



Dear Liang,

Thank you for submitting your proposal. A printable summary is below. Your confirmation number is 19916. A confirmation email will be sent to you within 24 hours.

Applicants will be notified of the status of the proposed project on February 2, 2018.

If you have questions or need assistance regarding your application please contact the AIR Grant staff at 850-391-7109 or [grants@airweb.org](mailto:grants@airweb.org).

## SUMMARY

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Demographics	
Highest degree	
Discipline of highest degree	
Position description	
Staff members in IR office	
Campus type	
Years of experience in IR	
IR Roles	
Year of birth	
Race/Ethnicity	
Gender	

Grant Type
I am applying for a:
Research Grant

Financial Representative
Name
Nancy S. Daneau
Affiliation

New York University

Department

Office of Sponsored Programs

Title

Director

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665 Broadway, Suite 801

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State or Province

NY

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**Additional Contacts**

**Project Description**

**Project title:**

Veterans Going to Graduate School: Evaluating the Impact of the Post-9/11 GI Bill on Graduate School Enrollment

**Statement of the research problem and national importance (limit 750 words):**

- What is the research problem this proposal intends to address?
- How does this topic relate to the research priorities areas of access, affordability, and value of legal or graduate/professional education?
- Why is this topic of national importance?
- Why is it timely to conduct this research at this time?

The proposed research project aims at evaluating the overall impact of the Post-9/11 GI Bill on graduate and professional school attendance among veterans, as well as its potentially heterogeneous impact across veteran groups of different age, gender, race/ethnicity, and disability ratings. It addresses a critical question in the intersection of the commitment to improve veterans' educational attainment and the increasing importance of graduate and professional education.

While voluminous research has confirmed that financial subsidies improve college participation (Angrist et al., 2016; Bound & Turner, 2002; Castleman & Long, 2016; Dynarski, 2000, 2004; Goldrick-Rab et al., 2016; Long, 2004; Seftor & Turner, 2002; Zhang & Ness, 2010), the impact of the Post-9/11 GI Bill on veterans' college participation only starts to gain traction. Since its inception in August 2009, the Post-9/11 GI Bill (a.k.a. the New GI Bill) has provided educational benefits to over 3 million military service members and veterans. In Fiscal Year 2016, about 790 thousand veterans received education benefits under the New GI Bill with a total payment of \$11.6 billion (Department of Veterans Affairs, 2017), which supports a wide range of education and training programs including undergraduate and graduate degree programs. Compared with its immediate predecessor, the Montgomery GI Bill (MGIB), the New GI Bill offers more generous tuition benefits; it also includes stipends to cover monthly living expenses and miscellaneous educational costs. A few recent studies indicated that the New GI Bill has improved undergraduate college participation rates among Post-9/11 veterans (Barr 2015; Zhang 2017).

Meanwhile, knowledge growth and technological innovation have made undergraduate college education increasingly inadequate for many occupations. Mullen, Goyette, and Soares (2003) suggested that graduate education offered a fast track to the most powerful and prestigious positions in the occupational distribution. According to a recent report by the Center on Education and the Workforce at Georgetown University, among the estimated 55 million job openings between 2010 and 2020, about 11% requires a Master's degree or higher (Carnevale, Smith, & Strohl, 2013). Many fast-growing occupations such as managerial and professional, healthcare professional and technical, and education have the greatest volume of job openings for graduate degree holders. There might also be a credentialing aspect to this increasing value of graduate education: As college education became quite a universal phenomenon, many individuals sought to distinguish themselves from others through graduate education.

These two concurrent social contexts—the commitment to improve educational attainment for service members and veterans and the increasing importance of graduate and professional education—make a strong case for conducting rigorous research to advance our understanding of the effect

of the Post-9/11 GI Bill on graduate and professional school attendance among veterans. The proposed study is both timely and of significant national importance for several reasons, with salient policy implications to policymakers, veterans, and higher education institutions.

First, the Post-9/11 GI Bill (and more recently the Forever GI Bill) represent significant financial investment and commitment to veterans who have and will serve in the armed forces. While a few recent studies have examined the effect of the New GI Bill on undergraduate college participation, knowledge is nonexistent on how the bill might have affected graduate and professional school attendance. Understanding the effect of a policy of such a magnitude would help policymakers make continued improvements to the GI Bill so that it serves the evolving needs of future generations of veterans to come.

Second, although holding a graduate degree does not guarantee ultimate career success, it brings greater employment opportunities and better career advancement. The Post-9/11 GI Bill and recent modifications provide a great opportunity to promote veterans' transition to civilian life and enhance their employment prospects. Results of this proposed research project will yield concrete and useful data to help veterans make informed decisions regarding graduate school attendance.

Third, the proposed work extends financial aid literature by not only investigating the overall impact of the New GI Bill on veterans' graduate and professional school attendance, but also delving into potentially heterogeneous impact across veterans' age, gender, race/ethnicity, and disability ratings. For example, women are most represented in the health care, administrative, intelligence, and supply officers in military service, with many of these positions requiring college education. Consequently, women veterans might be more likely to take the advantage of the Post-9/11 GI Bill to attend graduate and professional schools after they separate from military service. Understanding the potentially heterogeneous effect of the GI Bill across different subgroups would help colleges and universities provide better services to an increasingly heterogeneous veteran population.

#### Review the literature and establish a theoretical grounding for the research (limit 1000 words):

- What has prior research found about this problem?
- What is the theoretical/conceptual grounding for this research?

Despite the national visibility of the Post-9/11 GI Bill and increasing importance of graduate and professional education, there exists no empirical study on the proposed research topic. The current study is informed by two strands of research that have examined (1) the effect of financial incentives—including educational benefits under GI bills—on college enrollment, and (2) factors related to graduate and professional school attendance.

#### Effect of financial incentives on college enrollment

The vast majority of studies on financial incentives have focused on undergraduate college education. These studies, almost without exception, used human capital theory as their theoretical framework. That is, financial incentives would improve college enrollment by reducing the cost side of the cost-benefit equation, making the comparison in favor of college participation. Early studies on student demand for higher education were reviewed by Leslie and Brinkman (1987) and Heller (1997), who confirmed that as college tuition decreases, college enrollment rates increase. Recent studies on the effect of financial aid programs on college enrollment have further confirmed that financial subsidies improve college participation, although effects may vary across programs (Angrist et al., 2016; Castleman & Long, 2016; Dynarski, 2000, 2004; Goldrick-Rab et al., 2016; Long, 2004; Sjoquist & Winters, 2012). Deming and Dynarski (2010) concluded that on average, an increase of \$1000 in financial aid improves the likelihood of college enrollment by 4 to 6 percentage points.

The positive enrollment effects of financial incentives among civilian students have also been observed in a handful of studies on the effects of veteran's educational benefits programs. Angrist (1993) used a group of veterans in the 1987 Survey of Veterans and estimated that veteran's educational benefits increased college education by approximately 1.4 years. Bound and Turner (2002) found that the original GI Bill increased college completed by 0.23 to 0.28 year. Similarly, Simon, Negrusa and Warner (2010) found that a \$10,000 increase in educational benefits under MGIB improved its usage by about 5 percentage points. In a recent study on the effect of the New GI Bill, Barr (2015) found that the expansion in veteran education benefits increased college enrollment rate of veterans by approximately 5 percentage points immediately after the bill's adoption. Zhang (2017) extended this line of research by examining the enrollment effect over a longer period of time. Results suggested that the New GI Bill has increased overall college enrollment by about 3 percentage points, with much larger effects immediately after the bill's adoption than in later years. It is worth noting that both Barr (2015) and Zhang (2017) examined college education broadly to include both undergraduate and graduate education. The current study advances this line of research by examining the overall effect of the Post-9/11 GI Bill on graduate and professional education, as well as its potentially heterogeneous impact across groups of different age, gender, race/ethnicity, and disability ratings.

#### Factors related to graduate and professional education

Graduate education is an integral stage of human capital accumulation, a prerequisite to many desirable and prestigious professions with great economic rewards and high social status. In recent decades, the earnings of highly successful professionals have increased sharply, attracting more and more college graduates into graduate and professional schools. However, access to graduate education is not evenly distributed and is heavily influenced by a host of academic and non-academic factors.

Academic factors such as undergraduate academic performance and college selectivity are significant predictors of graduate and professional school enrollment. Simply put, students with higher undergraduate GPAs and graduated from more selective institutions are more likely to attend graduate and professional schools (Eide, Brewer, & Ehrenberg, 1998; English & Umbach, 2016; Mullen, Goyette, & Soares, 2003; Tienda & Zhao, 2017; Zhang, 2005). In addition, individual characteristics exert significant influences on graduate school enrollment. These characteristics include gender (English & Umbach, 2016; Perna, 2004; Sax, 2001), race/ethnicity (English & Umbach, 2016; Millett, 2003; Zhang, 2005), and socioeconomic status (Ethington & Smart, 1986; Tienda & Zhao, 2017; Walpole, 2003; Wakeling, 2005; Wakeling, Tranmer, & Devine, 2009). Finally, financial factors matter; however, the effects vary across students. For example, Malcolm and Dowd (2012) found that cumulative undergraduate debt has a negative effect on graduate program enrollment in the STEM fields. Zhang (2013) found that cumulative undergraduate debt has a negative effect on graduate school attendance for public college graduates, but not for private college graduates.

In short, while research is abundant on determinants for graduate school attendance, there exist no empirical research on factors related to veterans'

participation in graduate and professional education, which presents a significant gap in the literature given that veterans represent an important and growing population on college campuses.

#### The Post-9/11 GI Bill

To understand the impact of the New GI Bill on graduate school enrollment, a brief description of the bill is in order. The New GI Bill became law in June 2008 and went into effect in August 2009, providing education benefits for military members who have served on active duty since September 10, 2001. The main provision of the New GI Bill includes (1) full tuition and fees at in-state public schools, (2) a monthly housing allowance, and (3) up to \$1000 a year for books and supplies. In addition, the bill offers a living stipend based on the location of the institution, which could vary greatly, with the current rate (Grade E5 without dependents) of just under \$1000/month for the least expensive places to over \$3500/month for New York City. Students attending online programs also receive a flat allowance rate; this amount was \$805/month during the 2016-17 academic year. These benefits are much improved over MGIB, which paid a flat amount of about \$1400/month in 2008. Although the New GI Bill went into effect in August 2009, all service members who served post-9/11 were eligible for the educational benefits. Because the educational benefits apply not only to undergraduate education, but also to advanced degree programs, the bill would encourage veterans who already hold college degrees to further their education.

#### Describe the research method that will be used (limit 1000 words):

- What are the research questions to be addressed?
- What is the proposed research methodology?
- What is the statistical model to be used?

The proposed research project attempts to address two specific research questions. First, what is the overall impact of the Post-9/11 GI Bill on graduate and professional school attendance among Post-9/11 veterans? Second, does the effect vary across groups of different age, gender, race/ethnicity, and disability ratings?

To address these research questions, I propose to use Public Use Microdata Sample (PUMS) from American Community Survey (ACS) 2005-2015 and Current Population Survey (CPS) 2005-2015 with its August and October Supplements. (See the data section for details). The primary goal is to determine whether the New GI Bill has improved graduate school enrollment for post-9/11 veterans. As in any policy evaluation study of this kind, the most difficult task is to construct a "counterfactual" (i.e., a scenario of what would have happened if there had been no change in veterans' educational benefits). Schneider et al. (2007) provided a detailed discussion on establishing causal relationships based on observational data. A treatment-control research design is employed in this study. The identification of program effect is based on the timing of program implementation; specifically, I will use the difference-in-differences (DD) strategy, which has been widely used in recent program evaluations and described in the related literature (e.g., Cornwell, Mustard, & Sridhar, 2006; Dynarski, 2000; Zhang & Ness, 2010).

Several issues need to be addressed when using DD in this study. First is program eligibility—who are in the treatment group? Since the New GI Bill is applicable to veterans who have served in the post-9/11 era, the treatment group is straightforward. Selecting a comparison group, however, is not as straightforward. The selection is crucial because the difference between the pre- and post-policy period in the comparison group would be substituted for the difference in the treatment group within a DD framework. An obvious comparison group includes individuals who never served in military (e.g., Barr, 2015; Zhang 2017), assuming similar time effects between veterans and non-veterans. However, veterans are different from non-veterans in important ways. For example, in addition to the requirement of physical and mental fitness for military service, serving the military may alter individuals' educational expectations that may in turn affect their graduate school decisions. In other words, serving in the military is itself part of the treatment of the New GI Bill.

A possible comparison group with military experience could be veterans from the Gulf War era—those who served between 1990 and 2001 but not in the post-9/11 era. Using Gulf War veterans as a comparison group may greatly reduce the biases caused by the unobserved differences between veterans and non-veterans; however, this approach is not without limitations. Because the Gulf War era ended in August 2001, Gulf War veterans who did not serve in the post-9/11 era were at least 27 years old in 2009 when the New GI Bill was adopted. This would restrict the study sample to those older than 27 years of age. Since using non-veterans and Gulf War veterans as comparison groups have both strengths and limitations, I will use both of them in the analysis to check for the robustness and consistency of estimates.

Once the treatment and comparison groups are identified, the application of DD is straightforward. Because ACS and CPS data are cross-sectional surveys on a rolling basis, pre- and post-policy periods are clearly defined, except for the year 2009. Formally, I used the following ordinary least squares regression:

$$y_{it} = \alpha_0 + \beta(\text{Vet}_i * \text{Post}) + \text{Vet}_i + \theta_t \text{ year}_t + Z_{it}' \xi + \mu_{it}$$

where  $y_{it}$  is graduate school enrollment for individual  $i$  in year  $t$ ;  $\text{Vet}_i$  is a binary variable for post-9/11 veterans;  $\text{Post}$  is a dummy variable indicating the implementation of the New GI Bill in 2009;  $\text{year}_t$  is a set of dummy variables representing years (i.e.,  $\theta_t$  is year fixed effect);  $Z_{it}$  includes a set of covariates for individual  $i$  in year  $t$  (i.e., state of residence dummies, age dummies, sex, race/ethnicity dummies). State of residence fixed effects are added to the model to account for the fact that the actual benefit level could vary across states.

One potential problem in estimating this standard DD equation is that the effect of some covariates could be different for treatment and comparison groups. For example, veterans and non-veterans might have different enrollment-age profiles, which necessitates the inclusion of a set of interaction terms between veteran and age dummies. For similar reasons, I include the interaction terms between veteran and other covariates in the model:

$$y_{it} = \alpha_0 + \beta(\text{Vet}_i * \text{Post}) + \text{Vet}_i + \theta_t \text{ year}_t + Z_{it}' \xi + (\text{Vet}_i * Z_{it}') \delta + \epsilon_{it}$$

Sub-group analyses will be conducted based on age, gender, race/ethnicity, and disability ratings to provide more in-depth and nuanced analyses on this topic. One particular issue discussed in the recent literature when using DD estimates is incorrect statistical inference due to serial correlation (Bertrand, Duflo, & Mullainathan, 2004); this is especially severe when the number of clusters or the number of treated groups is small (Abadie, Diamond, & Hainmueller, 2010; Conley & Taber, 2011; Cameron, Gelbach, & Miller, 2011; Cameron & Miller, 2015). In the current analysis, given the large difference in college enrollment rates by age, it is reasonable to control for serial correlation within ages after controlling for its fixed effects.

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### Project Description - Appendix

There are no files attached.

## Datasets

### List the datasets that will be used and explain why they best serve this research (limit 500 words)

I propose to use Public Use Microdata Sample (PUMS) from American Community Survey (ACS) 2005-2015 and Current Population Survey (CPS) 2005-2015 with its August and October Supplements.

ACS collects detailed population and housing information every year based on a national representative sample of households. Since 2005, about 3 million individuals were included in the public use file each year, accounting for about 1% of the U.S. population. Because military members represent a relatively small proportion in the population, larger samples were always preferred, especially when examining effects in subgroups. A total of four years of data (i.e., 2005–2008) before the adoption of the New GI Bill provides a reasonable pre-policy period to observe time trends for my treatment and comparison groups. Because the bill was implemented in August 2009 and because the ACS data were collected throughout the year, the year of 2009 traversed pre- and post-policy periods. Therefore, the year 2009 will be excluded from my pre- and post-policy comparison; however, it will be included when I estimated year-by-year variations in the enrollment effects. For each ACS file, I will extract the following information: state of residence, place of birth, age, sex, race/ethnicity, educational attainment, levels of school enrollment (including graduate school enrollment), military status and, for veterans, whether they served during Gulf War era (i.e., August 1990 to August 2001) or the post-9/11 era, whether they had service-connected disabilities (and disability rating). Considering that graduate school enrollment is the main dependent variable, I will limit the analytic sample to individuals who had baccalaureate degrees.

The CPS is a monthly U.S. household survey, which was originally designed to measure labor market outcomes. The basic monthly survey includes a wide range of demographic and labor force variables similar to ACS survey. In recent years, each basic monthly survey contains about 140 thousand individuals in about 70 thousand household. In addition to the basic monthly survey, some topical supplements are conducted in the same month each year. For example, the October supplement includes detailed school enrollment information; veteran's supplements typically occur in August since 2001 (odd years before 2010 and every year since then). Once a household is selected into the CPS sample, household members participate in four consecutive months, leave the survey during the subsequent eight months, and then participate in another four consecutive months. This unique 4-8-4 rotating panel design would allow matches of observations across adjacent months. By design, about half of all CPS respondents in August (veteran's supplement) are also observed in October (education supplement). The exact number of matches could be less than 50% due to migration, mortality, non-response, and recording errors. It is important to note that while the basic monthly survey includes veteran status, detailed information about when they separated from military service and disability ratings are only available through veteran's supplement. Merging veteran's and education supplements provides a unique opportunity to conduct a more in-depth analysis on veteran's graduate school enrollment.

### Statement of use of restricted datasets (limit 250 words):

Applicants should provide a statement indicating whether the proposed research will require use of restricted datasets. If restricted datasets will be used, the plan for acquiring the appropriate license should be described.

If restricted datasets will not be used, leave this text box blank and click *Save and Continue*.

## Timeline and Deliverables

### Timeline:

Provide a timeline of key project activities.

March 1 – June 30, 2018

1. Download, convert, and review ACS and CPS data files from 2005 to 2015
2. Merge CPS August and October Supplements
3. Review codebooks and refine variable lists
4. Conduct data quality check including matching quality and missing data
5. Finalize data cleaning
6. Prepare and submit research proposal to ASHE 2018 annual conference

July 1 – October 31, 2018

1. Prepare and submit mid-year progress report
2. Conduct descriptive analysis including trend data
3. Estimate multivariate analysis using difference-in-differences framework
4. Draft tables and figures
5. Complete manuscript for ASHE presentation

November 1 – February 28, 2019

1. Finalize statistical models; revise tables and figures accordingly
2. Refine literature review as needed
3. Present the project at the Access Group Legal Education Research Symposium
4. Present the project at the ASHE conference
5. Prepare and submit final report
6. Submit one or more research articles for peer-reviewed publications

### Deliverables:

List deliverables such as research reports, books, and presentations that will be developed from this research initiative.

The project will result in the following deliverables:

1. Mid-year progress reports to ACCESS/AIR on July 1 and November 1, 2018
2. Presentation at the Access Group Legal Education Research Symposium
3. Presentation at the 2018 ASHE annual conference
4. Final report to ACCESS/AIR by February 28, 2019
5. Research article(s) to be submitted for publication in Educational Evaluation and Policy Analysis, Education Finance and Policy, and/or Research in Higher Education.

#### Disseminate results:

Describe how you will disseminate the results of this research.

(Note: Costs of travel to meetings should be calculated on the budget page.)

A four-part dissemination plan is in place for this research project:

1. Main results from this project will be presented at the ACCESS/AIR Legal Symposium and ASHE/AERA conferences. Feedback from conference presentations will be incorporated into the final report and manuscript(s) for journal submission.
2. Working papers will be disseminated through NYU Steinhardt Institute for Higher Education Policy (SIHEP) where I serve as a faculty fellow. NYU Steinhardt offers excellent online forum and e-newsletters to disseminate faculty research. See NYU News and Steinhardt At a Glance for NYU internal coverage of my previous project on veterans and Post-9/11 GI Bill.
3. Manuscripts based on this project will be submitted for publication in Education Evaluation and Policy Analysis, Education Finance and Policy, and/or Research in Higher Education.
4. I will work with NYU Steinhardt's press officer and distribute a press release to reporters who are interested in veteran issues. Examples of media coverage of my previous project on veterans can be found at Military Times, Social Work Helper, Futurity, and Phys.org.

#### IRB Statement

##### Statement of Institutional Review Board approval or exemption (limit 250 words):

As part of the proposal, a statement outlining a plan for Institutional Review Board (IRB) approval is required. The statement should outline the applicant's timeline and plan for submitting the proposal to an IRB or explain why IRB approval is not necessary. Final IRB action is not necessary prior to submitting the application.

Because the data used in this project include Public Use Microdata Samples from American Community Survey and Current Population Survey, this project does not require IRB approval under NYU Institutional Review Board Guideline.

#### Biographical Sketch(es)

##### Biographical sketch (limit 750 words):

Dr. Liang Zhang is a Professor of Higher Education in the Department of Administration, Leadership, and Technology at the NYU Steinhardt School of Culture, Education, and Human Development. He holds a PhD in Economics from Cornell University and a PhD in Higher Education from the University of Arizona. His research focuses on higher education economics, finance, and public policy, particularly on the role of governments and institutions in affecting institutional performances and student outcomes. His recent studies include (1) the impact of college education on student outcomes post-graduation, (2) the efficacy of federal, state, and institutional policies on college access and success, (3) the changing landscape of the academic labor market and its consequences, and (4) research production at higher education institutions across the globe.

Dr. Zhang will be responsible for all aspects of this project. He has extensive knowledge in national databases sets available from NSF, NCES, BLS, and Census and has used various such data sets in previous research projects, including projects examining the effects of merit aid programs on student enrollment, college choices, and degree completion. One graduate research assistant will work with Dr. Zhang by identifying and screening recent and emerging literature. The graduate assistant will also assist in identifying and obtaining variables, converting the data into necessary formats, and conducting some of the analyses depending on his/her qualifications.

#### Budget

- [Zhang budget](#)

#### Funding History

##### Funding history (limit 250 words):

A statement of prior, current, and pending funding for the proposed research from all sources is required. The statement should also include a history of all prior funding from AIR to any of the PIs for any activity. Funding from other sources will not disqualify the application but may be considered in the funding decision.

There is no prior, current, or pending funding for the proposed research project. I have not received funding from AIR before.

#### Dissertation Advisor Letter of Support

There are no files attached.

#### How Did You Hear About This Grant Opportunity?

Check all that apply:

- Association for Institutional Research (AIR) website or direct communication
- Association for the Study of Higher Education (ASHE)
- Other (please list below)

Colleagues



# Research Grant Proposal Budget Form



Name: Liang Zhang

### Personnel - Salary

Principal Investigator \$

Second Principal Investigator \$

Third Principal Investigator \$

Graduate Research Assistant \$

### Travel

2018 AccessLex Institute Legal Education Research Symposium: Principal Investigator \$

2018 AccessLex Institute Legal Education Research Symposium: Second Principal Investigator \$

2018 AccessLex Institute Legal Education Research Symposium: Third Principal Investigator \$

2018 AccessLex Institute Legal Education Research Symposium: Graduate Research Assistant\* \$

Other research related travel: \$

(Note: Other planned travel should be listed in the "Timelines and Deliverables" section)

### Other research expenses

*Please provide a breakdown of expenses below and add the total value in the box to the right.* Allowable expenses include: materials, such as software, books, supplies, etc.; consultant services, such as transcription, analysis, external researchers, etc.; and costs for publishing articles in journals. The purchase of computer hardware, overhead or indirect costs, and living expenses are not allowable. If you have questions about specific expenditures, please contact AIR. \$

TOTAL REQUESTED – Maximum Allowable is \$50,000 \$

*\*Note: The AccessLex Institute believes graduate student professional development and mentoring opportunities are important aspects of the Research Grant Program. Therefore, Research Grant recipients are strongly encouraged to designate funds for graduate student travel for the AccessLex Institute Legal Education Research Symposium Presentation.*