was at with respect to by-state maximum benefits and national-level benefits. Specifically, we are interested in for-profit institutions that had baseline tuition in 2010 that were both above the maximum state benefit pre-change but that would subsequently be below the upcoming federal maximum. We believe these institutions would be the most sensitive to the additional subsidy because they would have had no incentive to raise prices before the change (and may be aware of it, setting rates above the state maximum), but afterwards, had extra room for a price increase that would not be noticed by their veteran students.

The second robustness check addresses the limitation in our data that we cannot observe how many total veterans are attending a given institution in a given year. IPEDS started to collect these data in 2014, but these data are after the policy change and we would worry about general equilibrium effects. Instead, we leverage data from two sources: administrative data from the U.S. Army merged with the National Student Clearinghouse, and public use data from the Department of Veteran's Affairs. The Army administrative data contains the number of enrolled Army veterans. While the Army data do not capture all veterans (only those who served in the U.S. Army), they do represent approximately thirty-five percent of all active duty military members (U.S. Department of Defense, 2017) and the Army is the largest branch of the United States military. We examine how pass-through rates vary depending on the level of PGIB users at the institution, averaging 2009 to 2011 Army veteran rates. The Veterans' Affairs data comes from the VA's new "GI Bill Comparison Tool". These data capture most of the expenditures by the VA, but it is impossible to know what expenditures came from the PGIB or previous versions of the GI Bill. Since both data sources have their limitations, we show results using each sample.

6 Results

6.1 The Effects of Changes of PGIB on Tuition Pricing

We begin by examining the results for for-profit schools. Table 2 presents the results for the sticker price of tuition. We use the sticker price as the dependent variable because the Post 9/11 GI Bill is a first dollar scholarship meaning that the VA will pay institutions *before* other sources of financial aid. Thus universities may have an incentive to manipulate the sticker price to extract rents from the PGIB program. Table 2 also builds our argument for sample selection. There are two policies changes in our time frame in our sample. The first was the transition from the Montgomery GI Bill to the Post 9/11 GI Bill in 2009. As outlined previously, this transition included a large and multifaceted expansion of GI Bill benefits including housing benefits, paying institutions directly, and the ability for sufficiently-tenured servicemembers to pass on their unused benefits to their dependents. These additional changes transitioning from the MGIB to the PGIB could be potential confounders to our identification and make our estimates less precise. The second change and the focus of our identification is the re-authorization that occurred in 2011 that moved a state by state amount for private universities to a flat, nationwide amount. Since our identification is from the second policy change, our preferred specification uses data from years after 2009. However, for completeness, we show results in Table 2 using years from the entire sample.

Column 1 shows the simple difference-in-difference regression with all years and no additional covariates than necessary for the simple difference-in-differences. We find a statistically insignificant increase in tuition of $1.436 for each additional $100 of increased veteran aid, for a pass-through rate of around 1.4%. If we add institution fixed effects, this number decreases to 0.924. This result is robust to adding additional covariates. Finally, for reasons cited previously, we limit the sample to years 2009 (after the introduction of PGIB) through 2013 (after the reauthorization of PGIB that collapsed to a national maximum rebate limit). Limiting our sample to only years during the PGIB's existence and only including the policy change in question increases the effect size and makes the coefficient more precise. We find that a $100 increase in PGIB benefit increases sticker price tuition at for-profit universities by around one dollar for a pass through rate of 1 percent. For the remainder of the analysis, we use the full set of fixed effects and covariates of column 4, as well as the limitation of years to 2009 to 2013 for the cleaner analysis which focuses in on the years of interest. The result increases slightly to a pass-through rate of around 1 and is significant at the 5 percent level. This provides our primary specification and sample definition.

We next show the results for all types of colleges and sector in Table 3 using our main specification. In Columns (1) and (2), we consider only for-profit institutions. Column 1 of Table 3 repeats Column 4 of Table 2. Since the the average of the absolute value of the change in benefits is $10,973, the average change in tuition at for-profit colleges is $110.72. In Column (2), we consider four year, for-profit colleges and find similar results as the full sample of for-profit institutions. Next, we estimate the same models for public and private, non-profit colleges. The public colleges serve as an ideal placebo test for our identification strategy because the GI Bill paid a veteran's tuition bill in full if the veteran attended a public college. Thus the 2011 policy change should have had no effect on the trends in sticker price tuition at public colleges. Indeed, this is what we find in Columns (3) and (4) of Table 3. The expected effect of the policy change on private, non-profit colleges is less clear. While the maximum tuition reimbursement does change for veteran students, there may be institutional constraints that cause for-profit colleges to be more flexible than non-profit institutions (Deming, Goldin and Katz, 2012), and the incentives for a non-profit may be less driven to maximize the total profit by increasing tuition prices, reflective of the missions of the schools. Here, we find that a $100 increase in the PGIB benefit increased tuition at private colleges by about $0.13 in the full sample and $0.23 in the subsample with only four year schools, far smaller than the magnitude as the for-profit response. Additionally, these results are statistically insignificant.

In Table 4, we further explore the effect of changes in the PGIB benefits at for-profit colleges. In the first three columns, we estimate the same regression as the previous table, but use the natural log of the sticker price tuition as the dependent variable. With this alternative specification, we find that a $100 increase in the PGIB increased tuition by 0.006 percent; the average absolute change being $10,973, this would be associated with about a 0.65 percent increase in tuition rates. We find a similar result when using a subsample of only four year schools. When we consider less than four year institutions, we find that the coefficient estimate shrinks and becomes statistically insignificant. In Columns (4), (5), and (6), we use the tuition level as the dependent variable, as shown in the previous table for all schools and 4-year schools. Here, we see that when we consider colleges that only offer less than a four-year degree, the result disappears, as in the log model. Thus, four-year colleges are driving our main results for for-profit colleges.

6.2 Pass Through Rates by Direction of Change

Table 5 contains results from two triple difference estimators examining asymmetry in the pass through rate. Columns 1 and 2 show results from a triple difference model that compares for-profit and public institutions within a state. This model tests whether aid increases and decreases affect tuition prices in a symmetric fashion. The first row (Post 2011 x For-Profit) shows the average effect of the policy change on tuition changes in states where GI Bill aid decreased, while the sum of the first and second rows shows the effect for institutions in states where GI bill aid increased, with the second row showing the difference between the two. Column (1) uses the tuition level as a dependent variable while Column (2) uses the log. The negative coefficient in Column (1) implies that, on average, for-profit institutions reduced their tuition prices by $1,225 when GI Bill reimbursement declined relative to public institutions. We find that in states where aid increased, for-profit colleges also decreased their tuition prices relative to public institutions in the state, although the pooled effect was not statistically significant. These estimates show that institutions located in states where the policy decreased financial aid are one driver of our main results. In states where aid decreased, the average decrease in benefits was $19,294 which implies a pass through rate of 6.64 percent. These results show that in pre-policy areas where aid was very generous, for-profit universities capitalized on this aid to prop up higher tuition prices. Once Congress decreased the maximum reimbursement rates in their state, institutions responded by cutting tuition.

Columns 3 and 4 present an alternative model, where we take our primary specification for the main results of the paper and interact the Δ Benefit $\times$ Post 2011 term with whether the policy change increased or decreased the maximum reimbursable amount. In Column (3), we again find that the effect is driven by the states that saw decreases in the maximum tuition reimbursement rate. Since we are looking at the change in the reimbursement rate, the positive coefficient associated with the interaction between the policy change reducing rates with the change in the rate and being post-policy implies that tuition moved in the same direction as the rate change. The pass-through rate in this case is around 12.86 percent. Given the falling overall tuition rates over this time period for for-profit schools, this means that schools in states that saw large benefits decreased their tuition by a larger amount than schools that were in states with a small decrease in benefits. For schools that saw an increase in benefits (suggesting they raised tuition rates in response to higher benefits), we found a positive but near-zero and not statistically significant effect.

6.3 Effect of the 2011 PGIB Policy Change on Enrollment

Next, we estimate the same model but with the number of students enrolled as our dependent variable. These results help to distinguish whether the increase in sticker price tuition is a result of increased demand for education versus price discrimination. If the change in PGIB encouraged veterans to enroll at for-profit colleges because veterans had more resources to pay for college, then we would also expect the tuition result to be driven by a change in demand. However, if for-profit universities are price discriminating to capture the increased benefit, then colleges may not admit more students, but simply charge the current non-veterans an increased price. Our conceptual framework shows that for-profit universities would recruit more veterans as the benefit increases but at the expense of decreases in non-veteran students; thus the change to total enrollment is ambiguous. Table 6 shows the results for universities using the same difference in differences strategy. We find negative enrollment effects at for-profit universities that are statistically significant for the full for-profit sample. We find that a $100 increase in PGIB benefit decreases enrollment by 2.8 students. Thus the average change of $10,973 would decrease enrollment by 307 students.[15] However, we do not find a similar result in other sectors. These results show that for-profit universities may

[15] We also estimated the same model with the dependent variable of the fraction of students that are Army veterans and the number of Army veterans enrolled. We find positive, but imprecise and small, effects.

have substituted non-veterans students for veterans students when offered the incentive of increased PGIB benefits.

7 Extensions of Main Results

7.1 Institutions Above State Maximum, Below National Maximum

While the results for states where the benefits increased were small compared to states with decreased benefits, there is a potential subgroup of institutions in states with benefit increases where the policy change could be more salient. We consider these to be institutions whose 2010 tuition was both above the state maximum benefit before the policy change (suggesting perhaps an attention to the potential to extract these benefits from the veterans), but whose 2010 tuition would fall below the upcoming nationwide maximum after the policy change. These institutions would have an additional incentive to increase tuition to extract more surplus created by the aid change. In our sample, 35 percent of for-profit institutions exposed to increased GI Bill benefits were in this "Above, Below" group. Their average 2010 tuition rates were slightly lower than the rest of for-profit tuitions ($14,125 as compared to $17,997)

The results, presented in Table 7, confirm our hypothesis. We use an indicator for whether an institution's 2010 tuition was above the state maximum before the policy change, and below the new state maximum afterwards, using that "Above, Below" designation. In columns (1) and (3), we do a simple interaction of this indicator with whether an observation occurred after the 2011 policy change to form the difference-in-difference regression. In Column (1), we find that institutions in this subgroup had tuition changes of around $1,062 more than other institutions across the policy change threshold. Column (3) displays results for the same empirical model, but with the logged tuition as the dependent variable. In this specification, we find that an institution in this category increased tuition by 5.2 percent. Columns (2) and (4) do triple difference regressions wherein we interact this above-below indicator with the difference-in-difference primary specification. In Column (2), we use the level of the tuition rate and find that the pass-through rate is the largest of any subgroup we evaluate at around 8 percent, almost an order of magnitude larger than the overall pass-through rate from Table 3, and statistically significant. We further find effectively no pass-through rate for all other schools (-0.379 and not significant). In Column (4), we use the logged tuition rate and find again find a sizable and highly significant pass-through rate for these schools with a large incentive to change their tuition; much higher than in Table 3 column (1). The fact that the group we believe has the largest incentive to have higher pass-through rates does have higher pass-through rates adds evidence that our findings plausibly represent actual responses to the change in benefits. This also shows that the pass-through response is not limited to schools in states where benefits decreased, but are the most responsive for a specific but not small group of schools in states that saw increased benefits.

7.2 Fraction Army Veteran Enrolled

The IPEDS data do not provide information on the number of veterans enrolled for our entire sample.[16] To overcome this data limitation, we linked the IPEDS data to college-going data from the National Student Clearinghouse provided by the United States Army's Office of Economic and Manpower Analysis (OEMA). The United States Army tasks OEMA with maintaining data on every soldier and their dependents. OEMA has linked these data with other federal agencies and organizations like National Student Clearinghouse. Using these data, we can see how many Army veterans attend a particular institution in any given

[16] IPEDS did start to provide veteran enrollment as part of the Veteran Scorecard in 2014. However, this is post-treatment and we worry about general equilibrium effects. Thus we chose to use the Army adminstrative and VA data for this paper.

year with the PGIB. Unfortunately, we cannot see observations from other services using these data (i.e. Air Force, Coast Guard, Marines, and Navy) and thus we must code for-profit institutions that focus on recruiting veterans from these services as having low Army veterans, even if they may and will in some case have non-Army PGIB-users. Nonetheless, this attenuation bias of not capturing all veterans would cause our estimated results to be less than the actual result, and our estimates can serve as a helpful lower bound. We use the proportion of students that are Army veterans averaged from 2009 to 2011, all before the policy change.

In addition to the Army administrative data, we use data from the Department of Veteran's Affairs College Comparison Tool. These data show how many veterans attended a specific school. However, one limitation with these data is we cannot observe which veterans used the PGIB, which used the MGIB, or which attended using personal funds. We compare results from using the same specification across both data sets. In this case, we use the earliest available year, 2011, that was before the policy change.

The first panel of Table 8 displays results from the subsample analysis with institutions that have no Army veterans present, institutions with Army veterans present, and institutions with greater than ten percent of their student body being Army veterans (the median amount conditional on having veterans on campus). Columns (1)-(3) use the natural log of the tuition rate as our dependent variable. Column (1) shows our results for the full sample and we find that a $100 change caused 0.004 percent change in the tuition rate. Column (2) shows that among institutions with any Army veterans present, the estimated coefficient is 0.004 percent. Column (3) shows our estimates when we consider institutions with a student body greater than ten percent Army veteran, the coefficient represents about a 0.01 percent change.

Next, we consider the tuition level as the dependent variable. Column (4) shows that when we consider the institutions with no Army veterans present, that estimates are slightly below a pass-through rate of 0.6 and not statistically significant; roughly half of the main result sample is in this group. In Column (5), we consider only for-profit institutions who have Army veterans present on their campus. Here, the estimated coefficient increases to a pass-through rate of 1.18. Finally, we consider institutions with student populations that are more than ten percent Army veteran (approximately the median fraction of veterans for schools with any veterans). Here the pass-through rate increases slightly to 1.38. However, the coefficients for any veteran and veterans over 10 percent are not statistically different from each other, based on pooled regressions. Overall, these results support our main result because, given the diversity in the for-profit sector, when we only consider those institutions that recruit veterans, our estimates increase and become statistically significant. We do not have sufficient number of observations to test higher rates of veterans reliably.

In the second panel of Table 8 we repeat the same specifications but use the VA's College Comparison Tool. We find similar results as before just with more statistical significance in both the log and the tuition level. One exception is in Column (4) where we estimate a pass-through rate of 3.707 for colleges without veterans present, but this estimate is very imprecise (a standard error of 6.324). Otherwise, the estimates from the two data sources are remarkably similar and show that schools where more veterans are present drive our results.

We repeat the same analysis for enrollment in Table 8. As discussed in the conceptual framework, our model is ambiguous as to whether enrollment will change more in high-veteran institutions, although our prior is that it will. We find that at more veteran-heavy for-profit colleges, enrollment decreases at an increasing rate. For institutions with student populations greater than ten percent, the coefficient is negative and statistically significant. While not shown here, we did the same regressions with the outcome of number of Army veterans, and the results were positive, very small, and statistically insignificant. These estimates show that for-profit institutions that recruit veterans are willing to lose some of their civilian students to capture additional G.I. Bill dollars via tuition increases, or alternatively, gain more civilian students as they strategically drop tuition rates in response to decreases in veteran benefits.

8 Conclusion

The PGIB is one of the largest sources of publicly provided financial aid. The expansion of the GI Bill benefits in the most recent authorization has the potential to provide increased educational opportunities for active duty military members, dependents, and their families. However, one concern could be whether an increased amount of financial aid dollars would lead institutions to increase their sticker price tuition to capture this new financial resource. If the latter is true, then the social welfare benefits of increasing PGIB benefits would be unclear. According to the Bennett Hypothesis, changes in aid may represent not only subsidization of student education, but be a transfer of wealth from tax-payers to the institutions, and not fully captured by changes in student learning. Evaluating evidence for this hypothesis has important policy implications.

To identify an effect of changing financial aid benefits on a university's sticker price tuition, we use an exogenous policy change to PGIB where various state specific maximum amounts were changed to one nationwide amount. This policy change essentially caused an increase in PGIB benefits in some states while other states saw a decrease. In this study, we use a difference-in-difference estimator and the exogenous variation in changes to the PGIB benefit to determine if changes in tuition are associated with price discrimination or a shift in demand for higher education.

We find no overall response for non-profit colleges (either public or private). However, we find that for-profit institutions change their tuition by a little more than one dollar for every $100 change in tuition reimbursement benefit, i.e., a one percent pass-through rate, a result that is statistically significant. We also find that decreases among for-profit universities in states where the Congress cut GI Bill benefits are the main drivers of this overall effect. However, there is a group of schools in the states that saw increased benefits that had the strongest response to the change: institutions with 2010 tuition rates above their state maximum benefits but below the upcoming new national maximums. This is about one third of all for-profits in states that saw an increased benefit due to the policy change. We find their pass-through rates are the highest of any evaluated subgroup, at 8 percent, suggesting they are highly responsive to the change in benefits.

We also linked the IPEDS data to National Student Clearinghouse Data, provided to us by the Office of Economic and Manpower Analysis and data from the VA's College Comparison Tool. When we consider institutions with Army veterans present on campus, our estimated pass-through rates doubles from 0.58 percent in schools with no Army veterans to 1.38 percent in school with some Army veterans. These increases show that our results are stronger at for-profit institutions that have veterans, reflecting the fact that they are more aware of veterans, are actively recruiting veterans, or both. We find no meaningful overall effects on student enrollment, while schools with higher Army veterans proportions (that also changed tuition the most) did see a change in enrollment, with a decrease of two students for every $100 higher benefits.

While the estimated magnitudes are overall relatively small, our conceptual frameworks shows that a for-profit institution must balance tuition increases with enrollment losses of non-veteran students. Since veterans are generally a small (but over-represented) group on campus, for-profit colleges cannot increase their tuition too high in an attempt to capture all of the GI Bill increase (unless veterans made up 100 percent of their student body). However, these estimates are in line with previous literature, which has shown that the pass through rate of Pell Grants is around nine percent Turner (2017), where Pell Grant students make up around 60 percent of students at for-profit colleges.

This analysis is evidence that for-profit institutions are more likely to increase tuition rates to capture increases in PGIB benefits, as well as decrease tuition in response to lowered aid Our results give evidence for Bennett hypothesis style behavior at for-profit colleges with regards to the Post 9/11 GI Bill. These results may be specific to the national trending environment of decreasing for-profit institution education during this time period. However, regulatory policies such as the 90-10 rule may have helped students in general, but the exemption for DoD and VA education benefits creates incentives for for-profit universities to target veterans. Our findings show that for-profit universities are sensitive to changes in PGIB reimbursement rates and respond by changing the sticker price to extract surpluses from their students. Our study fits in line with other previous literature that shows that policymakers should consider the behavior of the for-profit sector when designing financial aid programs.

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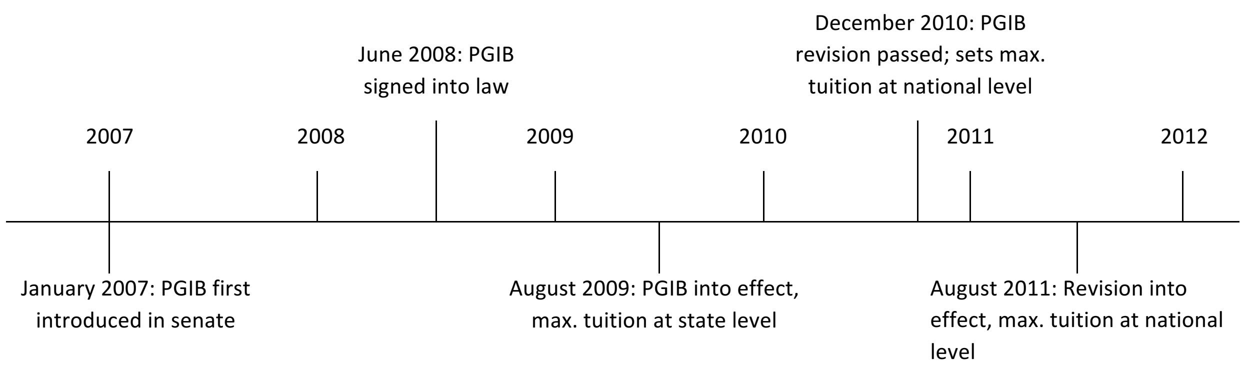
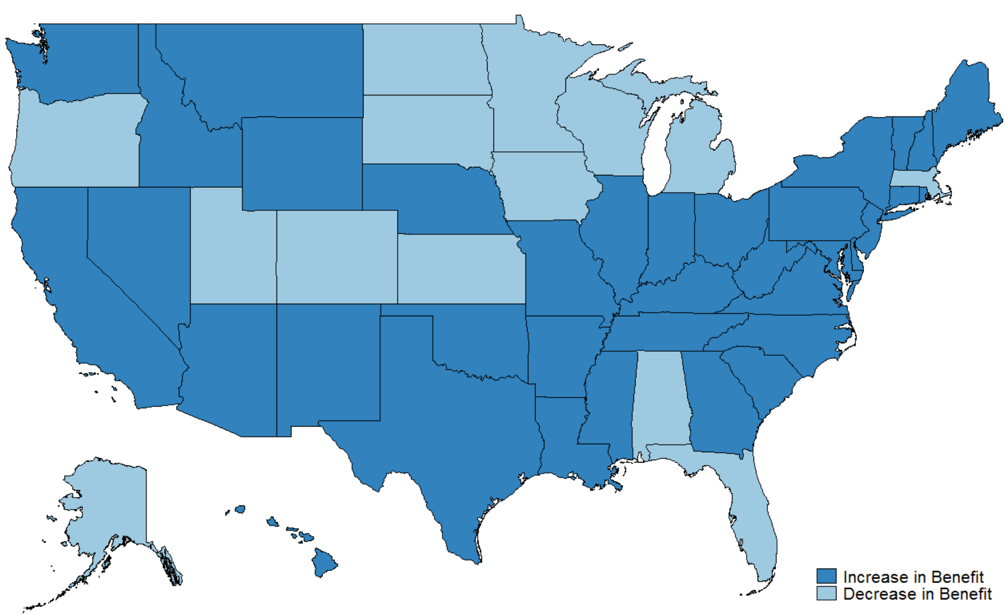
Figure 1: Timeline of events regarding PGIB



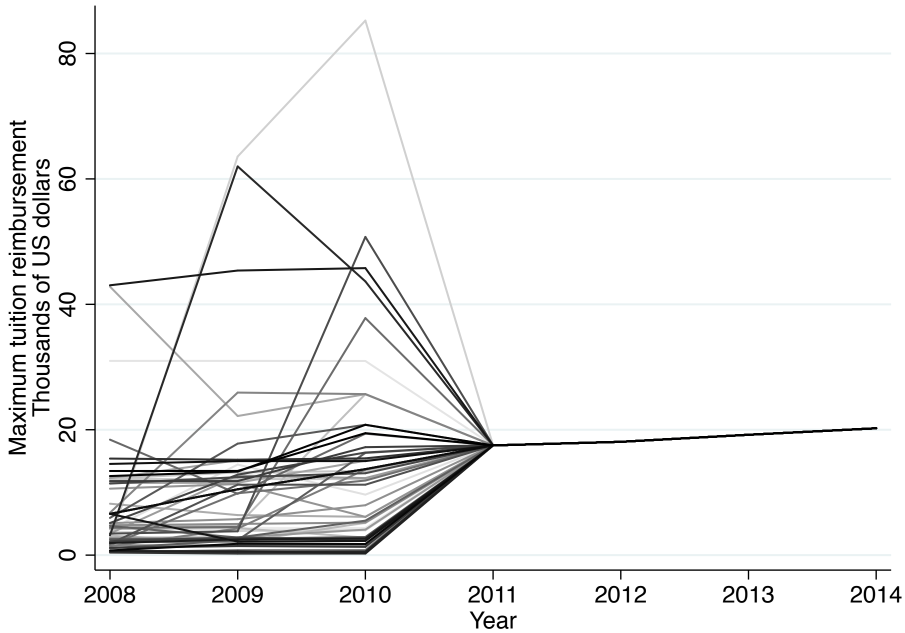
This figure shows the approximate dates of each part of the Post 9/11 GI Bill. The exogenous variation for this paper comes form the 2011 re-authorization that changed the maximum tuition benefit from a state specific amount to one national constant of $17,500.

Figure 2: Differences in benefit by state



This figure shows which states had a positive increase (dark blue) or decrease (light blue) in the maximum tuition reimbursement rate. Note that there exists variation within region and political orientation of state voting patterns.

Figure 3: Maximum PGIB tuition reimbursement rates by state



This figure shows the maximum PGIB for each state over time. The movement to the $17,500 cap shows the exogenous variation created by the 2011 re-authorization.

Figure 4: Average tuition, by school type

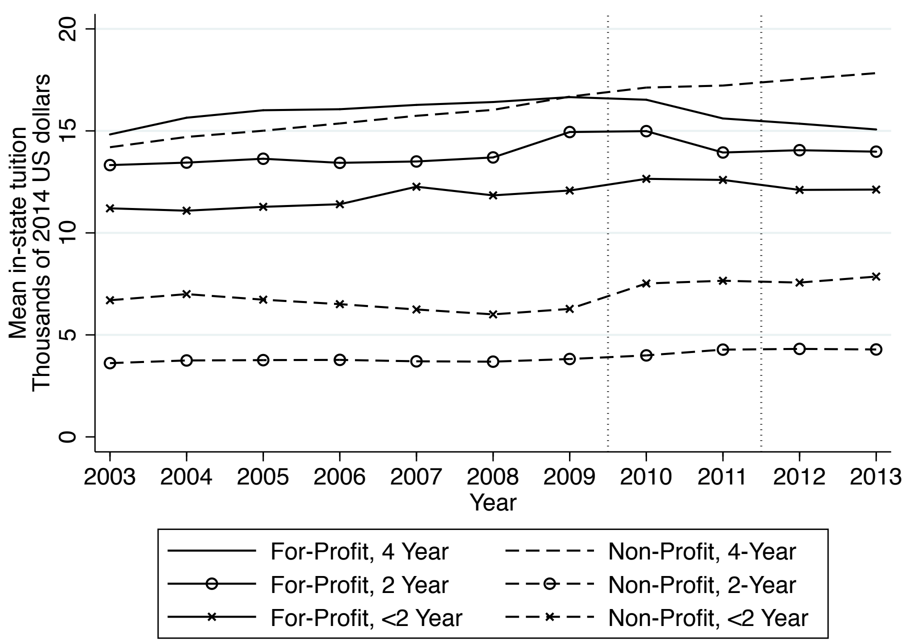


Figure 5: Average tuition, by school type and direction of maximum benefits change

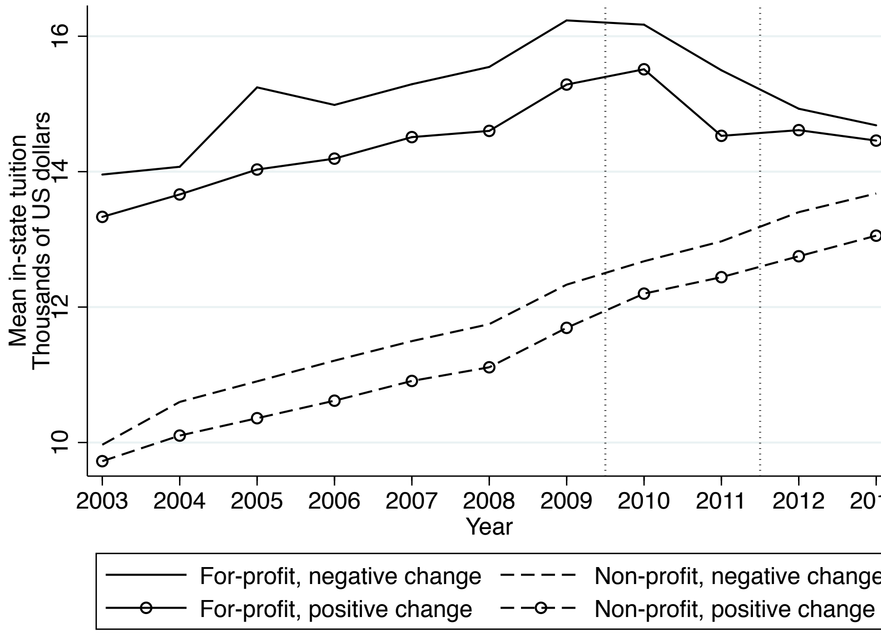


Figure 6: Number of enrolled students, by school type

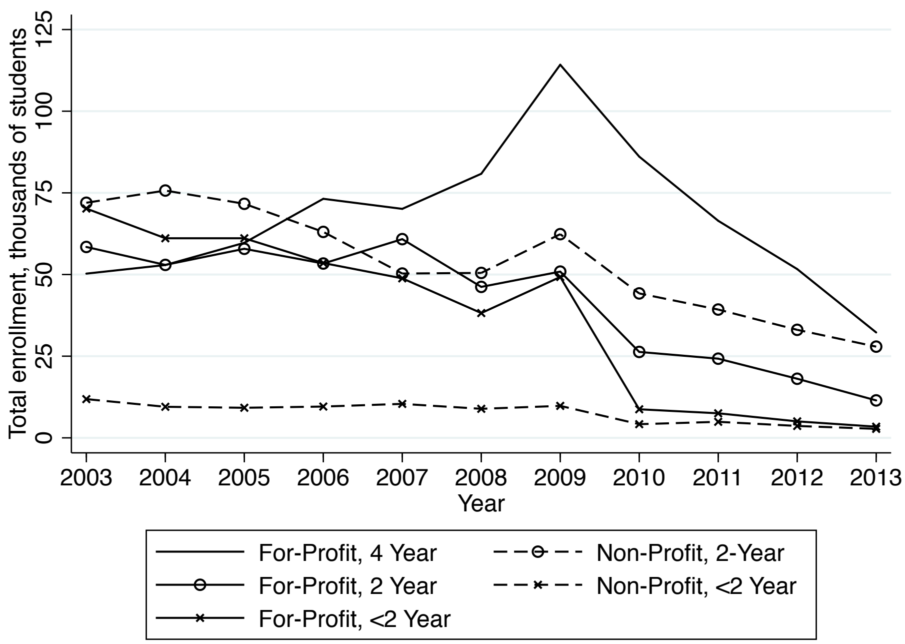
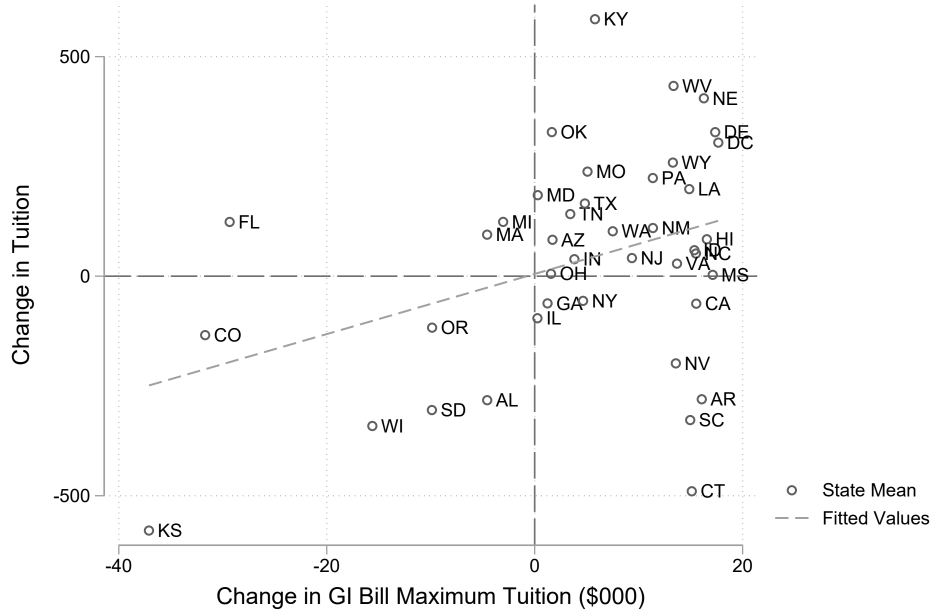
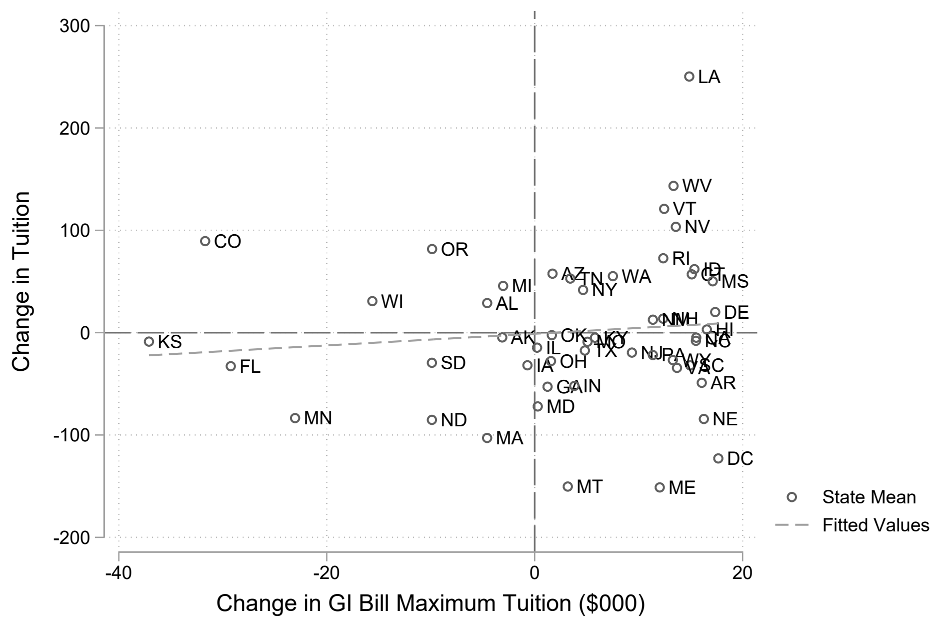


Figure 7: For-Profit vs Public Sector: Change in the GI Bill benefit vs. Change in the Sticker Price Tuition.



(a) For-Profit Sector



(b) Public Sector

Table 1: Data Summary Statistics

Variable	Non-Profit <4 Year	Non-Profit 4 Year	For-Profit < 4 Year	For-Profit 4-Year
Observations	8097	11777	13681	3556
Institutions	1826	2487	3444	900
Tuition Mean	4261	17285	14095	15776
Tuition St. Dev.	3942	12194	4964	4562
Tuition Min.	378.9	71.14	294.7	309.3
Tuition Max.	51569	50524	73696	47480
Δ Benefit Mean	3,108	2,840	2,100	-2,200
Δ Benefit Std. Dev.	14,110	13,590	15,950	19,510
Δ Benefit Min.	-74,560	-74,560	-74,560	-74,560
Δ Benefit Max.	1,773	1,773	1,766	1,766
ln(Tuition) Mean	8.060	9.447	9.497	9.623
ln(Tuition) St. Dev.	0.757	0.859	0.344	0.313
ln(Tuition) Min.	5.937	4.265	5.686	5.734
ln(Tuition) Max.	10.85	10.83	11.21	10.77
Enrollment Mean	678.2	744.2	125.0	274.8
Enrollment Std. Dev.	868.2	1085	127.8	616.2
Enrollment Min.	1	1	1	1
Enrollment Max.	5542	10241	8498	16577

Note: Institution data from Integrated Postsecondary Education Data System, veteran data authors' estimates from the American Community Survey 2009-2011 3 year file, county data from Area Health Resource Files. Std. Dev. is the standard deviation, min. is the minimum, max. is the maximum.

Table 2: Tuition Regression Results for For-Profit Institutions ($100 Change)

	(1) Tuition	(2) Tuition	(3) Tuition	(4) Tuition
Δ Benefit X Post 2011	1.436	0.924	0.926	1.009**
	(0.878)	(0.551)	(0.582)	(0.472)
Δ Benefit	-2.517			
	(2.213)			
Post 2011	-109.554	-347.072**		
	(191.084)	(153.462)		
2007			296.118**	
			(116.091)	
2008			622.919***	
			(215.627)	
2009			1347.565***	
			(284.115)	
2010			1462.746***	419.687
			(349.751)	(282.611)
2011			984.631**	-97.959
			(455.189)	(379.712)
2012			1225.800**	-73.154
			(548.131)	(403.469)
2013			1116.913*	-416.910
			(613.184)	(461.784)
Institution FE		X	X	X
Control Variables			X	X
Years Included	All	All	All	2009+
Observations	11,166	10,907	8,118	5,402
R^2	0.006	0.775	0.788	0.804

Standard errors in parentheses, clustered at the state level., ***p-value<.01; **p-value<.05; **p-value<.1 Benefit refers to the change in the maximum tuition benefit in going from the state-level to national-level maximum tuition. Control variables, available starting in 2006: degree-granting status, county-level variables, lagged one year: race proportions, log population, unemployment rate, per-capita income, and proportion below poverty line

Table 3: Tuition Regression Results by For-Profit Status and Type of Degrees ($100)

	(1)	(2)	(3)	(4)	(5)	(6)
	For-Profit		Public		Private	
	All	4-year	All	4-year	All	4-year
Δ Benefit X Post 2011	1.009**	1.011**	0.083	-0.008	0.133	0.229
	(0.472)	(0.450)	(0.124)	(0.213)	(0.292)	(0.347)
Institution FE	X	X	X	X	X	X
Control Variables	X	X	X	X	X	X
Observations	5,402	3,050	7,733	3,019	6,998	6,320
R-squared	0.804	0.851	0.983	0.984	0.992	0.992

Standard errors in parentheses, clustered at the state level, ***p-value<.01; **p-value<.05; **p-value<.1 Δ Benefit refers to the increase in the maximum tuition benefit in going from the state-level to national-level maximum tuition. Sample restricted to 2009 and later. Control variables: degree-granting status, county-level variables, lagged one year: race proportions, log population, unemployment rate, per-capita income, and proportion below poverty line

Table 4: Tuition Results by Level for For-Profit Colleges (per \$100)

	(1)	(2)	(3)	(4)	(5)	(6)
		ln(Tuition)			Tuition	
	All	4-year	<4-year	All	4-year	<4-year
Δ Benefit × Post-2011	0.00006**	0.00007**	0.00003	1.009**	1.011**	-0.064
	(0.00003)	(0.00003)	(0.00005)	(0.472)	(0.451)	(0.978)
Institution FE	X	X	X	X	X	X
Control Variables	X	X	X	X	X	X
Observations	5,402	3,050	2,301	5,402	3,050	2,301
R^2	0.852	0.903	0.816	0.804	0.851	0.750

Note: Standard errors in parentheses, clustered at the state level, ***p-value<.01; **p-value<.05; *p-value<.1. All data are from 2009 to 2014. Control variables include institution and year fixed effects, as well as degree-granting status and lagged one year: race proportions, log population, unemployment rate, per-capital income, and proportion below poverty line for the county that the institution is located.

Table 5: Tuition Results by Direction of Change

	(1) Tuition	(2) ln(Tuition)	(3) Tuition	(4) ln(Tuition)
Post 2011 × For-Profit	-1225.201***	-0.119***		
	(182.427)	(0.020)		
Positive × Post 2011 × For-Profit	376.186	-0.012		
	(238.635)	(0.040)		
Positive × Post 2011	59.051	0.028		
	(81.188)	(0.028)		
Δ in Aid			-2097.766***	-0.186***
			(365.231)	(0.021)
Post 2011			-228.194	-0.021
			(551.541)	(0.034)
Negative ×Δ Benefit × Post 2011			12.863*	0.001
			(7.520)	(0.000)
Positive ×Δ Benefit × Post 2011			1.509	0.001
			(20.344)	(0.001)
Institution FE	X	X	X	X
Control Variables	X	X	X	X
Observations	13673	13673	5533	5533
R^2	0.956	0.985	0.805	0.854

Note: Standard errors in parentheses, clustered at the state level. ***p-value<.01; **p-value<.05; *p-value<.1. All data are from 2009 to 2014. Control variables include institution and year fixed effects, as well as degree-granting status and lagged one year: race proportions, log population, unemployment rate, per-capital income, and proportion below poverty line for the county that the institution is located.

Table 6: Enrollment Regression Results by For-Profit Status and Type of Degrees ($100)

	(1)	(2)	(3)	(4)	(5)	(6)
	For-Profit		Public		Private	
	All	4-year	All	4-year	All	4-year
Δ Benefit X Post 2011	-0.028*	-0.051	-0.020	0.057	0.020	0.030
	(0.017)	(0.051)	(0.036)	(0.074)	(0.020)	(0.023)
Institution FE	X	X	X	X	X	X
Control Variables	X	X	X	X	X	X
Observations	15,214	3,373	9,406	3,183	8,814	7,651
R^2	0.802	0.829	0.977	0.984	0.967	0.967

Standard errors in parentheses, clustered at the state level, ***p-value<.01; **p-value<.05; **p-value<.1 Δ Benefit refers to the increase in the maximum tuition benefit in going from the state-level to national-level maximum tuition. Sample restricted to 2009 and later. Control variables: degree-granting status, county-level variables, lagged one year: race proportions, log population, unemployment rate, per-capita income, and proportion below poverty line

Table 7: Robustness Check-Results by Whether Tuition is Above/Below Maximum Amount for For-Profit Colleges (per $100)

	(1) Tuition	(2) Tuition	(3) ln(Tuition)	(4) ln(Tuition)
Above, Below × Post 2011	1062.263***	212.537	0.052***	-0.003
	(283.198)	(484.600)	(0.001)	(0.031)
Δ Benefit × Post 2011		-0.379		0.000
		(0.689)		(0.000)
Above, Below × Post 2011		8.040*		0.0005**
× Δ Benefit		(4.060)		(0.0002)
Institution FE	X	X	X	X
Control Variables	X	X	X	X
Observations	4,920	4,920	4,920	4,920
R^2	0.796	0.796	0.844	0.844

Note: Standard errors in parentheses, clustered at the state level. ***p-value<.01; **p-value<.05; *p-value<.1. All data are from 2009 to 2014. Control variables include institution and year fixed effects, as well as degree-granting status and lagged one year: race proportions, log population, unemployment rate, per-capital income, and proportion below poverty line for the county that the institution is located.

Table 8: Robustness Check-Tuition Results by Concentration of Veterans for For-Profit Colleges (per $100)

	Army Administrative Data					
	(1)	(2)	(3)	(4)	(5)	(6)
		ln(Tuition)			Tuition	
	No Vets	Vets Present	Vets >10%	No Vets	Vets Present	Vets >10%
Δ Benefit	0.00004	0.00006	0.00010	0.577	1.188*	1.3811**
× Post-2011	(0.00006)	(0.00004)	(0.00006)	(0.691)	(0.631)	(0.550)
Observations	3,545	1,988	1,261	3,545	1,988	1,261
R^2	0.867	0.831	0.820	0.802	0.809	0.804

	VA Enrollment Data					
	(1)	(2)	(3)	(4)	(5)	(6)
		ln(Tuition)			Tuition	
	No Vets	Vets Present	Vets >10%	No Vets	Vets Present	Vets >10%
Δ Benefit	0.00017	0.000067**	0.000065**	3.707	1.022**	1.043*
× Post-2011	(0.00031)	(0.000032)	(0.00006)	(6.324)	(0.584)	(0.557)
Observations	287	5,246	5,044	287	5,246	5,044
R^2	0.828	0.852	0.845	0.841	0.802	0.790

Note: Standard errors in parentheses, clustered at the state level. ***p-value<.01; **p-value<.05; *p-value<.1. All data are from 2009 to 2014. Control variables include institution and year fixed effects, as well as degree-granting status and lagged one year: race proportions, log population, unemployment rate, per-capital income, and proportion below poverty line for the county that the institution is located.

Table 9: Robustness Check-Enrollment Results by Concentration of Veterans for For-Profit Colleges (per $100)

	Army Administrative Data		
	(1)	(2)	(3)
	No Vets	Vets Present	Vets>10%
Δ Benefit × Post-2011	-0.011	-0.088	-0.239*
	(0.015)	(0.067)	(0.116)
Observations	3,539	1,983	1,259
R^2	0.774	0.834	0.881

	VA Enrollment Data		
	(1)	(2)	(3)
	No Vets	Vets Present	Vets>10%
Δ Benefit × Post-2011	0.374	-0.050	-0.052
	(0.353)	(0.049)	(0.045)
Observations	287	5,235	5,033
R^2	0.565	0.792	0.793

Note: Standard errors in parentheses, clustered at the state level. ***p-value<.01; **p-value<.05; *p-value<.1. All data are from 2009 to 2014. Control variables include institution and year fixed effects, as well as degree-granting status and lagged one year: race proportions, log population, unemployment rate, per-capital income, and proportion below poverty line for the county that the institution is located.