

# Eroding Our Foundation: Sequestration, R&D, Innovation and U.S. Economic Growth

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*Unless changed,  
sequestration will result  
in significant cuts to  
federal R&D investments  
from 2013-2021 and  
lead to GDP losses of up  
to \$860 billion.*

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## EXECUTIVE SUMMARY

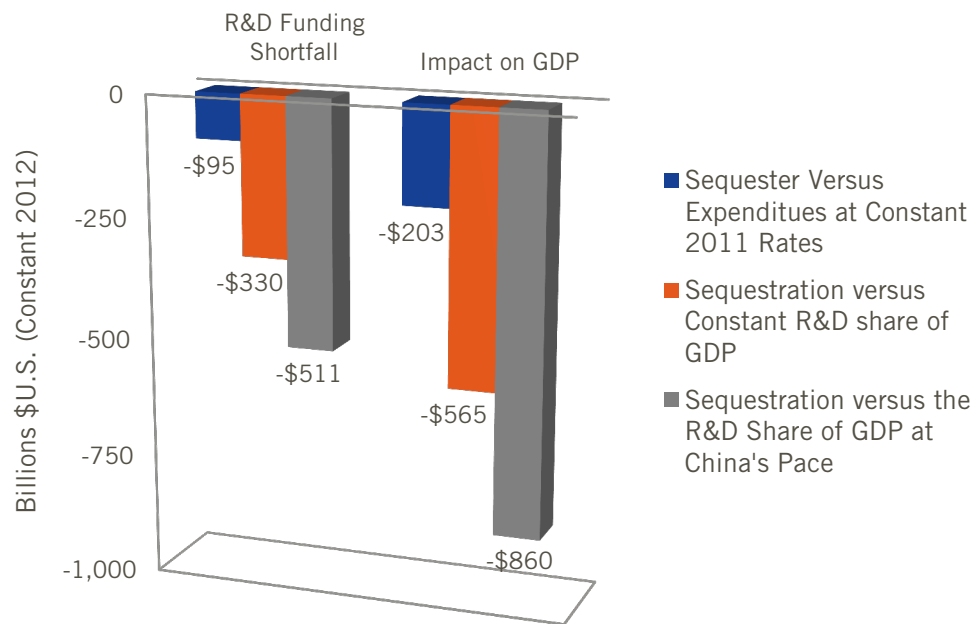
Because of the Budget Control Act, budget enforcement procedures known as *sequestration* will commence January, 2013 unless Congress and the Obama Administration act otherwise. The sequester requires cuts in discretionary spending to achieve \$1.2 trillion in savings from 2013-2021. When compared to 2011 spending levels, this will lead to a cut of 8.7 percent (or \$12.5 billion) of federally-funded research and development (R&D) in 2013.

Because of the key role federal R&D plays in driving U.S. innovation, productivity, and economic growth; we estimate that the projected decline in R&D will reduce GDP by between \$203 billion and \$860 billion over the nine year period, depending on the baseline used. At \$203 billion, the loss is equivalent to taking away from U.S. consumers all the new motor vehicles purchase over six months, over two years of airline travel, or six years of attendance at professional sporting events. These R&D cuts will also result in job losses of approximately 200,000 in 2013. Reducing the budget deficit is important, but it should not and does not have to come at the expense of growth-inducing investments in areas like federal support for R&D. In fact, undermining growth capability is disruptive of a deficit control policy.

We generate these estimates by comparing sequestration to three alternative benchmarks. First, we compare sequestration to a benchmark that holds discretionary expenditures constant at their 2011 rates; just as the Office of Management and Budget (OMB) and Congressional Budget Office (CBO) did when determining how much would be sequestered from each agency starting in 2013. Under this scenario we find that sequestration of federal R&D will lead to a shortfall of \$95 billion from 2013-2021. Second, we introduce a benchmark where the R&D share of GDP remains constant. It

should be noted that from 1994 through 2009, R&D expenditures have outpaced GDP growth by 20 percent, so even this benchmark would result in slower growth in R&D than in the past. Using this benchmark would result in a R&D shortfall of \$330 billion. In other words, in order to increase federal R&D expenditures at a rate that simply keeps pace with the rest of the economy we would need to invest \$330 billion more that sequester allows over the 2013-2021 period. Lastly, we consider what the level of R&D expenditures would need to be for federal R&D expenditures to grow at the same rate as China's relative to its economy. Sequestration will leave the United States \$511 billion behind in R&D investment when compared to expected Chinese R&D expenditure growth rates.

R&D is a critical source of economic growth and therefore we estimate the implications of these cuts to the economy at large. We use the latest academic estimates which show how R&D impacts productivity to build an empirical model that analyses the impacts of R&D sequestration on GDP. To be clear, the effects to GDP do not stem from short-run reductions in government expenditures (Keynesian effects); rather the estimated effects are caused by the reduction in R&D and its impact on the underlying mechanisms of growth. Figure 1 shows the estimates of the cuts in federal R&D expenditures from sequestration and the related losses to GDP stemming from reduced innovation over the 2013-2021 period.



**Figure 1: R&D Funding Shortfalls and the Related Losses in GDP: 2013-2021 Cumulative Effect, Sources: NSF, OMB, CBO, BEA, ITIF**

In addition to the losses in productivity and GDP, we find that R&D sequestration would also reduce the knowledge base (publications and patents), U.S. international competitiveness, and employment. We estimate that sequestration compared to the CBO baseline of no real growth in federal R&D budgets would result in U.S. scientific journal

publications declining almost 8 percent and patents almost 3 percent over the decade-long period.

In order to estimate the effects of sequestration on employment, we use a similar technique to the GDP model, but supplement it with more traditional measures of how changes in federal spending affect employment. The employment effect from cutting R&D comes from both the short-term job losses from current worker displacement, and the longer-term effects from less innovation as related to the formation of new firms. We estimate that if sequestration of R&D goes into effect, the U.S. economy will have approximately 200,000 fewer jobs per year between 2013 and 2016. This would result in the U.S. unemployment rate being 0.2 percentage points higher than it otherwise would be.

In summary, this report models the impact of R&D cuts from sequestration on the U.S. economy. The report first explains how sequestration will impact R&D expenditures and the U.S. innovation system. Next, the report presents the conceptual model and previous research explaining how R&D funding impacts the economy at large. Subsequently, based on the latest academic research, we estimate the effects of the R&D expenditure cuts on: productivity and GDP, the knowledge base (patents and publications), the U.S. standings in the global innovation system, and finally employment.

While ensuring that the federal budget crisis comes under control is critical, everything should not be “on the table” when doing this. Cutting federal support R&D, a key “fuel” for the U.S. innovation economy engine, would not only lead to a relatively smaller U.S. economy and higher unemployment, it would reduce U.S. global competitiveness precisely at a time when the U.S. economy is struggling to stay in the race for global innovation advantage.

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## ABOUT ITIF

The Information Technology and Innovation Foundation (ITIF) is a Washington, D.C.-based think tank at the cutting edge of designing innovation strategies and technology policies to create economic opportunities and improve quality of life in the United States and around the world. Founded in 2006, ITIF is a 501(c) 3 nonprofit, non-partisan organization that documents the beneficial role technology plays in our lives and provides pragmatic ideas for improving technology-driven productivity, boosting competitiveness, and meeting today's global challenges through innovation.

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