

# How Does the “Tax Cuts and Jobs Act” Affect Ph.D. Students?

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*(Revised November 7, 2017: Fixed typo on standard deduction amount. Added extended health insurance costs to MIT calculations. Added section “Effects on Other Students.” [Original here](#))*

*Legal disclaimer: This work is my own, and I am not a tax expert.*

## Summary

On Thursday, November 2, 2017, House Ways and Means Committee Chairman Kevin Brady (R-TX) introduced the Tax Cuts and Jobs Act<sup>[1]</sup>. One of this bill’s provisions is the repeal of the deduction for qualified tuition and related expenses. Most Ph.D. programs in the United States, particularly in STEM disciplines, offer tuition remission to their students in exchange for either a teaching appointment (TA) or a research assistantship (RA). As a result, this provision would specifically target these students and increase their tax burdens. In this document, we examine the exact costs of the House tax plan on Ph.D. students. We find that this provision is significant at both public and private institutions, but it is much stronger at private institutions due to their higher tuitions. We estimate the federal income tax for a TA at UC Berkeley, an RA at UC Berkeley, and an RA at MIT; we find that the Tax Cuts and Jobs Act will respectively increase their tax burdens from \$2,229 to \$3,641 (61% increase), \$3,590 to \$4,730 (31% increase), and \$3,993 to \$13,577 (240% increase). We further estimate the federal income tax for a UC Berkeley student on fellowship, which would likely decrease from \$3,719 to \$3,156 (15% decrease). We briefly discuss how out-of-state students, international students, and students with families might be affected.

## The Tax Cut and Jobs Act

The Tax Cut and Jobs Act<sup>[2],[3]</sup> (TCJA) makes four major changes to the tax code that are relevant to this analysis.

First, it changes federal income tax brackets. The current brackets<sup>[4]</sup> for a single filer are below on the left, and the proposed brackets<sup>[3]</sup> are on the right:

10% for \$0 to \$9,325	12% for \$0 to \$45,000
15% for \$9,325 to \$37,950	25% for \$45,000 to \$200,000
25% for \$37,950 to \$91,900	35% for \$200,000 to \$500,000
28% for \$91,900 to \$191,650	39.6% for \$500,000+
33% for \$191,650 to \$416,700	
35% for \$416,700 to \$418,400	
39.6% for \$418,400+	

Second, it increases the standard deduction. For a single filer in 2017, this increases from \$6,350 to \$12,000<sup>[3]</sup>.

Third, it eliminates the personal exemption, which is \$4,050 for 2017<sup>[3]</sup>.

Fourth, it eliminates the deduction for qualified tuition and related expenses. To quote directly from the Tax Cuts and Jobs Act Summary<sup>[3]</sup>: *“Under current law, qualified tuition reductions provided by educational institutions to their employees, spouses, or dependents are excluded from income. The exclusion may be provided in the form of either reduced tuition or cash. The reduction must be part of a program that does not discriminate in favor of highly compensated employees and may not apply to graduate programs (except for a graduate student who is teaching or a research assistant) ... Under the provision, the deduction for interest on education loans and the deduction for qualified tuition and related expenses would be repealed. The exclusion for interest on United States savings bonds used to pay qualified higher education expenses, the exclusion for qualified tuition reduction programs, and the exclusion for employer-provided education assistance programs would also be repealed.”* Or, equivalently, the bill’s text<sup>[2]</sup> strikes U.S. Code Title 26, Subtitle A, Chapter 1, Subchapter B, Part III, Section 107(d)<sup>[5]</sup>.

## Effects on UC Berkeley

Here, we analyze the effects of the bill on a typical UC Berkeley Ph.D. student, and we calculate their tax burden under both current law and the proposed bill. At UC Berkeley, most students will be funded by positions as teaching assistants (TA) or research assistants (RA). These positions generally provide waivers for in-state tuition and the University-run health insurance program, as well as a monthly salary. According to current law, federal income tax must be paid on the salary and the health insurance waiver, but not on the mandatory tuition and fees<sup>[6]</sup>. The TCJA would require Ph.D. students to pay federal income tax on all these benefits.

First, we consider a student who is a TA for all twelve months in 2017. A “standard” TA appointment is usually 20 hrs/week, or 50% of full-time employment, and is most commonly at the Step 1 salary rate. We use the contractually-obligated rates<sup>[7]</sup> to determine that this student will earn \$24,241 of income in 2017. In addition, she will get health insurance through the UC Berkeley SHIP program, which costs \$2,073 for Spring/Summer 2017<sup>[8]</sup> and \$2,231 for Fall 2017<sup>[9]</sup>. She will also get a waiver for in-state tuition, which costs \$6,759 for Spring 2017<sup>[10]</sup> and \$7,034 for Fall 2017<sup>[11]</sup>. With this information and the appropriate deductions and tax brackets, we can calculate her 2017 tax burden. **We find that her federal income tax would be \$2,229 under current law, and \$3,641 under the TCJA, or a 61% increase.** Please see the end of this document for a more detailed derivation of this result.

Second, we consider a student who is an RA for all twelve months in 2017. At UC Berkeley, RA appointments can vary by department, but a “standard” appointment in science departments, like Physics and Chemistry, is roughly on par with 48% of full-time employment at the Step 9 salary rate<sup>[12]</sup>. Thus, we estimate that her 2017 income will be \$33,317. The tuition and health insurance benefits listed in the previous paragraph apply here, as well, so we can again calculate her federal income tax. **We find that her federal income tax would be \$3,590 under current law, and \$4,730 under the TCJA, or a 31% increase.**

## Effects on MIT

Here, we estimate the effect of the TCJA on the tax burden of an MIT student, primarily to note the increased burden on students at private institutions, where tuitions are much higher. MIT has a similar structure to Berkeley; at both schools, a Ph.D. student gets a salary and tuition remission. At MIT, however, the health insurance system is set up differently. The cost of tuition includes the standard MIT Student Medical Plan, but not the the MIT Student Extended Insurance Plan (SEIP), which is required to be in accordance for the Affordable Care Act<sup>[13,16]</sup>. RA appointments at MIT do generally include the extended plan<sup>[17]</sup>, and the cost of the SEIP is included as taxable income under both current law and the TCJA. Furthermore, for simplicity, we assume that the salary and tuition over the year are fixed at the Fall 2017 rates.

An MIT Ph.D. student who is an RA for all twelve months in 2017 will get a salary of approximately \$37,128<sup>[14]</sup>, and a health insurance plan valued at \$3,000<sup>[13]</sup>. The cost of a year of tuition at MIT is about \$49,580<sup>[15]</sup>. With these figures, we can estimate the student’s 2017 tax burden. **We find that her federal income tax would be \$3,993 under current law, and \$13,577 under the TCJA, or a 240% increase.** We also note that her tax burden is about 37% of her salary.

## Effects on Other Students

Not all students fall neatly into the categories listed above of TAs and RAs. Some are on fellowships, like the National Science Foundation Graduate Research Fellowship Program (GRFP), in which case they get a stipend as an award for excellence in their studies, rather than directly for a TA/RA job. Many are out-of-state or international students at public universities, in which case tuition costs are higher. Some students are married or have children. This section is meant to explore how the TCJA might affect them.

Here, we consider a UC Berkeley student who is on a fellowship, namely the GRFP. This program provides three years of a \$34,000 annual stipend and a \$12,000 cost-of-education allowance for tuition and fees, paid to the institution directly. Since \$12,000 is not enough to cover tuition, fees, and health insurance at UC Berkeley, most departments will make up the

difference for their students. Current tax law<sup>[5]</sup> distinguishes between two categories of tuition deductions: “qualified scholarships” and “qualified tuition reductions.” The former is defined as “any amount received by an individual as a scholarship or fellowship grant to the extent the individual establishes that, in accordance with the conditions of the grant, such amount was used for qualified tuition and related expenses.” We believe that the GRFP, as well as any extra stipend that departments pay to cover the entire cost of attendance, would fall into this category under both current law and the TCJA. The latter category is defined as “the amount of any reduction in tuition provided to an employee of an organization described in section 170(b)(1)(A)(ii) for the education (below the graduate level) at such organization...”, and that “In the case of the education of an individual who is a graduate student at an educational organization described in section 170(b)(1)(A)(ii) and who is engaged in teaching or research activities for such organization, paragraph (2) shall be applied as if it did not contain the phrase ‘(below the graduate level)’.” This does not seem to apply to the GRFP.

With this assumption, the TCJA would not affect whether tuition is treated as taxable income, because the TCJA only removes qualified tuition reductions<sup>[2]</sup>. So, a student on fellowship would be able to continue treating her stipend as taxable, her health insurance costs as taxable, and her tuition waiver as non-taxable. Then, we can calculate her 2017 tax burden using a \$34,000 annual stipend, and the same costs for tuition and insurance we described above. **We find that her federal income tax would be \$3,719 under current law, and \$3,156 under the TCJA, or a 15% decrease.** Note that this number will not change much by institution, because it only depends on health insurance costs, which vary less than tuition.

It is worth discussing the TCJA’s effect on out-of-state and international students, but it is hard to do so. At most public institutions, out-of-state students (i.e. non-Californians at a UC school) will pay a substantially higher tuition. At UC Berkeley, this amounts to an extra \$15,102<sup>[10,11]</sup> in 2017. Most departments will pay the difference for their out-of-state students who are TAs/RAs, but the question arises, does this count as taxable income? An equivalent question is, does this extra stipend count as a qualified scholarship given by the department, or is it a qualified tuition reduction granted for TA/RA work? The answer is unclear. If it is a qualified scholarship, then out-of-state students will not be affected any differently than in-state students by the TCJA; if it is a qualified tuition reduction, then the extra tuition will count as taxable income. If we assume the latter, then we find that an out-of-state TA would pay an extra \$1,869 in taxes relative to her in-state colleague, and an out-of-state RA would pay an extra \$3,049.

For international students, the situation is even more complicated. First, the tuition is generally higher for them than for domestic students, both in-state and out-of-state. For example, at UC Berkeley, the cost of tuition is \$4,564 higher for the 2017-18 year for international students than for out-of-state students<sup>[11,18]</sup>. In addition, most international students are not eligible for the standard deduction<sup>[19]</sup>. They are usually eligible for one personal exemption<sup>[19]</sup>, but this is being eliminated by the TCJA in exchange for a higher standard deduction. The most complicated feature, however, is that many nations have treaties with the United States, creating special rules for how their citizens are taxed when working here. Each nation would need to be treated

separately. As a result, doing a detailed calculation for how the TCJA affects international students would be beyond the scope of this work.

Finally, it is worth mentioning that this entire work has been for single filers. The TCJA makes many modifications to tax law for families, including different tax brackets, new tax rates, elimination of the personal exemption, and changes to the child tax credit. Graduate students who are married or have children will undoubtedly be affected in different ways than single filers. Unfortunately, that analysis is also beyond the scope of this paper.

## **Conclusions**

It is clear that the TCJA's provision to repeal the deduction for qualified tuition and related expenses would have a negative impact on most Ph.D. students by increasing their federal income tax burden. The effects of a larger standard deduction and lower rates above \$9,325 are outweighed by the effect of adding tuition remission as taxable income. Higher tuitions naturally lead to steeper increases; when we compare UC Berkeley to MIT, we see that the tax increase is disparate by nearly an order of magnitude.

National research universities (i.e. Ph.D.-granting institutions) tend to have similar tuition costs and stipends, so we can use UC Berkeley and MIT as models for many public and private universities. This equivalence is, of course, not perfect because there is variance between institutions. Nevertheless, we see strong evidence that a Ph.D. student at a public university would see their taxes go up by 30-60%, and a student at a private university would see their taxes increase by a factor of 2-4.

## References

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- [17] <https://osp.mit.edu/sites/osp/files/uploads/ay-16-17-ra-ta-memo-2016-04-21.pdf>
- [18] <https://internationaloffice.berkeley.edu/students/current/expenses>
- [19] <https://www.irs.gov/pub/irs-pdf/p4011.pdf>

## Appendix: Detailed Calculations

### UC Berkeley (TA)

Annual Income: \$24,241  
Health Insurance Waiver: \$4,304  
Tuition Waiver: \$13,793

	Current Law	House Tax Plan
Total Income:	\$28,545	\$42,338
Standard Deduction:	(\$6,350)	(\$12,000)
Personal Exemption:	(\$4,050)	(\$0)
Taxable Income:	\$18,145	\$30,338
Tax:	\$2,256	\$3,641

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### UC Berkeley (RA)

Annual Income: \$33,317  
Health Insurance Waiver: \$4,304  
Tuition Waiver: \$13,793

	Current Law	House Tax Plan
Total Income:	\$37,621	\$51,414
Standard Deduction:	(\$6,350)	(\$12,000)
Personal Exemption:	(\$4,050)	(\$0)
Taxable Income:	\$27,221	\$39,414
Tax:	\$3,617	\$4,730

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### MIT (RA)

Annual Income: \$37,128  
Health Insurance Waiver: \$3,000  
Tuition Waiver: \$49,580

	Current Law	House Tax Plan
Total Income:	\$40,128	\$89,708
Standard Deduction:	(\$6,350)	(\$12,000)
Personal Exemption:	(\$4,050)	(\$0)
Taxable Income:	\$29,728	\$77,708
Tax:	\$3,993	\$13,577

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UC Berkeley (GRFP)

Annual Income: \$34,000  
Health Insurance Waiver: \$4,304  
Tuition Waiver: \$13,793

	Current Law	House Tax Plan
Total Income:	\$38,304	\$38,304
Standard Deduction:	(\$6,350)	(\$12,000)
Personal Exemption:	(\$4,050)	(\$0)
Taxable Income:	\$27,904	\$26,304
Tax:	\$3,719	\$3,156

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UC Berkeley (TA, out-of-state)

Annual Income: \$24,241  
Health Insurance Waiver: \$4,304  
Tuition Waiver: \$28,895

	Current Law	House Tax Plan
Total Income:	\$28,545	\$57,440
Standard Deduction:	(\$6,350)	(\$12,000)
Personal Exemption:	(\$4,050)	(\$0)
Taxable Income:	\$18,145	\$45,440
Tax:	\$2,256	\$5,510

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UC Berkeley (RA, out-of-state)

Annual Income: \$33,317  
Health Insurance Waiver: \$4,304  
Tuition Waiver: \$28,895

	Current Law	House Tax Plan
Total Income:	\$37,621	\$66,516
Standard Deduction:	(\$6,350)	(\$12,000)
Personal Exemption:	(\$4,050)	(\$0)
Taxable Income:	\$27,221	\$54,516
Tax:	\$3,617	\$7,779

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