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Tax bill would imperil nation's innovation, future

Many observers are deeply skeptical of higher education. At this political moment, distrust of the academy is being translated into law in ways that will damage our nation. State funding support for public universities is eroding.

Important concerns about the cost, accessibility and effectiveness of education are being translated into tax bills that will harm students.

Although the value of research spending is being questioned, the value of research results for U.S. innovation — such as Google or the smart phone — is not. By placing additional burdens on students, the current tax bill threatens the very foundation of our nation's research success — the people whose work and training allow them to carry new ideas and skills from academic research groups to workplaces in many different sectors and industries — as well as future tax revenue.

At major universities, research is also teaching. Graduate training in the practice of research supports discovery and enables its application. Research creates ideas, and training transmits them. The students who do both things carry them out into the world where they



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have an impact on all our lives. J. Robert Oppenheimer said it best: "The best way to send knowledge is to wrap it up in a human being." This is just what graduate education through research does. It is what the current tax bill threatens.

This isn't just supposition; anecdotes abound. For instance, the discovery of a new search algorithm and the founding of a company, Google, to implement it was driven by graduate students working on a National Science Foundation-funded project at Stanford University. A key set of discoveries underpinning the multi-touch capabilities that allow iPhone users to scroll and zoom result from work done by a graduate student at the University of Delaware.

Large-scale, systematic data is becoming available. Work we published with collaborators in Science magazine demonstrates that research-trained graduate students who take

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industry jobs work in the most productive businesses in the most cutting-edge industries. Forthcoming work shows the critical role research training plays in creating successful startups that survive and create new jobs.

The tax bill passed by the House will dim our economic future — innovative workforce, startups, productive firms, competitive industries, even future tax revenue. Limiting the ability of graduate students from across the country and the income spectrum to pursue research and training together will also endanger our major research universities. These are the places where research and training, hand in hand, are likely to produce the greatest concentrations of new discoveries.

Increasing taxes on graduate students will unambiguously reduce that flow of ideas and imperil our national success. Moreover, the benefits of investments in training — the higher pay that trainees make and the

increased economic activity they generate — are taxed. If training is discouraged by higher taxes today, future tax revenue will be reduced.

Why are we so sure? Because we are looking at evidence. The Institute for Research on Innovation and Science (IRIS), founded by my co-authors, Julia Lane from New York University and Jason Owen Smith from the University of Michigan, and me is a consortium of major research universities who share data to make just these kinds of analyses possible. We combine confidential data from universities and the U.S. Census Bureau for the first time to examine the careers of people trained in research. These data allow us to more fully understand how graduate students play key roles in research and its results. In 2015, nearly 43 percent of employees (more than 51,000 people) paid by federal grants at 23 IRIS universities were students.

Links from university data to restricted Census information allow us to

document that research-trained graduate students get jobs in industries such as pharmaceuticals, chemical manufacturing, semiconductors, computer systems design and specialty hospitals and at high-wage companies. When they pursue entrepreneurial jobs, the startups that hire those graduate students have employment growth that is 6-20 percentage points higher than other startups and revenue growth that is as much as 3 percentage points higher.

The value of the results of research and training of graduate students is clear. If the tax-bill proponents expect to grow and stimulate the economy with tax cuts, the way to do that is to cut taxes on those that help generate economic growth — graduate students and universities — not increase them. That is the surest way to create jobs and continue our national lead in innovation.

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Alabama, thankfully, says no to Trump's tribalism

There are so many things I could say right now after watching Doug Jones defeat Roy Moore in the Senate race in Alabama, but for me it comes down to just two words: "Thank you."

Thank you to the majority of Alabamians, for loving our country more than you hated Democrats. Thank you for voting as citizens, not as members of a tribe. Thank you for understanding that sending a credibly accused child molester to represent Alabama in the U.S. Senate would not only have denigrated your state, it would have denigrated that whole legislative body. Thank you for seeing the decency of Doug Jones, even though he is a Democrat, and seeing the indecency of Roy Moore.



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And most of all, thank you for sending a message to Donald Trump and Stephen Bannon that you are not as dumb as they think you are. That you see what they are up to — trying to use divisive tweets and racist dog whistles to get as many Americans as possible so aroused and inflamed that they won't think about the real issues, they won't think about the actual candidates, they won't think about the national interest, or even

their own self-interest, but just how much they dislike "the other" — and you're not buying it anymore.

God bless every one of you. Yours was a deeply patriotic act.

It's too soon to say for sure, of course, whether this is a national trend, but when the majority in a deep-red state like Alabama — where anti-abortion sentiments run so high, making it nearly impossible for a pro-choice Democrat to be elected — repudiates the effort by Trump and Bannon to turn us from citizens into tribes, there is hope for the country after all. It is a real sign of health.

We've confronted such thinking before in our history. But in the past moments of raw, tribal/

cultural divisions, our system was always able to produce leaders able to summon our better angels and pull us together to rise to the challenges of the day.

But even with Jones' victory in Alabama, I worry that technology — social networks in particular — and archaic laws that prevent new players from entering politics work against the emergence of such national leaders. I worry that irreversible damage is being done to our norms and institutions by this poisonous cocktail of Trump, Twitter and tribalism.

I was not surprised to hear former Facebook executive Chamath Palihapitiya tell CNBC on Tuesday that social media is creating a society that confuses popularity

with truth. The tools we've created, he explained, "are starting to erode the social fabric of how society works."

It's easy to forget, in this age of Twitter, how much a daring leader who can pull people together can accomplish — even in the most difficult of times.

Maybe, just maybe, the narrow majority in Alabama has sent both Trump and the country a message. We are fed up with your cynicism, we are fed up with your effort to break us into tribes, we want a president who is a uniter, not a divider, because we have big hard work to do as a country right now — and it can only be done together.

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