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How Does Defense Spending Affect Economic Growth?

In recent years, there has been a growing debate about the U.S. role in the world, or U.S. grand strategy. A grand strategy guides choices about how to manage relations with allies and adversaries, where to forward deploy U.S. forces, and how much to spend on defense. Some analysts argue that the United States remains incredibly powerful and geographically distant from its adversaries, allowing it to remain secure with a reduced global footprint and without spending as much on defense as in previous years.¹ Others argue that the threats to the United States are plentiful and must be countered with policies that require the current or an even higher level of defense

KEY FINDINGS

This report is the first in a series on the security and economic trade-offs associated with competing visions for U.S. grand strategy—that is, the U.S. approach to the world. We focus on an underexamined aspect of the decision calculus about U.S. grand strategy: the relationship between U.S. defense spending and economic growth. We arrive at the following key conclusions:

- Prioritizing defense spending over infrastructure investment, a long-standing domestic concern, might undermine economic growth and, therefore, resources available for defense in the long run.
- Prior to the pandemic response, spending on national defense was roughly half of discretionary spending, so defense spending contributes notably to annual deficits, even if it is not the main driver.
- Economists generally believe that the rising U.S. public debt will eventually undermine growth, but there is disagreement as to exactly when or how.
- As public debt rises, there is a risk that defense spending might eventually have a deleterious effect on growth, unlike during the Cold War, when public debt was lower.
- The economic literature is not conclusive on how increasing taxes to maintain or increase defense spending would affect economic growth.

Abbreviations

CBO	Congressional Budget Office
COVID-19	coronavirus disease 2019
DoD	Department of Defense
DSGE	dynamic stochastic general equilibrium
FY	fiscal year
GDP	gross domestic product

spending.² Those responsible for making decisions about grand strategy and levels of defense spending must consider a number of economic and security trade-offs, which the RAND Center for Analysis of U.S. Grand Strategy is considering in a series of reports. This first report in the series focuses on one dimension: possible trade-offs between defense spending and U.S. economic growth.

Compared with other aspects of the debate about U.S. grand strategy, there has been less focus on the economic trade-offs associated with U.S. strategic choices and defense spending specifically. Yet these trade-offs might be of greater public interest in coming years. In early 2021, as the United States remains in a recession amid an ongoing pandemic, questions about how different budget choices affect economic performance might become more salient. In fact, some politicians are calling for reductions in defense spending, and analysts note that pressure for cuts might increase as demands grow for domestic spending to respond to the coronavirus disease 2019 (COVID-19) pandemic and the associated recession.³ Once the immediate crisis has passed, the country will have an even larger public debt than before and might also have to grapple with the question of what level of defense spending is sustainable in the long run.⁴

We evaluate competing arguments about the effect of defense spending and economic growth that have been put forward in the debate about U.S. grand strategy. Supporters of sustaining or increasing U.S. defense spending argue that large defense budgets are not only necessary for U.S. security; they are also

affordable. These analysts argue that during the Cold War, the United States spent a much larger share of its gross domestic product (GDP) on defense, yet it continued to see economic growth.⁵ These analysts do not argue that the country should increase defense spending to promote growth during this recession, but rather that sustaining or increasing defense spending based on international conditions is not harmful to growth.⁶ These analysts acknowledge that annual deficits and public debt are growing over the long term, but they argue that mandatory programs, such as Social Security and Medicare, not defense, are the primary drivers. In this context, they argue that cutting defense spending would have little effect on U.S. fiscal health or any of the negative effects associated with growing public debt.⁷ In sum, these strategists see little to no trade-off between defense spending and economic growth.

Other strategists argue that the current level of U.S. defense spending is not necessary for U.S. security and is unsustainable in the context of a public health emergency, aging infrastructure, and growing public debt.⁸ These strategists argue that reducing defense spending to increase infrastructure investments would promote economic growth, which is also the basis of U.S. military power in the long term.⁹ These strategists are also more worried about the risks of the growing U.S. public debt. They are joined by some economists who warn that the growing U.S. public debt, to which the defense budget—like all federal spending—contributes, could eventually cause interest rates to rise. When interest rates rise, it affects not only the amount of the federal budget dedicated to interest payments but also the costs of borrowing for private businesses, ultimately undermining economic growth.¹⁰ Although reducing defense spending will not, on its own, bring about balanced budgets, supporters of a smaller defense budget believe that reductions could have a meaningful impact on the annual federal budget and U.S. public debt.¹¹ Furthermore, they argue that increasing taxes to maintain or increase defense spending would hurt economic growth, because they believe that private spending is more beneficial for the U.S. economy.¹² These strategists ultimately see serious trade-offs between a larger U.S. defense budget and U.S. economic growth.

To evaluate these competing viewpoints, we consider how U.S. economic growth would change in response to three alternative policy changes: reallocating funds between defense spending and infrastructure investments, changing the level of defense spending and applying the difference to public debt, and increasing taxes to fund defense spending (Figure 1).¹³

We evaluate the effect of defense spending changes on growth in three parts. First, we review the academic literature to determine how defense spending and infrastructure investments have affected economic growth in the past. We find that, in the long run, infrastructure spending generally increases economic growth more than defense spending does. This suggests that reallocating funds from defense to infrastructure could promote growth and increase long-run U.S. resources.

Second, we examine the current U.S. fiscal situation in greater depth. We develop a simple model that illustrates how different levels of defense spending over the next decade would affect public debt. We then discuss the literature on the effects of public debt on economic growth. We find that there is not yet a consensus in the economics literature on the extent to which the size of the public debt will undermine economic growth or at what level of public debt this will occur. This makes it difficult to assess how changes in defense spending will affect future economic growth. However, there is agreement that a growing public debt will, either incrementally or at some threshold, cause interest rates to rise, which, in turn, will harm growth.¹⁴ This means that deficit spending to enable large defense budgets might have

deleterious effects on U.S. economic growth in the future in ways that it did not during the Cold War, when public debt was lower.

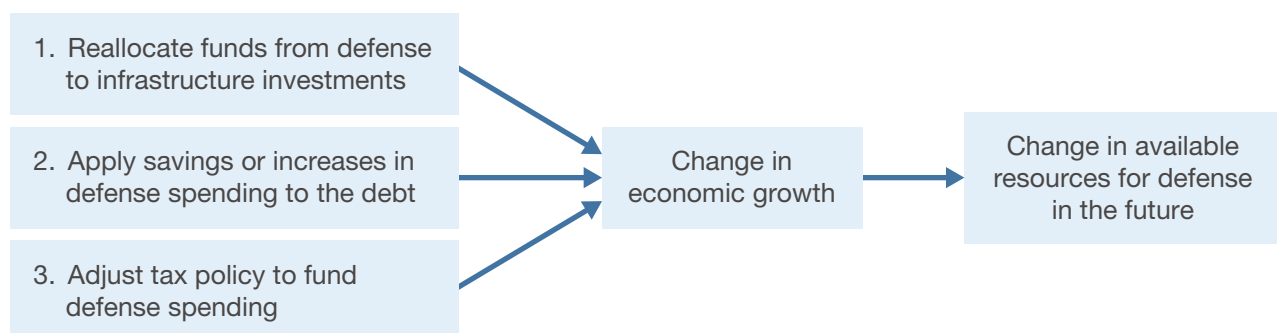
Lastly, we consider the relative impact of tax policy and defense spending changes on growth. Despite extensive research on the topic, there remains much disagreement about the size of the effect. As a result, there is not sufficient information to say how tax increases to fund current defense spending would affect growth. Moreover, there has not been sufficient research to say how tax increases to fund increases in the defense budget would affect growth.

Policymakers need to consider threats to U.S. security and competing domestic priorities as they determine what grand strategy to adopt and how much the United States should spend on defense. Decisions about the size of the defense budget should never be entirely economic. Still, the findings discussed in this report suggest that defense spending choices have impacts on economic growth that should be included in a broader calculation about U.S. grand strategy.

Would Reallocating Funds from Defense Spending to Infrastructure Spending Boost Growth?

Advocates of lower defense spending have explicitly argued that infrastructure investment boosts growth more than defense spending. They argue, therefore, that the United States should consider reallocating funds between these priorities.¹⁵ Existing studies

FIGURE 1
Policy Options Considered in This Report



have not directly tested the economic effects of redirecting defense spending to infrastructure spending. However, they have assessed the relationship between defense spending and economic growth and the relationship between infrastructure spending and economic growth. We draw on these literatures and compare their results to offer implications for the proposed reallocation.

Defense spending affects economic growth in multiple ways. Defense spending generates jobs directly and can improve economic output indirectly through the spillover of technology and human capital to the civilian economy.¹⁶ We talk about these absolute effects on growth first. However, defense spending also has opportunity costs because it diverts resources from government programs that might do more to promote growth.¹⁷ Therefore, we also consider the relative effects of defense spending compared with infrastructure investments.

Does Defense Spending Promote Growth in Absolute Terms?

We begin by looking at what is known about how defense spending affects the economy in absolute terms. Two groups of analysts, largely disconnected from one another, have approached this difficult problem in different ways. Scholars of grand strategy have relied primarily on the defense and peace economics literature, which has its roots in the field of political science, to bolster their claims.¹⁸ Therefore,

we describe this literature first. In doing so, we explain why strategists should be careful in drawing from this literature, which continues to struggle with methodological problems. We then explain how the applied macroeconomics literature has made progress on these methodological challenges and has found consensus that defense spending has, in absolute terms, a positive effect on growth.

The defense and peace economics literature has produced a large number of studies on the relationship between defense spending and economic growth but has not yet reached agreement on whether the relationship is positive, negative, or near 0.¹⁹ There are three methodological challenges that all analysts examining this relationship must consider but have not yet been overcome in this literature. First, analysts need to isolate the effect of defense spending from the large number of factors that affect U.S. economic growth. The defense and peace economics literature assumes economic growth is a function of defense spending and a small set of other variables—most frequently capital, labor, and technological progress—that are known to drive growth in the long term. However, these studies do not account for the effects of other variables, such as tax policy or monetary policy, that, like defense spending, can affect growth as well. Without these variables, studies' findings might be biased, meaning that they do not isolate the effect of defense spending on growth. For example, a finding that defense spending hurts growth could actually be driven by an increase in

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taxes to fund this spending that took place around the same time.

Because a country's economic performance can affect how much the government spends, analysts also have to find ways to determine whether growth drives spending or the other way around.²⁰ In the defense and peace economics literature, analysts often assume that defense spending affects growth and have not developed ways to rule out that the relationship runs the other way.²¹ Finally, the defense and peace economics literature infrequently considers how the impact of defense spending unfolds over time.²²

The applied macroeconomics literature also has produced some conflicting results, but it has made more progress in solving the methodological challenges described earlier. In particular, these researchers found ways to better capture the effect of defense spending on growth, rather than the other way around, aided by using higher-frequency data than the data used by defense and peace economics researchers.²³ One approach involves first identifying changes in defense spending driven by international events that are not connected to current economic conditions.²⁴ The next step in this "narrative" approach entails examining historical documents to determine precisely when expectations about defense spending began to change.²⁵ Using this precise information about timing, researchers then use statistical models to assess how these unexpected defense spending changes affect U.S. GDP over a range of possible periods within which defense spending might affect growth.

The macroeconomics literature also uses a second approach to capture the effects of defense spending on growth. Rather than using historical documents to pinpoint changes in expectations about defense spending, this second method takes advantage of the timing of government behavior. Because of structural and bureaucratic hurdles, policymakers are unable to rapidly change government spending in response to changes in the economic growth rate. For example, decision and implementation delays make it difficult for defense spending (or any other fiscal policy change) to immediately respond to unexpected shocks to GDP growth. As a result, these models assume that the government does not alter fiscal

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policy in response to changes in GDP within the same quarter.²⁶ The plausibility of this assumption increases researchers' confidence in the direction of the causal relationship.²⁷

Regardless of approach to overcoming these methodological challenges, the results of macroeconomic studies examining the effect of defense spending on growth are captured by a *multiplier*. A multiplier measures how much economic growth \$1 of defense spending produces in the economy over a specified period of time. For example, if, over a five-year time horizon, a \$1 spending increase leads to a \$1 increase in GDP, this would return a multiplier of 1—i.e., a 1-to-1 increase.²⁸ A multiplier greater than 1 implies that defense spending induces additional private economic activity by circling money through the economy. By contrast, a positive multiplier that is less than 1 implies that defense spending crowds out some private investment or spending, even though the net effect on output is still positive. For example, defense spending could cause wages to rise in certain sectors, making it more expensive for private companies to do business. In the worst case, a multiplier can be negative, meaning that the government spending is substantially undermining private economic activity.

The applied macroeconomics literature consistently finds that defense spending has a positive effect on growth.²⁹ However, there are disagreements on exactly how large this impact is. Ramey surveyed leading macroeconomic studies calculating the government spending multiplier.³⁰ Ramey's surveys include both studies that examine government

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spending more broadly, which frequently make use of defense spending as a stand-in for all government spending, and those that focus specifically on defense spending.³¹ Within the set of studies that examine defense spending—either in isolation or as a stand-in for all government spending—scholars generally find a multiplier between 0.6 and 1.2, meaning that a \$1 increase in defense spending would be expected to lead to between a \$0.60 increase and a \$1.20 increase in GDP.³² Where the estimates fall within the range depends on the sample period and how the multiplier is calculated.³³ More-recent studies tend to find defense spending multipliers on the lower end of the spectrum. These studies use data over a longer period of time, calculate multipliers for different periods, and employ more-appropriate techniques for computing the multipliers.³⁴ They find that defense spending promotes growth but also crowds out some private economic activity, and they find, on average, multipliers at or below 1. However, these studies are relatively few in number; at present, there is not a robust-enough body of evidence to conclusively narrow the range from what is reported above (i.e., between 0.6 and 1.2).

Therefore, the best available evidence suggests that defense spending promotes growth, even if there are disagreements about how much.³⁵ However, it is important to remember that this finding is for the *average* effect of defense spending on the economy over time. The effect in any given year might depend on the specific makeup of the defense budget or the nation's broader economic situation. For example, a

defense budget that prioritizes high-tech programs might promote growth more than a budget that prioritizes low-tech items.³⁶ The effect of the defense budget might vary depending on whether the economy was in an expansion or a recession when spending changed,³⁷ whether the change was anticipated,³⁸ the level of accommodation of monetary policy,³⁹ and how spending was financed.⁴⁰ However, the average effect of defense spending on growth is a helpful starting point for considering the impact in the future, when the details of the defense budget and economic context are not known.

How Does Defense Spending Affect Growth Compared with Infrastructure Spending?

We now turn to comparing defense spending with infrastructure spending, an oft-cited alternative to more productively use government resources. Past analysis has found that, in the short run, government investments in infrastructure have a lower effect on growth than defense spending does, for two reasons.⁴¹ First, there are typically meaningful delays between when infrastructure funds are appropriated and when they are spent, because of such requirements as coordination with state and local governments and the time it takes to solicit and review bids on large infrastructure projects. It also takes time to build new infrastructure, such as bridges and dams. Thus, it can take a long time for these investments to boost growth.

Second, government investment in infrastructure is more likely than defense spending to crowd out private spending in the short term.⁴² When the government invests in infrastructure, demand for capital goods (e.g., construction equipment) increases. Borrowing costs also increase, making it more expensive for the private sector to make investments. Because private-capital goods, such as machinery and production plants, are long-lasting, the private sector might simply wait to invest until after the government projects are complete.⁴³ Other types of government spending have less of this crowd-out effect. Unlike with investments in equipment or facilities, the private sector is less able to delay its own consumption of other items. Therefore, government spending on such items as office supplies, uniforms, and food tends to suppress private spending to a lesser degree than infrastructure investment. As noted earlier, empirical analyses have confirmed that these forces make public investment less effective at promoting economic growth in the first few years after the funds are committed.

However, in the long run, infrastructure investments have been widely shown to promote growth because they create bridges, dams, and other public capital that increase the productivity of the entire economy over time. This finding holds across a wide variety of countries, time periods, and types of public investment.⁴⁴ The exact size of the effect on the economy depends on the type of infrastructure investment and the current state of national infrastructure.⁴⁵ Therefore, within the larger literature, we focus on two sets of studies with the most relevance to the United States. First, we look at studies that consider the effect of infrastructure investments among countries that are part of the Organisation for Economic Co-operation and Development, which

includes most of the highly developed countries in the world. These studies find long-run multipliers for infrastructure investment in excess of 1.5.⁴⁶

Second, studies that focus solely on infrastructure investment in the United States also have a multiplier above 1.5. These studies have examined a range of time periods and types of infrastructure investments. For example, studies that examine the construction of the U.S. interstate highway system beginning in the 1950s and studies that examine investments to improve that existing infrastructure from 1990 to 2010 both show multipliers in excess of 1.5.⁴⁷ In fact, studies that look at public investment more generally, not only in infrastructure, also find multipliers above 1.5.⁴⁸ Recent analyses have acknowledged that the United States still has infrastructure shortfalls, giving reason to expect that infrastructure investment should continue to promote growth in a similar way as it has in the past.⁴⁹

Therefore, the most-relevant literature suggests that the infrastructure investment multiplier is consistently above 1.5—above the defense spending multiplier. It is difficult to directly compare multipliers from different studies. For example, each study calculates a point estimate for the multiplier. But any comparison also has to account for the uncertainty around each result. Because of the difficulties associated with comparing findings across studies, we would ideally have a study that makes a direct comparison between the defense and infrastructure multipliers. Without that type of research, there is the possibility that the differences in multipliers are a statistical artifact rather than a meaningful difference.

However, there are several reasons why we consider the existing evidence to be strong enough to conclude that infrastructure spending has a greater

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impact on economic growth in the long run than defense spending does. First, the evidence is consistent with both economic theory and common sense. Infrastructure should have a more enduring effect on the economy because it increases the production capacity of the nation. Second, the differences between the defense spending and infrastructure multipliers have been consistently different across a large number of studies. Confidence in this finding will increase further if future research directly compares the defense spending and infrastructure investment multipliers.

Summary

The literature has a wide range of estimates (in both direction and magnitude) on the relationship between defense spending and economic growth. However, the studies with the most-appropriate research designs consistently find a positive effect of defense spending on GDP. Research shows that the effects of infrastructure spending on economic growth are limited within the first few years. However, we find that over the long term—the time period that grand strategists are most focused on—the body of theoretical and empirical literature points toward public infrastructure investment having a greater impact on economic growth than defense spending. This means that reallocating defense spending to public infrastructure investment likely would boost economic growth in the long term. Conversely, delaying infrastructure spending to

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enable larger defense budgets likely would harm long-term growth.

However, there are some important unanswered questions in this literature. As noted earlier, all reported effects on growth are average effects that might change depending on broader economic conditions. Economists have recently begun to ask how one of these conditions, the size of public debt, affects the relationship between government spending and growth. Studies on this topic, which look across countries rather than at the United States alone, find that when public debt levels are high, government spending might be less beneficial for growth and might even harm it.⁵⁰ The effect of public debt on the infrastructure multiplier, however, has been less well covered in the literature.⁵¹ Therefore, more work is needed to understand the relative effects of different government programs as the U.S. public debt grows.

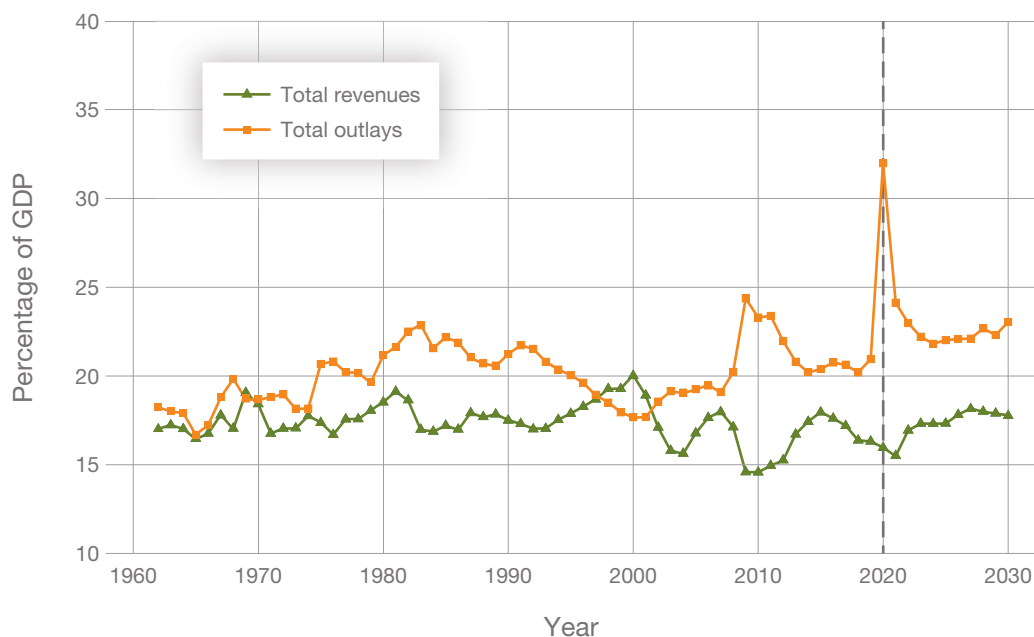
How Does Deficit-Financed Defense Spending Affect Growth?

Economists warn that, in the coming years, policymakers might need to look beyond allocating funds within the federal budget to reducing its overall size. The U.S. public debt is large and growing, and, as we detail in this section, some analysts warn that the size of the public debt will begin to inhibit economic growth. Among scholars of grand strategy, there is also a debate about the extent to which cutting or increasing defense spending would affect the U.S. debt and fiscal sustainability. Therefore, we first describe the current U.S. fiscal situation and the role of the defense budget within it. We then describe some of the alternative budgetary options that policymakers and analysts have proposed. We illustrate how each of these options would affect the size of the U.S. public debt. Finally, we describe what is known about how a high and increasing level of public debt affects economic growth.

Current U.S. Fiscal Picture

Figure 2 shows historical data (1962–2019) and CBO projections (2020–2030) for total revenues (e.g.,

FIGURE 2
Historical and Projected U.S. Revenues and Outlays



SOURCES: CBO, "Discretionary Spending in 2019: An Infographic," Washington, D.C., April 15, 2020b; and CBO, 2020e.

payroll and individual and corporate income taxes) and total outlays (i.e., the amount of money actually spent in each year) as a percent of U.S. GDP. CBO is a nonpartisan organization responsible for providing Congress with fiscal and economic information. Its projections assume that existing laws governing taxes and mandatory spending (e.g., Social Security, Medicare) remain the same.

The figure shows that, historically, the United States has often had an annual deficit, meaning that spending has been higher than revenues, particularly in the recent past. CBO projects that deficit spending will continue. In particular, the COVID-19 pandemic response will lead to a federal budget deficit of \$3.3 trillion in 2020, more than triple the recorded deficit in 2019 and equal to 16 percent of GDP.⁵²

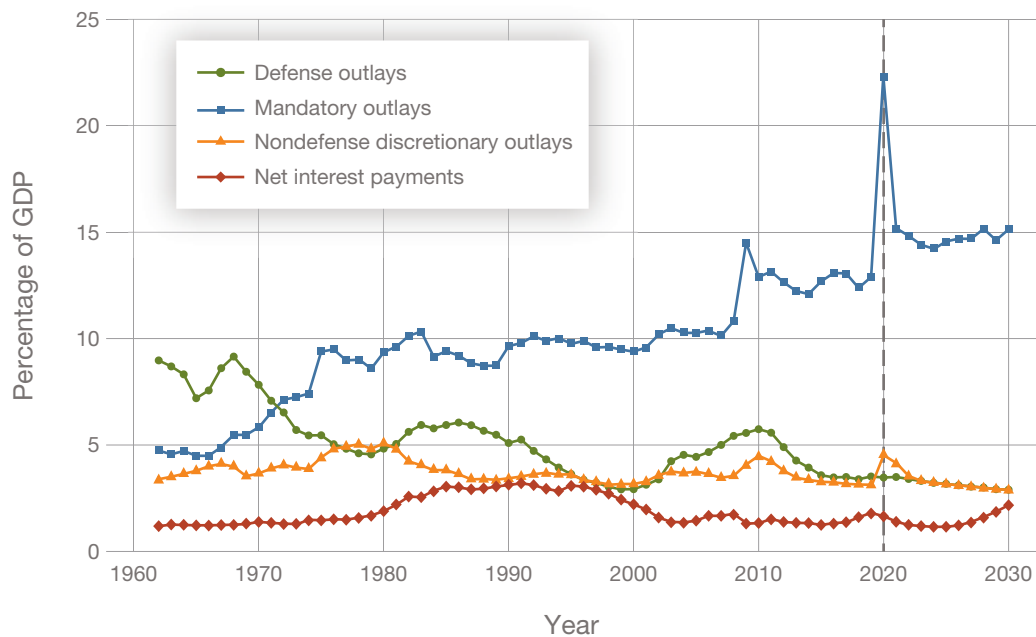
Figure 3 shows federal outlays by category. *Mandatory outlays* refer to spending on programs determined by criteria established in law rather than through annual appropriations bills; the largest of these programs are Social Security, Medicare, and Medicaid. *Discretionary outlays* include defense spending and nondefense spending authorized by

Congress in annual appropriations acts. *Net interest payments* represent outlays on servicing public debt.⁵³

The defense budget has generally been increasing in actual dollars spent each year (nominal terms). However, Figure 3 shows that, as a share of the economy, defense spending has trended downward. At the same time, mandatory spending has been trending upward as a share of GDP. As a result, since the mid-1970s, defense spending has been lower than spending on mandatory programs. This was true even during the defense buildup of the 1980s and the wars in Afghanistan and Iraq.⁵⁴ Still, defense spending has been a sizable share of the annual federal budget—15 percent of government spending was allocated for defense in 2019 before the pandemic response began—and equaled roughly half of all discretionary spending in 2019.⁵⁵

Figure 4 shows how deficit spending has led to growth in public debt. The debt-to-GDP ratio has risen dramatically over the past decade, approaching 80 percent at the end of fiscal year (FY) 2019 before skyrocketing as a result of COVID-19. It is expected to continue to rise, nearing 110 percent of GDP by the end of FY 2030. In recent years, interest rates have

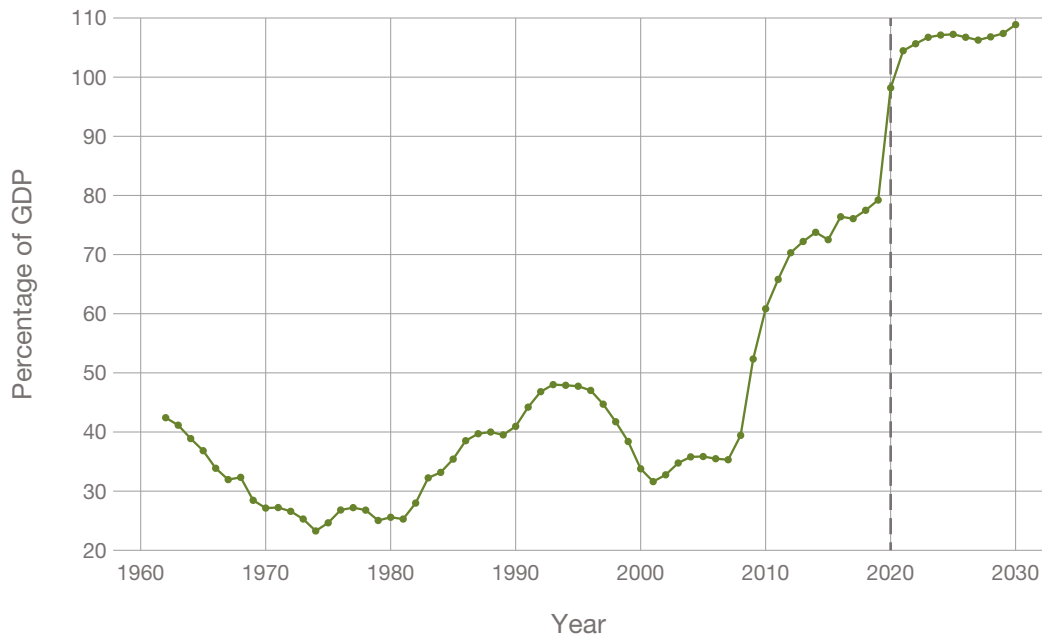
FIGURE 3
Historical and Projected Federal Spending, by Type



SOURCES: CBO, 2020b; CBO, 2020e.

NOTE: Historical defense spending includes overseas contingency operations spending, while projected defense spending does not.

FIGURE 4
Historical and Projected Size of the U.S. Debt Held by the Public



SOURCES: CBO, 2020b; CBO, 2020e.

been historically low, so the share of GDP devoted to interest payments has not grown, even as public debt has increased significantly. However, as Figure 3 shows, CBO projects that the share of GDP spent on interest payments will increase in the next decade as interest rates rise.

In sum, the figures show that although defense spending has not been the primary driver of public debt in recent decades, it is a contributor. To understand whether this contribution is meaningful, we next describe alternative options for the size of the defense budget and then examine how public debt is projected to grow in each scenario.

Alternative Defense Budget Choices

We consider five illustrative budget scenarios that have been suggested by policymakers and researchers. These include following current defense plans, which would see defense spending as a share of GDP decline, and sustaining current defense spending as a share of GDP. We also consider a recent congressional proposal to cut defense spending by 10 percent. Because questions surrounding the affordability of U.S. defense spending are particularly central in the debate about the future of U.S. grand strategy, we drew some of our scenarios from that debate, giving us a scenario with larger cuts and a scenario with larger increases. These scenarios do not capture every possible option that the United States has, but, together, they illustrate the effect of changes in the defense budget on U.S. public debt in the next ten years.

Follow the Current Trajectory

As a baseline, we use CBO's federal budget projections through 2030. CBO bases its projections of discretionary spending, including defense spending, on the most-recent appropriations and applies the appropriate inflation rate to project funding for future years.⁵⁶ Using that approach, CBO projects that defense outlays will rise at an average rate of roughly 2.3 percent per year in this time frame.⁵⁷ Therefore, in nominal terms, CBO projections expect defense spending to continue increasing.⁵⁸ However, the defense budget as a share of GDP is projected to

decline slightly, from roughly 3.5 percent in 2021 to 2.9 percent in 2030, because outlays are not expected to grow as quickly as projections of GDP growth.

Sustain Defense Spending at 3.5 Percent of Gross Domestic Product

Some analysts have argued that CBO's projections underestimate future defense spending. These analysts note that the United States maintains a large system of alliances and partnerships and has military forces forward deployed globally. The United States has also intervened in other regions and, particularly in recent years, has used confrontational diplomatic and military policies to deter other great powers from aggression. These analysts argue that seeking to maintain this type of grand strategy will become increasingly expensive in real terms as other powers rise and contest U.S. dominance.⁵⁹ There is no analysis that evaluates this claim of rising costs or calculates exactly how much U.S. defense spending might grow in real terms in the future. For the purpose of illustration, we fix defense spending in this scenario at its current share of GDP, approximately 3.5 percent. Doing so allows us to assess the impact on public debt if U.S. strategy proves only modestly more expensive than current defense plans, with defense spending growing at the same rate as U.S. GDP.

Increase Defense Spending to 4.5 Percent of Gross Domestic Product

Some analysts have argued that, given the example of the Cold War, the United States could spend a higher proportion of its GDP on defense to better compete with U.S. adversaries without affecting growth. Brands and Edelman argue that, even if defense spending were to rise to 4.5 percent of U.S. GDP, for example, the United States would not compromise its economic performance.⁶⁰ Therefore, in this scenario, we set defense spending starting in FY 2022 at 4.5 percent of projected GDP. This number is far below the height of U.S. defense spending as a share of GDP during the Cold War (15 percent of GDP in 1952) and below spending at the height of deployments in Iraq and Afghanistan (5.7 percent of GDP in 2010).

Reduce Defense Spending by 10 Percent

To free up funds for domestic priorities, progressives in Congress have proposed making cuts to the defense budget. In July 2020, the House of Representatives voted to defeat an amendment to the National Defense Authorization Act sponsored by Democrats Mark Pocan and Barbara Lee to cut 10 percent from defense spending.⁶¹ Inspired by this proposal, we examine the impact of a 10-percent reduction in defense spending beginning in FY 2022. In other words, beginning in 2022, we reduce annual projected defense spending by 10 percent from the CBO's projected level.

Adopt a Grand Strategy of Restraint

Other analysts argue that more-fundamental changes to U.S. strategy and defense spending are needed. Advocates of a more restrained U.S. grand strategy argue that the United States should reduce its forward military presence, reform or end alliance commitments, have a higher bar for the use of force, and adopt a less confrontational approach to other powers. They argue against core elements of post-Cold War U.S. grand strategy because they believe that these elements hurt U.S. interests and are increasingly unaffordable given the broader U.S. fiscal situation.⁶²

A grand strategy of restraint finds savings in the defense budget by, among other changes, reducing the overall size of the U.S. military. Although there

has not been detailed analysis of the costs of alternative grand strategies, advocates of restraint have estimated that the United States might be able to sustain this strategy with a defense budget of around 2.5 percent of GDP.⁶³ Advocates of restraint tend to argue for gradual change to the defense budget, and one scholar specifically notes that these cuts could be made over a period of five years.⁶⁴ As a result, we examine the case of a steady, evenly distributed decline in defense spending beginning in 2022 and reaching 2.5 percent of GDP in 2027, after which defense spending remains at this level.⁶⁵

Approach to Comparing Alternative Scenarios

We consider how the size of the U.S. public debt would change in the scenarios just described, starting with FY 2022.⁶⁶ To do so, we use a simple model that considers only the direct effects of the alternative discretionary defense budgets on the size of the public debt and holds everything else constant.⁶⁷ There are several indirect effects of defense spending on growth that we are unable to quantify given existing research. However, in the following sections, we discuss how our results would change qualitatively if we were able to include these secondary effects.⁶⁸ In addition, we note that any form of government spending, not just defense spending, will impact public debt. However, not all spending will have the same effect. For example, as described earlier, infrastructure spending generally tends to boost economic growth more than defense spending does in the long term. Therefore, depending on the specific type of infrastructure investments and defense spending in question, infrastructure spending might not increase the debt-to-GDP ratio as much as defense spending. Conversely, other forms of government spending not considered in this report could increase public debt more than defense spending.

For each scenario, we project public debt in the following three steps.

Start with CBO Projections

We start with CBO's projected public debt level for each year. This means we also fix government reve-

Any form of government spending, not just defense spending, will impact public debt. However, not all spending will have the same effect.

nues, GDP growth, mandatory spending, nondefense discretionary spending, revenues, and interest rates at their projected CBO levels.

Add Change in Defense Spending

We then calculate the change in defense spending in each year of the scenario. When defense spending is higher than CBO projections, we assume that the United States finances the difference through additional public debt rather than through increasing taxes. When defense spending is below the CBO baseline, we apply the savings toward reducing the debt. In principle, the money saved by lowering defense spending could also be reallocated to other forms of government spending instead of being devoted to public debt reduction. However, because our focus is on isolating the effects of the defense budget on public debt, we do not explore these alternatives.

Add Change in Interest Payments

We then calculate how interest payments would change given the changes in defense spending in the previous years. We do this by multiplying all of the defense spending changes from the previous years by the current-year projected interest rate. We then apply the resulting change in interest payments to the public debt.⁶⁹

One of our core simplifying assumptions is that the defense spending changes that define each scenario do not affect GDP growth relative to baseline CBO projections. In other words, we assume the defense spending multiplier equals 0. As we noted earlier, leading academic studies find that the historical multiplier is between 0.6 and 1.2. However, as also noted earlier, cross-national evidence suggests that the multiplier will decline, or even become negative, as U.S. public debt rises.⁷⁰ We do not know the exact threshold at which this will be true, particularly given the unique position of the United States in the global economy, as we discuss in greater detail later. However, cross-national studies find negative effects significantly below the current debt-to-GDP ratio in the United States, indicating that debt might drive down the U.S. spending multiplier moving forward.⁷¹ Because we do not know whether the future multi-

plier will be negative or positive, we set it at 0 for all defense spending changes from the baseline. This is a reasonable starting point for our analysis. However, the way that the multiplier actually evolves in the future would have significant effects on our findings, as we detail in a subsequent section.

Effect of Changes to the Defense Budget on the U.S. Debt

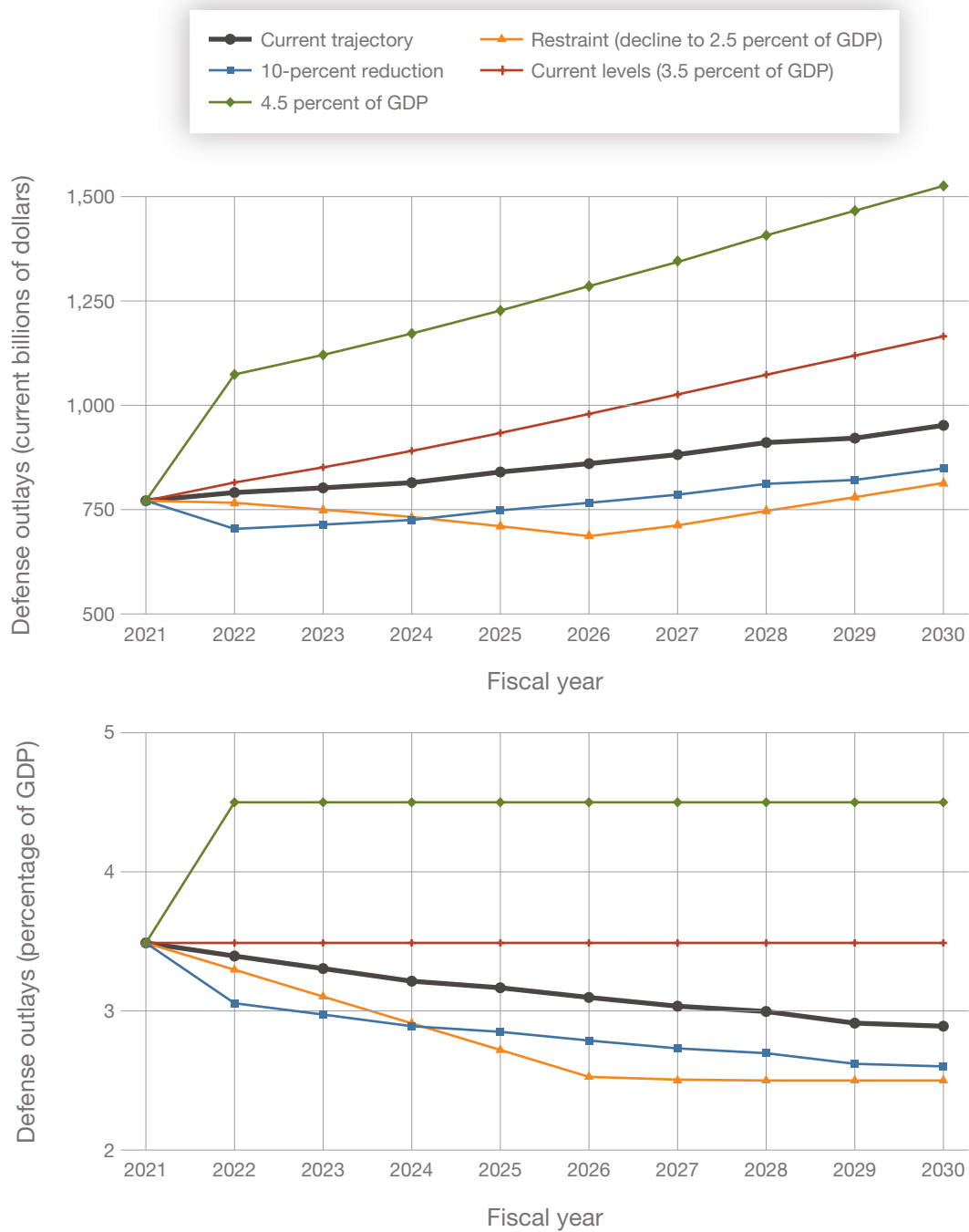
In this section, we apply the approach described in the previous section. We started with the baseline CBO projections from Figure 3. We then calculated the changes in defense spending for each scenario. In Figure 5, we show how U.S. defense spending changes in each scenario, both in absolute terms and as a share of GDP.

Figure 6 shows the projected levels of public debt across alternative scenarios. In the baseline scenario, public debt is projected to be \$33 trillion, or 108 percent of the U.S. GDP. As noted earlier, these projections are based on a simplified model and, therefore, should be seen as illustrative. However, these figures provide an important benchmark for the effect that changes in defense spending could have. We describe our findings in terms of changes in defense spending and the debt as a share of GDP. Although not the central focus of this report, these models also allow us to provide information on how these defense spending scenarios affect annual defense budgets.

Figure 6 illustrates the effect of a uniform 10-percent cut in defense spending starting in 2022. By 2025, debt held by the public as a percentage of GDP would be 1 percentage point lower than current projections, and, by 2030, the reduction would lead to a 2.4–percentage point decrease. In raw numbers, public debt would be \$745 billion less than the current trajectory in 2030. For the year 2030 alone, the reduction in defense spending and savings on interest payments would amount to \$103 billion.

In the grand-strategy-of-restraint scenario, debt as a percentage of GDP would be more than 3 percentage points below current projections in 2030. In raw numbers, by 2030, public debt would be \$949 billion lower than currently projected. As a result, interest payments would also steadily decrease. The

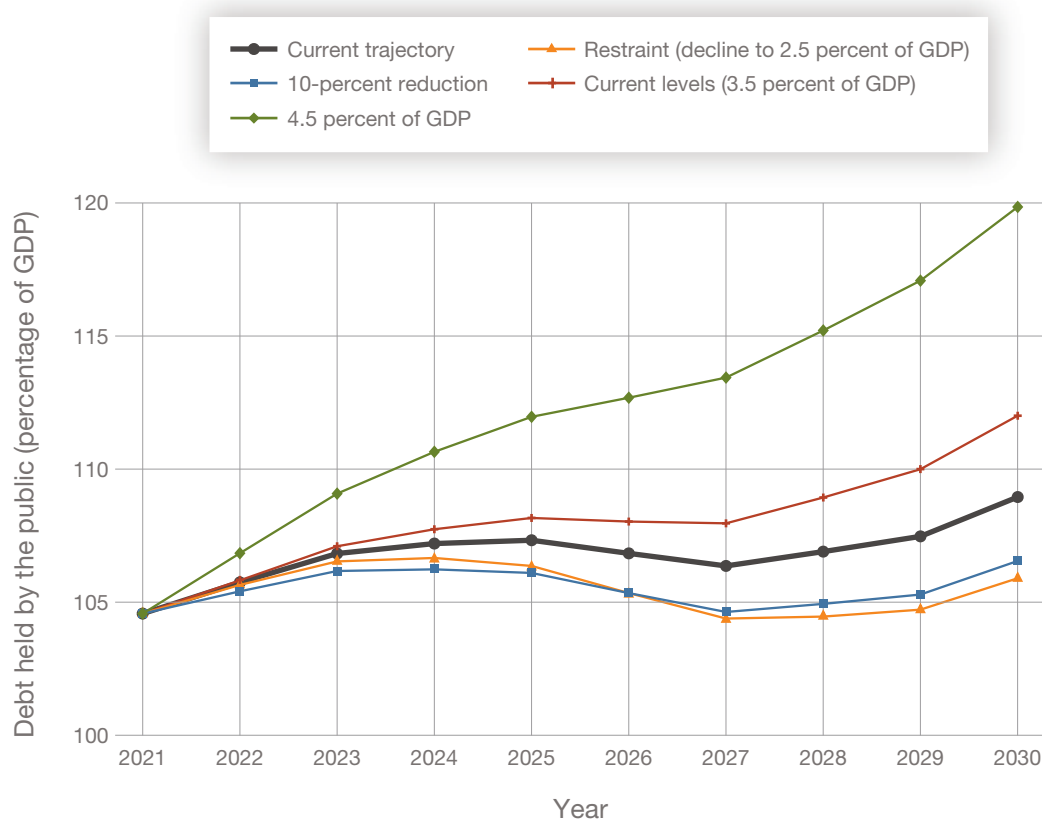
FIGURE 5
Changes in U.S. Defense Spending Across Scenarios



NOTE: Data on the current-trajectory scenario come from CBO, 2020b; and CBO, 2020e. The other scenarios represent illustrative ways that defense budgets could deviate from this baseline.

FIGURE 6

Illustrative Changes in U.S. Debt Across Alternative Defense Budget Scenarios



SOURCES: Data on the current trajectory are from CBO, 2020b; and CBO, 2020e.

decrease in interest payments alone in 2030 would be nearly \$18 billion, while the defense budget would shrink by \$120 billion. For the sake of comparison, the combined savings would be roughly equal to the budget for the Department of Transportation (adjusted for inflation to 2030).⁷²

Conversely, our results show that projections change markedly even in the scenario in which the United States maintains the current proportion of the GDP devoted to defense. Defense spending of 3.5 percent of GDP would increase public debt held by 3 percentage points by 2030. In 2030, increases in defense spending and on interest payments would amount to \$200 billion.

A shift to 4.5 percent, still far short of peak Cold War spending levels, substantially changes the fiscal outlook. Public debt as a percentage of GDP would increase by nearly 5 percentage points by 2025 and 11 percentage points by 2030. This is a massive dif-

ference from the current CBO projections, equivalent to more than \$3.3 trillion. Interest payments alone in 2030 would increase by over \$62 billion, while the defense budget would be \$594 billion larger. This total increase of \$557 billion is just under the FY 2020 budget for the Department of Labor when adjusted for inflation to 2030.⁷³

Our models examine changes over a relatively short time frame. The gaps between the baseline forecasts for public debt in alternative scenarios are increasing over time. This means that differences between these alternative futures would be magnified even more if spending changes were sustained over a longer period of time.

In sum, our simplified model shows how relatively small, sustained shifts in defense spending affect the size of public debt. This model involves the key simplifying assumption that defense spending will have no net impact on economic growth in the

future. If this assumption is wrong, our results will change. If the defense spending multiplier remains positive but less than 1, any increase in defense spending will still increase the debt-to-GDP ratio. However, the differences between alternative scenarios will be smaller. By contrast, there are reasons why the differences in debt levels across scenarios could be more pronounced than our model predicts. For example, our results will be magnified if interest rates rise higher than CBO currently expects. In the next section, we discuss the literature that suggests how a growing public debt could lead to such an outcome.

How Will Increasing Public Debt Affect Growth?

The natural question from our forecasts of changes in debt across our scenarios is how these and other contributions to the national debt affect the economic health of the nation. Some economists believe that if debt continues to grow, changes to the defense budget and other government spending could also have secondary effects on economic growth. They expect that the most-dramatic indirect effects would come from increasing interest rates brought on by investors viewing U.S. public debt as a progressively risky investment (Figure 7).⁷⁴ Higher interest rates would increase government interest payments, reducing the funds available for government spending and investments. Moreover, higher interest rates would raise the costs of capital in the private sector, making it harder for businesses to make investments that increase their profitability and productivity. Together, the crowding out of public and private investments caused by higher interest rates would reduce U.S. economic growth.⁷⁵

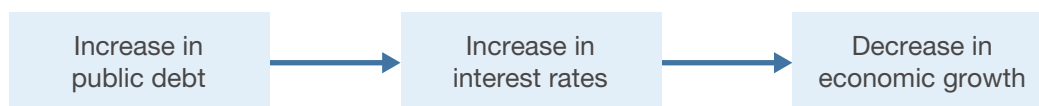
However, it is not clear from existing research what level of U.S. public debt could cause interest rates to rise in this way. Although economists agree that a growing debt undermines growth, the exact

nature of this relationship is the subject of debate. In a highly publicized paper, Reinhart and Rogoff claim that countries with debt in excess of 90 percent of GDP experience significantly slower economic growth.⁷⁶ However, later work has demonstrated that this finding resulted from methodological errors.⁷⁷ In the large literature that has followed, some studies have identified a similar threshold.⁷⁸ However, other researchers have found evidence suggesting thresholds of 20 percent,⁷⁹ between 20 and 60 percent,⁸⁰ 66 percent,⁸¹ 77 percent,⁸² and 115 percent,⁸³ respectively. Others have instead found that, beyond relatively low levels of public debt, growth rates appear to gradually decline as public debt rises.⁸⁴ In sum, this literature is characterized by a high level of uncertainty, and there has been no consensus on whether there is a debt-to-GDP “threshold” that undermines growth or where it lies.

Some economists believe that these contradictory findings suggest that the level of debt that harms economic growth might vary by country.⁸⁵ For example, Portugal, Ireland, Spain, and Greece faced adverse economic consequences during the recent European debt crisis, as debt-to-GDP ratios rose above 100 percent for each nation during this period and led to substantial increases in interest rates.⁸⁶ Yet even as the United States is approaching these more extreme levels, it has seen no meaningful effect on interest rates.

Scholars have speculated that the United States, because of its unique role in the global economy, might be able to sustain a higher level of public debt than other countries before the debt causes interest rates to increase. These scholars argue that there is virtually no threat of default for the United States, because the dollar has a flexible exchange rate rather than a fixed exchange rate.⁸⁷ Because the United States issues its own currency, it can always meet its debt obligations by having its central bank print more money or buy government debt.⁸⁸ In addition,

FIGURE 7
Theoretical Relationship Among Debt, Interest Rates, and Growth



Economists largely agree that rising public debt eventually will negatively affect an economy. The uncertainty surrounding the existence of a debt “threshold” or its particular value should not detract from this broader principle.

the U.S. dollar is the most widely used currency in the world by a wide margin, and historical evidence shows that the risk of a fiscal crisis is very low for countries that print their own money and borrow in their own currency.⁸⁹ The dollar is held by states as their official reserves and operates as the primary medium of foreign exchange for private actors. As a result, the United States will have little trouble attracting creditors, even at low interest rates. During the COVID-19 pandemic, for example, the United States has been able to borrow heavily without any change in interest rates.⁹⁰ In addition, there is little reason to suspect that another form of currency will be able to replace the dollar at any point in the near future.⁹¹

These unique aspects of the U.S. economy might explain why the United States has not yet seen interest rates rise and does not appear to be in any imminent fiscal danger. However, most economists do not expect this economic outlook to hold indefinitely. Economists largely agree that rising public debt eventually will negatively affect an economy. The uncertainty surrounding the existence of a debt “threshold” or its particular value should not detract from this broader principle. This is not to say that important, pressing domestic spending should be abandoned for fear of deficits, particularly in the midst of an ongoing pandemic. However, given the eventual consequences of escalating public debt, it is important to consider how different levels of defense spending affect projections of U.S. public debt.

For example, in the latest long-term budget outlook, CBO projects that increasing debt will contribute to slower GDP growth over the coming

decades. Specifically, although interest rates are expected to remain near 0 following the pandemic, they are expected to continually rise from 2025 to 2050.⁹² This is projected to crowd out some private investment in capital, resulting in slower capital accumulation and, consequently, slower economic growth. CBO estimates that if policies were put in place to gradually reduce public debt to 79 percent of GDP (its 2019 value) by 2050, GDP would, all else equal, be 5 percent higher in 2050 than under CBO’s extended baseline projections. This would amount to an increase in GDP per capita (economic output per person) of \$4,600 relative to baseline (in 2019 dollars). Thus, if the growing public debt eventually undermines growth as economists have suggested, even small, sustained changes over the short term might have meaningful effects on the U.S. economy over the long term.

Recall that our analysis in the last section starts from the current CBO projections for interest rates, which rise modestly by 2030, and assumes that defense spending changes have no impact on interest rates relative to CBO projections. These interest rates are projected to remain historically low in no small part because of COVID-19. Given the arguments made earlier, we expect that interest rates would, if anything, rise in our spending-increase scenarios and fall in our spending-decrease scenarios. Therefore, changes in federal spending—including on defense—would have an even greater impact on the debt-to-GDP ratio than our models project.⁹³

How Do Tax Policy Changes Affect Growth Compared with Defense Spending Changes?

Concerns about growing public debt could eventually lead to interest in the relative effects of tax policy and defense changes in the future. Although tax increases have not been proposed in the midst of the COVID-19 pandemic, they have been used in the past in response to growing deficits.⁹⁴ Tax increases would be one option if, for example, future policymakers wished to increase the defense budgets because of international conditions without contributing to the deficit. In this context, it might be increasingly important to ask how increasing taxes to offset increases in defense spending would affect growth.⁹⁵ As described earlier, some grand strategists have argued that this type of trade-off would undermine the U.S. economy.⁹⁶

Alternatively, if the concerns about public debt become even more acute, policymakers might focus on options to reduce, not just sustain, annual deficits. In this context, policymakers might see both defense spending cuts and tax increases as policy options and ask how they affect growth in relative terms. Unfortunately, gaps and inconsistent findings in the economics literature mean that we cannot satisfactorily answer either question. In this section, we describe the most-relevant literature and why it cannot yet answer these policy questions.

The evidence consistently shows that tax increases reduce economic growth while tax decreases increase economic growth. The exact size of the effect remains in dispute.

What Are the Absolute Effects of Tax Increases on Economic Growth?

Determining the effects of tax policy changes on growth has many of the same challenges as determining the effects of defense spending changes. Moreover, tax changes are frequently prompted by changes in economic conditions, so it is arguably even more difficult to determine the extent to which tax cuts affect growth versus the other way around. As with defense spending, the literature on the effects of tax policy captures an average effect over time. This means that the effect of any given tax change on growth might be different depending on the economic context and the type of tax change made (e.g., personal or corporate income taxes) and whether government spending changes at the same time.⁹⁷

Analysts have used many different approaches to assess the relationship between tax policy and growth.⁹⁸ The evidence consistently shows that tax increases reduce economic growth while tax decreases increase economic growth. The exact size of the effect remains in dispute. Individual studies of changes to federal taxes in the United States have found tax multipliers ranging from near 0 to close to 4, suggesting greater uncertainty than for defense spending.⁹⁹ The differences depend to some extent on the method that each study uses.

One approach, similar to the narrative approach described for defense spending, draws on presidential speeches and congressional reports to document the timing, magnitude, and rationale of significant tax policy initiatives in the United States.¹⁰⁰ This allows researchers to identify and focus on policy actions that were unrelated to economic conditions and, in doing so, to be confident that government spending changes, rather than economic conditions, were driving the result. Studies using this methodology in the United States, as well as in other developed countries, find tax multipliers that range from 2 to 3.¹⁰¹

As with the defense spending literature, some studies in the tax literature instead rely on timing assumptions based on the institutional structure and decisionmaking processes of the U.S. government. This second approach has yielded tax multiplier estimates both lower and higher than what is typically found using narrative methods.¹⁰² However, recent

work, seeking to reconcile the differing estimates produced by these two empirical approaches, found support for the range of 2 to 3.¹⁰³ Therefore, these two approaches appear to agree that tax cuts promote growth and, conversely, that tax increases inhibit growth.

However, a third approach that is widely used by academics, central banks, and government agencies worldwide produces different results. This approach employs what are known as *New Keynesian dynamic stochastic general equilibrium (DSGE) models*. These large and complex models use a mix of theory and data to model how consumers, firms, and the government behave. The models have also been used to generate historical tax policy multipliers.¹⁰⁴ These models are appealing to policymakers because they can be used to predict the effects of a prospective policy action, such as a tax policy change, on many parts of the economy and because they can account for the context in which the policy change will be made. However, there are risks to using such complex models; it might be difficult to know whether the assumptions are appropriate to the policy question at hand. This method has found lower multipliers than the previous two approaches; they typically find a multiplier below 1, and their estimates do not exceed 1.5.¹⁰⁵ In other words, DSGE models suggest that tax policy might have a smaller effect on growth than other methods find.

How Do Tax Policy and Defense Budget Changes Compare?

Given the remaining disagreements in the tax policy literature in particular, it is difficult to draw conclusions about the relative sizes of the defense spending and tax multipliers. The tax multipliers found using narrative methods tend to exceed estimates of the defense spending multiplier, but the picture is less clear when comparing defense spending multipliers with tax multipliers derived from DSGE models. Therefore, we are unable to provide a clear estimate of the tax policy multiplier or its size relative to the defense spending multiplier.

Even if there were greater agreement in the literature about the tax policy multiplier, it would be diffi-

We do not find the literature to be strong enough to draw a firm conclusion on the relative effects of tax policy and defense spending changes.

cult to use the existing literature to answer the policy questions described earlier. There are two types of studies that we ideally would like to have: (1) studies that use the same data and methods to examine both tax and defense spending changes over time and (2) studies that look at simultaneous changes in tax policy and defense spending.

As with the infrastructure policy multiplier, we would have evidence on the relative impact of tax cuts and defense spending increases from studies that directly compare the two policy choices within the same methodological framework.¹⁰⁶ The only study that does this finds that tax policy changes have a greater effect on economic growth than defense spending does.¹⁰⁷ The results imply that increasing taxes to offset an increase in defense spending has a negative net effect on GDP. However, the results of this single study conflict with other studies that compare taxation with government spending more generally.¹⁰⁸ Therefore, we do not find the literature to be strong enough to draw a firm conclusion on the relative effects of tax policy and defense spending changes.

Moreover, simultaneous changes in taxation and defense spending might have a different effect on growth than would be expected by adding each individual multiplier. As discussed earlier, multiplier estimates capture an average effect over time. For the defense spending multiplier, that means that it captures both episodes in which military build-ups were primarily funded with debt and episodes in which

build-ups were largely tax financed. The tax multiplier, on the other hand, is often calculated independently of government spending; furthermore, the economic conditions surrounding defense spending can be different from those surrounding other types of government spending.¹⁰⁹ Rather than simply looking at these average effects in situations that might be different, we would like research on simultaneous defense spending and tax policy changes in the past. Unfortunately, we find no such studies.

In sum, it is challenging to compare estimates across studies, which differ in sample and research design, and, unlike in the infrastructure analyses, we find neither a consistent estimate for the tax multiplier nor a consistent difference between the tax and defense spending multipliers. Ramey remarks on the discrepant findings in the literature and concludes that existing methods do not allow us to directly distinguish between defense spending and tax multipliers with sufficient precision.¹¹⁰

Summary

As with infrastructure spending, researchers have not directly examined the policy questions that we posed earlier. Unlike with infrastructure spending, the existing literature does not provide a clear answer as to the relative economic impacts of tax policy and defense spending changes. The range of tax multipliers makes it difficult to draw conclusions on how changes in tax policy and defense spending compare as alternative ways of reducing the annual deficit. Furthermore, as noted, we are unable to determine how increasing taxes to pay for higher defense budgets in the future might affect growth, because scholars have not examined how these effects move simultaneously. Therefore, it would be worthwhile

to conduct more research on this relationship.¹¹¹ Although we describe the ideal type of evidence that would be helpful for policymakers, that type of evidence is often not available. Policymakers have to make choices under uncertainty, and their questions might not be the focus of academic research. We note that even research that leads to greater precision on the defense spending and tax multipliers would significantly improve our understanding of the relationship between defense spending, taxation, and growth.

Key Findings

Research on the relationship between defense spending, public debt, and economic growth is ongoing, but there are important areas of agreement within the literature. We highlight four implications for U.S. strategic and defense budget choices.

Prioritizing Defense Spending over Infrastructure Investment Might Undermine Economic Growth and U.S. Power in the Long Run

Existing research shows that, in absolute terms, defense spending promotes economic growth. However, policymakers ultimately need to consider budget trade-offs and how alternative choices would affect growth. We considered one prominent alternative, infrastructure investment. There have not yet been direct comparisons between these two forms of government spending; direct comparisons would be the gold standard for assessing their relative effects on growth. Still, the large and consistent body of literature on the economic benefits of infrastructure investment supplies strong evidence that, as some

We are unable to determine how increasing taxes to pay for higher defense budgets in the future might affect growth, because scholars have not examined how these effects move simultaneously.

advocates of smaller defense budgets argue, diverting funds from defense spending to infrastructure investment likely would boost U.S. economic growth in the long term. Conversely, continuing to prioritize defense spending over infrastructure investment would slow long-term growth in relative terms. Because the size of the U.S. economy determines the resources available for defense, defense budget choices today could affect U.S. military strength in the future.

A Large and Growing U.S. Public Debt Means that Defense Spending Might Eventually Have a Deleterious Effect on Growth, Unlike During the Cold War, When Public Debt Was Lower

Macroeconomic research shows that countries with a large and growing public debt tend to face reduced economic growth. The unique position of the United States within the global economy makes it difficult to assess how or at what point public debt will undermine economic growth. The United States has surpassed the public debt levels at which other countries have seen significant negative effects on growth, without suffering higher interest rates or a slowing economy. Therefore, economists have little historical precedent on which to rely to predict exactly when or how growing public debt will undermine U.S. economic growth. Although economists are not sure exactly when or to what extent U.S. public debt will begin to undermine economic growth, they generally believe that the United States will begin to see negative effects if public debt continues to rise. The debt-to-GDP ratio cannot grow indefinitely; eventually, public debt must be repaid or defaulted on. Few question the solvency of the U.S. government over the foreseeable future, although as public debt rises, investors will view U.S. debt as an increasingly risky investment. This risk might reflect either a perceived increase in default risk or an increase in the likelihood that additional money will be printed to service U.S. public debt. Both would lead investors to demand higher interest rates to hold U.S. public debt, which would hamper economic growth. High public debt also generally reduces the amount of

The United States should not assume that defense spending will affect GDP growth in the same way that it did during the Cold War.

funds available for investment, leading to crowding out of private investment. To the extent that rising public debt is eventually paid for through future tax increases, doing this will reduce growth as well, as we showed earlier.

Given ongoing debate in the literature, we cannot say specifically how spending on defense, or any other government program, affects the risk of such outcomes. However, existing research suggests the possibility that sustaining deficits to enable defense and other government programs might have different effects than in the past. As a result, the United States should not assume that defense spending will affect GDP growth in the same way that it did during the Cold War, when public debt was lower.

Defense Spending Is Not the Main Driver of Annual Deficits, but Changes to National Security Spending Can Have A Meaningful Impact on Their Size

Our focus in this report has been primarily on the relationship between defense spending and economic growth. However, our results also address the effects of defense spending on the annual federal budget and the size of the deficit. Many commentators have correctly noted that defense spending is not the main driver of annual deficits or the growing public debt. For many years, spending on mandatory programs, such as Medicare, has outstripped defense spending. However, our findings suggest that the effects of

defense spending on the annual budget and the size of the deficit are meaningful.

Prior to the pandemic, defense spending had been about half of annual discretionary spending. Our models showed the sizable fiscal consequences of changing this portion of the federal budget. We examined how relatively small shifts in defense spending can lead to changes in the debt-to-GDP ratio and associated annual interest payments. For example, if the country were to adopt a defense budget of 2.5 percent of GDP, the annual difference in the defense budget plus associated interest payments in 2030 would be enough to fund a midsize government agency. Therefore, proposed changes in defense spending can have meaningful consequences for the federal budget and the size of the deficit.

The Economic Literature Has Not Concluded How Increasing Taxes to Maintain or Increase Defense Budgets Would Affect Economic Growth

As public debt grows, future policymakers could consider tying future defense budget increases to tax increases. Unfortunately, gaps and disagreements in the existing literature mean that we cannot say how this would affect growth. Relatedly, as the debt continues to increase, policymakers might begin to look for options for spending cuts or revenue increases to address annual deficits. It remains unclear how tax increases or defense spending reductions, two options for decreasing annual deficits, affect growth in relative terms. More research is needed on how tax policy affects growth and how these policy changes compare with defense spending cuts.

Conclusion

We do not make recommendations in this report about whether or how the United States should change its level of defense spending. Those decisions should be based on a range of other factors that we do not consider in this report, such as the security needs of the United States. However, we do recommend that policymakers take the economic consequences seriously as part of a broader assessment. Some public

commentary on the defense budget downplays the economic effects, suggesting that we can focus solely on geopolitical factors. However, this line of argument misses the very real effects of defense spending on growth that we describe in this report. The large and growing public debt means that the economic consequences of the defense budget might even grow in the future. Given that the size and health of the U.S. economy are ultimately the basis for U.S. military power, the economic effects of defense spending have consequences for long-term security that policymakers should consider.

The task before policymakers is not easy given the remaining uncertainty in the economics literature. Economists point to risks of a growing public debt but cannot yet say how large or imminent they are. There is evidence about trade-offs between different types of government spending and financing for growth, but uncertainty in these findings makes it difficult to quantify how large these trade-offs are. Therefore, our findings reinforce the importance of ongoing research on the relationship between government spending, taxation, public debt, and economic growth for questions of U.S. grand strategy.

Notes

¹ Eugene Gholz, Daryl G. Press, and Harvey M. Sapolsky, “Come Home, America: The Strategy of Restraint in the Face of Temptation,” *International Security*, Vol. 21, No. 4, Spring 1997; John J. Mearsheimer and Stephen M. Walt, “The Case for Offshore Balancing: A Superior U.S. Grand Strategy,” *Foreign Affairs*, Vol. 95, No. 4, July–August 2016; and Barry R. Posen, *Restraint: A New Foundation for U.S. Grand Strategy*, Ithaca, N.Y.: Cornell University Press, 2014.

² Hal Brands and Eric Edelman, *Avoiding a Strategy of Bluff: The Crisis of American Military Primacy*, Washington, D.C.: Center for Strategic and Budgetary Assessments, 2017; and Stephen G. Brooks, G. John Ikenberry, and William C. Wohlforth, “Don’t Come Home, America: The Case Against Retrenchment,” *International Security*, Vol. 37, No. 3, Winter 2012–2013.

³ Daniel Egel, Howard J. Shatz, Krishna B. Kumar, and Edward R. Harshberger, “Defense Budget Implications of the COVID-19 Pandemic,” *RAND Blog*, April 7, 2020; and Kathleen H. Hicks, “Could the Pandemic Reshape World Order, American Security, and National Defense?” in Hal Brands and Francis J. Gavin, eds., *COVID-19 and World Order: The Future of Conflict, Competition, and Cooperation*, Baltimore, Md.: Johns Hopkins University Press, 2020.

⁴ In this report, we use the term *public debt* to refer to U.S. debt held by the public. For a discussion of debt held by the public,

see Congressional Budget Office (CBO), *Federal Debt: A Primer*, Washington, D.C., March 2020a.

⁵ Dan Keeler, “How the Ballooning Federal Debt Threatens U.S. Defense,” *Order from Chaos*, blog, June 27, 2018. For a discussion of how people on different sides of the debate use different ways of characterizing defense spending (e.g., in nominal terms, as a share of GDP), see Michael E. O’Hanlon, “Is US Defense Spending Too High, Too Low, or Just Right?” Brookings Institution, October 15, 2019.

⁶ See, for example, Stephen G. Brooks and William C. Wohlforth, *America Abroad: The United States’ Global Role in the 21st Century*, New York: Oxford University Press, 2016, p. 131.

⁷ Hal Brands, “Rethinking America’s Grand Strategy: Insights from the Cold War,” *Parameters*, Vol. 45, No. 4, Winter 2015; and Brooks, Ikenberry, and Wohlforth, 2013, pp. 26–27.

⁸ “57 Members of Congress Support Defense Cuts,” *Bottom Line*, blog, Committee for a Responsible Federal Budget, October 14, 2010; Uri Friedman, “The Sanders Doctrine,” *The Atlantic*, February 11, 2020; Mearsheimer and Walt, 2016; and Posen, 2014, p. 27.

⁹ Mearsheimer and Walt, 2016; Posen, 2014, p. 27.

¹⁰ David Andolfatto and Andrew Spewak, “On the Supply of, and Demand for, U.S. Treasury Debt,” *Economic Synopses*, No. 5, 2018; Michael J. Boskin, “Are Large Deficits and Debt Dangerous?” *AEA Papers and Proceedings*, Vol. 110, May 2020; and Balázs Égert, “The 90% Public Debt Threshold: The Rise and Fall of a Stylized Fact,” *Applied Economics*, Vol. 47, No. 34–35, April 2015b.

¹¹ Gordon Adams and Matthew Leatherman, “A Leaner and Meaner Defense: How to Cut the Pentagon’s Budget While Improving Its Performance,” *Foreign Affairs*, Vol. 90, No. 1, January–February 2011, p. 141; and Benjamin H. Friedman, “Restrained Strategy, Lower Military Budgets,” *War on the Rocks*, September 7, 2016.

¹² Chris Edwards, “What Federal Spending to Cut?” blog post, Cato Institute, March 22, 2019; and Eugene Gholz and Daryl G. Press, “The Effects of Wars on Neutral Countries: Why It Doesn’t Pay to Preserve the Peace,” *Security Studies*, Vol. 10, No. 4, Summer 2001.

¹³ We do not consider the related claim that U.S. forward military presence and alliance commitments allow the United States to gain other economic advantages, such as favorable trade terms, in this report. Although large defense budgets allow these policies, the argument hinges more on the strategy associated with the defense budget rather than its size. The RAND Center for Analysis of Grand Strategy is considering these questions in another line of research. For discussions and analysis of the range of ways in which military engagement can produce these other economic benefits, see, for example, Brooks and Wohlforth, 2016; and Daniel Egel, Adam R. Grissom, John P. Godges, Jennifer Kavanagh, and Howard J. Shatz, *Estimating the Value of Overseas Security Commitments*, Santa Monica, Calif.: RAND Corporation, RR-518-AF, 2016.

¹⁴ CBO, for example, assumes in its future budget projections that U.S. debt begins to affect economic growth (CBO, *The 2020 Long-Term Budget Outlook*, Washington, D.C., September 2020e).

¹⁵ Gholz and Press, 2001, p. 55; Mearsheimer and Walt, 2016; John Nichols, “Representative Barbara Lee: ‘The Public Is with Us,’” *The Nation*, No. August 24/31, August 11, 2020; and Posen, 2014, p. 27.

¹⁶ Uk Heo and Min Ye, “Defense Spending and Economic Growth Around the Globe: The Direct and Indirect Link,” *International Interactions*, Vol. 42, No. 5, 2016.

¹⁷ Heo and Ye, 2016.

¹⁸ For example, see Brooks, Ikenberry, and Wohlforth, 2013.

¹⁹ These conflicting findings are not just among individual studies, but among surveys of the field; for a survey that found a small positive effect, see Aynur Alptekin and Paul Levine, “Military Expenditure and Economic Growth: A Meta-Analysis,” *European Journal of Political Economy*, Vol. 28, No. 4, December 2012. For a survey that found a negative effect, see J. Paul Dunne and Nan Tian, “Military Expenditure and Economic Growth: A Survey,” *Economics of Peace and Security Journal*, Vol. 8, No. 1, 2013. For a survey that found effects near 0, see Filiz Yesilyurt and M. Ensar Yesilyurt, “Meta-Analysis, Military Expenditures and Growth,” *Journal of Peace Research*, Vol. 56, No. 3, May 2019.

²⁰ Indeed, the purpose of some spending can be explicitly to respond to the state of the economy, as is often the case during recessions; examples include the American Recovery and Reinvestment Act of 2009 and the Coronavirus Aid, Relief, and Economic Security Act of 2020 (Public Law 111-5, American Recovery and Reinvestment Act of 2009, February 17, 2009; and Public Law 116-136, Coronavirus Aid, Relief, and Economic Security Act, March 27, 2020). Defense spending is arguably driven more by international events than domestic economic conditions, but economic circumstances could still be a factor.

²¹ For example, this literature tends to use annual data on defense spending and growth. Empirical translations of the model tend to examine the relationship between the growth rate of GDP and the growth rate of military spending and other variables in the same year. Because GDP growth and military spending affect one another, using annual data makes it difficult to determine which change comes first—change in GDP growth or change in military spending. Yesilyurt and Yesilyurt, 2019, acknowledges this problem.

²² Some scholars in this area have examined the effect of defense spending on growth over multiple years. For example, Heo and Ye use a distributed lag model to estimate the impact of defense spending on growth over the following two years (Heo and Ye, 2016).

²³ The use of higher-frequency data allows them to better account for the possibility that investors anticipate defense spending and, therefore, that defense budgets may affect growth even before the money has been spent.

²⁴ Valerie A. Ramey, “Identifying Government Spending Shocks: It’s All in the Timing,” *Quarterly Journal of Economics*, Vol. 126, No. 1, February 2011; Valerie A. Ramey and Matthew D. Shapiro, “Costly Capital Reallocation and the Effects of Government Spending,” *Carnegie-Rochester Conference Series on Public Policy*, Vol. 48, No. 1, June 1998; and Valerie A. Ramey and Sarah Zubairy, “Government Spending Multipliers in Good Times and in Bad: Evidence from U.S. Historical Data,” *Journal of Political Economy*, Vol. 126, No. 2, 2018.

²⁵ One well-known example of the narrative approach is Ramey, 2011; Ramey used the forecasts contained in *Business Week* articles to identify changes in expectations about defense spending.

²⁶ Olivier Blanchard and Roberto Perotti, “An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output,” *Quarterly Journal of Economics*, Vol. 117, No. 4, November 2002. Other models are based on assumptions that come from economic theory. For example, analysts assume that a contractionary monetary shock has a positive effect on interest rates and a negative effect on prices. See Andrew Mountford and Harald Uhlig, “What Are the Effects of Fiscal Policy Shocks?” *Journal of Applied Econometrics*, Vol. 24, No. 6, September–October 2009.

²⁷ This second approach has also been used to estimate the impact of many types of government spending, as well as taxation, which we discuss later.

²⁸ In this example, we use what is referred to in the macroeconomic literature as an *integral* multiplier. A second form of multiplier, a *peak* multiplier, considers the maximum effect of spending over the time frame considered rather than the average effect. For example, if an increase of \$1 of defense spending leads to a \$2 increase in GDP two years after the defense funds are spent, the peak multiplier would be 2—i.e., a two-for-one increase—even if year 1 and years 3 through 5 see lesser changes in GDP. Several studies argue in favor of the integral multiplier approach described in the text. In many cases, the peak multiplier yields a higher number than the integral multiplier.

²⁹ Nadav Ben-Zeev and Evi Pappa, “Chronicle of a War Foretold: The Macroeconomic Effects of Anticipated Defence Spending Shocks,” *Economic Journal*, Vol. 127, No. 603, August 2017; Blanchard and Perotti, 2002; Jonas Fisher and Ryan Heath Peters, “Using Stock Returns to Identify Government Spending Shocks,” *Economic Journal*, Vol. 120, No. 544, 2010; Ramey, 2011; Valerie A. Ramey, “Macroeconomic Shocks and Their Propagation,” in John B. Taylor and Harald Uhlig, eds., *Handbook of Macroeconomics*, Vol. 2, Amsterdam, Netherlands: Elsevier, 2016; Valerie A. Ramey, “Ten Years After the Financial Crisis: What Have We Learned from the Renaissance in Fiscal Research?” *Journal of Economic Perspectives*, Vol. 33, No. 2, Spring 2019; and Julio J. Rotemberg and Michael Woodford, “Oligopolistic Pricing and the Effects of Aggregate Demand on Economic Activity,” *Journal of Political Economy*, Vol. 100, No. 6, December 1992.

³⁰ Ramey, 2016; Ramey, 2019.

³¹ Defense spending is often used as a stand-in (or instrument for) all government spending because it is less affected by broader economic conditions. This allows economists to be confident that they are assessing the effect of spending on growth, not the other way around.

³² Robert J. Barro, “Output Effects of Government Purchases,” *Journal of Political Economy*, Vol. 89, No. 6, December 1981; Robert J. Barro and Charles J. Redlick, “Macroeconomic Effects from Government Purchases and Taxes,” *Quarterly Journal of Economics*, Vol. 126, No. 1, February 2011; Craig Burnside, Martin Eichenbaum, and Jonas D. M. Fisher, “Fiscal Shocks and Their Consequences,” *Journal of Economic Theory*, Vol. 115, No. 1, March 2004; Wendy Edelberg, Martin Eichenbaum, and Jonas D. M. Fisher, “Understanding the Effects of a Shock to

Government Purchases,” *Review of Economic Dynamics*, Vol. 2, No. 1, January 1999; Robert E. Hall, “The Role of Consumption in Economic Fluctuations,” in Robert J. Gordon, ed., *The American Business Cycle: Continuity and Change*, Chicago, Ill.: University of Chicago Press, 1986; Robert E. Hall, “By How Much Does GDP Rise if the Government Buys More Output?” *Brookings Papers on Economic Activity*, Vol. 40, No. 2, Fall 2009; Ramey, 2011; Ramey and Shapiro, 1998; and Ramey and Zubairy, 2018.

³³ For example, there is evidence that the multiplier might be higher when interest rates are near 0 (Ramey, 2019). A few studies estimate a multiplier strictly above 1 (Ben Zeev and Pappa, 2017; Fisher and Peters, 2010; Rotemberg and Woodford, 1992). However, Ramey, 2016, notes that the approaches in Fisher and Peters, 2010; and Ben Zeev and Pappa, 2017, have issues with instrument relevance, meaning their defense spending measures are not strongly predictive of variation in government spending more broadly. This problem can result in unreliable estimates.

³⁴ In particular, there has been increased focus on using integral multipliers as opposed to peak multipliers (Ramey, 2019; Ramey and Zubairy, 2018).

³⁵ On the whole, different applied macroeconomic methods produce similar ranges, unlike in the tax literature described later.

³⁶ Viktor Slavtchev and Simon Wiederhold, “Does the Technological Content of Government Demand Matter for Private R&D? Evidence from US States,” *American Economic Journal: Macroeconomics*, Vol. 8, No. 2, April 2016.

³⁷ Alan J. Auerbach and Yuriy Gorodnichenko, “Fiscal Multipliers in Recession and Expansion,” in Alberto Alesina and Francesco Giavazzi, eds., *Fiscal Policy After the Financial Crisis*, Chicago, Ill.: University of Chicago Press, 2013; and Ramey and Zubairy, 2018.

³⁸ Ramey, 2011.

³⁹ Ethan Ilzetzki, Enrique G. Mendoza, and Carlos A. Végh, “How Big (Small?) Are Fiscal Multipliers?” *Journal of Monetary Economics*, Vol. 60, No. 2, March 2013.

⁴⁰ Ramey, 2016.

⁴¹ Studies have found negative short-term effects of infrastructure spending on employment, for example (Alfredo M. Pereira and Rafael Flores de Frutos, “Public Capital Accumulation and Private Sector Performance,” *Journal of Urban Economics*, Vol. 46, No. 2, September 1999). Other studies have calculated the short-run government investment multiplier. See Christoph E. Boehm, “Government Consumption and Investment: Does the Composition of Purchases Affect the Multiplier?” *Journal of Monetary Economics*, Vol. 115, November 2020; and Ilzetzki, Mendoza, and Végh, 2013, which found multipliers around 0 and 0.4, respectively. See also Valerie A. Ramey, “The Macroeconomic Consequences of Infrastructure Investment,” paper presented at National Bureau of Economic Research “Economics of Infrastructure” Conference, June 24, 2020.

⁴² Ramey, 2020.

⁴³ Some aspects of the defense budget, such as development and acquisition of major weapon systems, might have similar short-term effects. However, large portions of the defense budget

are spent on other categories, such as personnel, operations, and maintenance.

⁴⁴ Ramey, 2020. The meaning of *long term* varies by study. For example, Leff Yaffe looks at the multiplier over a decade, while Leduc and Wilson consider the multiplier over 15 years (Sylvain Leduc and Daniel Wilson, “Roads to Prosperity or Bridges to Nowhere? Theory and Evidence on the Impact of Public Infrastructure Investment,” *NBER Macroeconomics Annual*, Vol. 27, No. 1, 2012; and Daniel Leff Yaffe, *Essays on the Effects of Highway Spending*, dissertation, San Diego, Calif.: University of California San Diego, 2020). See also Boehm, 2020; and Ilzetzi, Mendoza, and Végh, 2013.

⁴⁵ Ramey, 2020.

⁴⁶ Boehm, 2020. Ilzetzi, Mendoza, and Végh, 2013, considers the multipliers for different groups of countries. Most relevant for our purposes, the authors estimate a long-run public investment multiplier of 1.5 for the set of high-income countries.

⁴⁷ Leff Yaffe, 2020, for example, examines the effects of building the U.S. interstate highway system. Leduc and Wilson, 2012, estimates the effects of highway grants from the U.S. federal government to states between 1990 and 2010. Previous RAND research has also found support for the relationship between economic growth and infrastructure spending in the context of highway infrastructure spending (Howard J. Shatz, Karin E. Kitchens, Sandra Rosenbloom, and Martin Wachs, *Highway Infrastructure and the Economy: Implications for Federal Policy*, Santa Monica, Calif.: RAND Corporation, MG-1049-RC, 2011).

⁴⁸ For example, Gechert’s 2015 meta-analysis of fiscal policies finds public investment multipliers roughly equal to 1.5 and public spending multipliers close to 1 (Sebastian Gechert, “What Fiscal Policy Is Most Effective? A Meta-Regression Analysis,” *Oxford Economic Papers*, Vol. 67, No. 3, July 2015).

⁴⁹ According to a 2019 report by the World Economic Forum, the United States ranked 13th in quality of overall infrastructure, ahead of much of the world but behind many developed countries (Klaus Schwab, ed., *The Global Competitiveness Report 2019*, Geneva, Switzerland: World Economic Forum, 2019). The United States requires increased investment in operations and management, for example (Debra Knopman, Martin Wachs, Benjamin M. Miller, Scott G. Davis, and Katherine Pfrommer, *Not Everything Is Broken: The Future of U.S. Transportation and Water Infrastructure Funding and Finance*, Santa Monica, Calif.: RAND Corporation, RR-1739-RC, 2017).

⁵⁰ Cross-national work found evidence that government spending multipliers are lower when the debt-to-GDP ratio is above 100 percent (Giancarlo Corsetti, Andre Meier, and Gernot J. Müller, *What Determines Government Spending Multipliers?* Washington, D.C.: International Monetary Fund, Working Paper No. 12/250, June 2012). Subsequent studies have found an immediate multiplier that is indistinguishable from 0 and a long-run multiplier that is negative when the debt-to-GDP ratio exceeds 60 percent (Ilzetzi, Mendoza, and Végh, 2013). Others have found that, beyond these thresholds, negative effects materialize earlier and accumulate quicker. Specifically, they find that the overall effect becomes negative more quickly above a debt-to-GDP ratio of roughly 65 percent (Christiane Nickel and Andreas Tudyka, “Fiscal Stimulus in Times of High Debt: Reconsidering

Multipliers and Twin Deficits,” *Journal of Money, Credit and Banking*, Vol. 46, No. 7, October 2014).

⁵¹ In general, the forces dragging down the government spending multiplier during high-debt periods would be expected to also lower the infrastructure multiplier. However, given that the long-run multiplier on infrastructure spending is generally considered to be larger than the defense spending multiplier, the exact value that we should expect is unclear.

⁵² CBO, *An Update to the Economic Outlook: 2020 to 2030*, Washington, D.C., July 2020c, p. 1.

⁵³ For a discussion of the differences between mandatory and discretionary spending, see CBO, “What Is the Difference Between Mandatory and Discretionary Spending?” webpage, undated. *Defense spending* in this context refers to the national defense budget rather than Department of Defense (DoD) spending.

⁵⁴ Mandatory and nondefense discretionary spending are expected to increase sharply following the onset of COVID-19. Mandatory spending, such as Supplemental Nutrition Assistance Program expenditures, unemployment insurance expenditures, and Medicaid expenditures, typically rises during economic downturns as unemployment increases. Direct government responses to economic downturns, such as the Coronavirus Aid, Relief, and Economic Security Act, raise nondefense discretionary outlays.

⁵⁵ CBO, 2020b.

⁵⁶ CBO calculations are consistent with projections in the Future Years Defense Program (FYDP), a DoD-provided projection of the forces, resources, and programs necessary to support DoD operations over the next five years under current strategic priorities. However, CBO also notes that in many areas of DoD’s budget, costs have historically grown more rapidly than they are projected to grow in the 2021 FYDP, such as costs for operation and maintenance, acquisitions, and military health care (CBO, *Long-Term Implications of the 2021 Future Years Defense Program*, Washington, D.C., September 2020d, p. 3).

⁵⁷ This number includes all spending on national defense (CBO, 2020c).

⁵⁸ CBO projections after 2021 do not include spending for ongoing U.S. operations or future wars, known as *overseas contingency operations* (OCO). CBO notes that funding caps will expire at this time, and, therefore, DoD plans to request funding for enduring activities that currently fall under OCO funding in the base budget. Moving forward, CBO will use DoD projections of OCO costs, which DoD expects to be small. However, these costs might well be underestimated (CBO, 2020d, p. 3).

⁵⁹ For arguments that deep engagement will lead to rising costs, see Christopher Layne, “The Unipolar Exit: Beyond the *Pax Americana*,” *Cambridge Review of International Affairs*, Vol. 24, No. 2, June 2011, p. 154; and Posen, 2014, pp. 27–28, 32, 67–68.

⁶⁰ Brands and Edelman, 2017, p. 25.

⁶¹ Congresswoman Barbara Lee, “Reps. Barbara Lee and Mark Pocan Statement on House Vote for 10% Cut to Pentagon Budget,” press release, Washington, D.C., July 21, 2020. A companion U.S. Senate amendment sponsored by Sen. Bernie Sanders (I-Vt.)

and Sen. Ed Markey (D-Mass.) would make the same 10-percent cut. In this specific case, the bill's sponsors argued that its cuts would not be made to either personnel or health care and argued that the savings would be transferred to education, health care, and other domestic programs (Benjamin H. Friedman, "A 10 Percent Pentagon Cut Is a Down Payment on Restraint," *Responsible Statecraft*, July 22, 2020).

⁶² Adams and Leatherman, 2011; and Benjamin H. Friedman and Justin Logan, "Why the U.S. Military Budget Is 'Foolish and Sustainable,'" *Orbis*, Vol. 56, No. 2, Spring 2012.

⁶³ Posen and Friedman both propose a defense budget of roughly 2.5 percent of GDP (Friedman, 2016; Posen, 2014, Chapter 3). Advocates of restraint have put forward other proposed defense budget figures. However, those earlier proposals might be less applicable given changes in the international setting (Adams and Leatherman, 2011; Benjamin H. Friedman and Christopher A. Preble, "Budgetary Savings from Military Restraint," *Cato Institute, Policy Analysis* No. 667, September 21, 2010; and Gholz and Press, 2001).

⁶⁴ Posen, 2014, p. 163.

⁶⁵ From 2022 to 2027, defense spending as a percentage of GDP declines about 0.2 percent each year.

⁶⁶ We start our projections in FY 2022 because major changes to the FY 2021 budget are less likely following the approval of the National Defense Authorization Act, and because this is the first year in which the budget will be determined by the Biden administration. In addition, beginning in FY 2022, there are no discretionary spending caps. FY 2022 begins on October 1, 2021.

⁶⁷ This is called a *partial equilibrium analysis*. A more complex model, known as a *general equilibrium analysis*, would account for less direct effects of defense spending on public debt. We also do not consider changes to mandatory defense spending, such as military retirements.

⁶⁸ As detailed later, there is not yet agreement on how interest rates might change as the debt increases or on exactly whether defense spending increases growth by making the country more productive.

⁶⁹ $Debt\ held\ by\ the\ public_t = CBO\ projected\ debt_t$

$$+ \sum_{t0}^t change\ in\ defense\ spending \\ + \sum_{t0+1}^t change\ in\ interest\ payments,$$

where t represents the year under examination and $t0$ represents the first year of the change, 2022.

⁷⁰ Corsetti, Meier, and Müller, 2012; Ilzetzi, Mendoza, and Végh, 2013; Nickel and Tudyka, 2014.

⁷¹ Ilzetzi, Mendoza, and Végh, 2013; Nickel and Tudyka, 2014.

⁷² The FY 2020 budget was \$100.3 billion for the Department of Transportation (USAspending.gov, "Federal Spending by Category and Agency," web tool, undated). CBO projections have inflation rising to roughly 2 percent by 2024 and remaining stable thereafter (CBO, 2020c). Therefore, the FY 2020 budget would equal roughly \$118.6 billion in 2030 dollars.

⁷³ The FY 2020 budget for the Department of Labor was \$477.5 billion. When adjusted for inflation to 2030 based on CBO projections, this would equal \$564 billion (USAspending.gov, undated).

⁷⁴ In addition, there are other possible secondary effects. For example, individuals might begin to anticipate future tax increases to cover the debt, causing households to reduce spending and increase saving in anticipation of the future fiscal consolidation, further harming the economy (Nickel and Tudyka, 2014).

⁷⁵ CBO, *The 2019 Long-Term Budget Outlook*, Washington, D.C., June 2019; CBO, 2020e; and Balázs Égert, "Public Debt, Economic Growth and Nonlinear Effects: Myth or Reality?" *Journal of Macroeconomics*, Vol. 43, March 2015a.

⁷⁶ Carmen M. Reinhart and Kenneth S. Rogoff, "Growth in a Time of Debt," *American Economic Review: Papers & Proceedings*, Vol. 100, No. 2, May 2010. See also Carmen M. Reinhart, Vincent R. Reinhart, and Kenneth S. Rogoff, "Public Debt Overhangs: Advanced-Economy Episodes Since 1800," *Journal of Economic Perspectives*, Vol. 26, No. 3, Summer 2012.

⁷⁷ Thomas Herndon, Michael Ash, and Robert Pollin, "Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff," *Cambridge Journal of Economics*, Vol. 38, No. 2, March 2014.

⁷⁸ Anja Baum, Cristina Checherita-Westphal, and Philipp Rother, *Debt and Growth: New Evidence for the Euro Area*, Frankfurt, Germany: European Central Bank, Working Paper No. 1450, 2012; Stephen G. Cecchetti, M. S. Mohanty, and Fabrizio Zampolli, *The Real Effects of Debt*, Basel, Switzerland: Bank for International Settlements, No. 352, 2011; Cristina Checherita and Philipp Rother, *The Impact of High and Growing Government Debt on Economic Growth: An Empirical Investigation for the Euro Area*, Frankfurt, Germany: European Central Bank, Working Paper No. 1237, 2010; Pier Carlo Padoan, Urban Sila, and Paul van den Noord, *Avoiding Debt Traps: Fiscal Consolidation, Financial Backstops and Structural Reforms*, Paris, France: Organisation for Economic Co-operation and Development Economics Department, Working Paper No. 976, June 2012; and Jaejoon Woo and Manmohan S. Kumar, "Public Debt and Growth," *Economica*, Vol. 82, No. 328, October 2015.

⁷⁹ Deniz Baglan and Emre Yoldas, *Government Debt and Macroeconomic Activity: A Predictive Analysis for Advanced Economies*, Federal Reserve Board Finance and Economics Discussion Series, Washington, D.C.: Federal Reserve Board, No. 2013-05, December 2012.

⁸⁰ Égert, 2015a.

⁸¹ Jørgen Elmeskov and Douglas Sutherland, *Post-Crisis Debt Overhang: Growth Implications Across Countries*, paper presented at Second International Research Conference 2012, Mumbai, India: Reserve Bank of India, February 2012.

⁸² Mehmet Caner, Thomas Grennes, and Fritz Koehler-Geib, *Finding the Tipping Point—When Sovereign Debt Turns Bad*, Washington, D.C.: World Bank, Policy Research Working Paper No. 5391, July 2010.

⁸³ Alexandru Minea and Antoine Parent, *Is High Public Debt Always Harmful to Economic Growth? Reinhart and Rogoff and*

Some Complex Nonlinearities, Clermont-Ferrand, France: Centre D'Etudes et de Recherches sur le Developpement International, No. E.2012.18, February 2012.

⁸⁴ Baglan and Yoldas, 2012; Égert, 2015a; Égert, 2015b.

⁸⁵ Herndon, Ash, and Pollin, 2014.

⁸⁶ In Greece, for example, debt-to-GDP has risen above 180 percent. See Eurostat, "General Government Gross Debt (EDP Concept), Consolidated—Annual Data," data set, last updated August 2, 2021.

⁸⁷ This means that the United States does not pledge to convert its currency at a fixed rate into, for example, gold, as it has done in the past, or peg the value of its currency to that of another.

⁸⁸ Michael Mastanduno, "System Maker and Privilege Taker: U.S. Power and the International Political Economy," *World Politics*, Vol. 61, No. 1, January 2009; Carla Norrlof, "Dollar Hegemony: A Power Analysis," *Review of International Political Economy*, Vol. 21, No. 5, 2014; and Carla Norrlof and William C. Wohlforth, "Is U.S. Grand Strategy Self-Defeating? Deep Engagement, Military Spending and Sovereign Debt," *Conflict Management and Peace Science*, Vol. 36, No. 3, May 2019.

⁸⁹ Jason Furman and Lawrence H. Summers, "Who's Afraid of Budget Deficits: How Washington Should End Its Debt Obsession," *Foreign Affairs*, Vol. 98, No. 4, March–April 2019.

⁹⁰ David Wessel, "How Worried Should You Be About the Federal Deficit and Debt?" Brookings Institution, July 8, 2020.

⁹¹ Even those who believe that the dollar will lose some of its dominance expect it to remain the principal currency of international reserves for the foreseeable future (Barry Eichengreen, "The Dollar Dilemma: The World's Top Currency Faces Competition," *Foreign Affairs*, Vol. 88, No. 5, September–October 2009).

⁹² CBO, 2020e. Although interest rates are projected to rise, it is worth noting that they are still expected to remain below their historical levels because of a number of factors.

⁹³ CBO also expects a continued increase in the U.S. debt-to-GDP ratio from 2030 to 2050 to contribute to higher interest rates and lower growth over this period (CBO, 2020e).

⁹⁴ Christina D. Romer and David H. Romer, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks," *American Economic Review*, Vol. 100, No. 3, June 2010.

⁹⁵ Although defense spending has frequently been financed by increased deficit spending, there is historical precedent for the United States funding military ventures through taxation (Lee E. Ohanian, "The Macroeconomic Effects of War Finance in the United States: World War II and the Korean War," *American Economic Review*, Vol. 87, No. 1, March 1997).

⁹⁶ Gholz and Press, 2001.

⁹⁷ Karel Mertens and Morten O. Ravn, "The Dynamic Effects of Personal and Corporate Income Tax Changes in the United States," *American Economic Review*, Vol. 103, No. 4, June 2013; and Romer and Romer, 2010. However, the studies that we examine do not focus on differences across types of tax changes.

⁹⁸ Differences across studies include model specifications, assumptions, and data. At the cross-national level, meta-regression analysis, which combines data from multiple studies, has placed the number between 0.6 and 0.7. However, because the effect of taxes can depend on the context, we report primarily on U.S.-focused studies (Gechert, 2015).

⁹⁹ Carlo Favero and Francesco Giavazzi, "Measuring Tax Multipliers: The Narrative Method in Fiscal VARs," *American Economic Journal: Economic Policy*, Vol. 4, No. 2, May 2012; Karel Mertens and Morten O. Ravn, "A Reconciliation of SVAR and Narrative Estimates of Tax Multipliers," *Journal of Monetary Economics*, Vol. 68, December 2014; and Roberto Perotti, "The Effects of Tax Shocks on Output: Not So Large, but Not Small Either," *American Economic Journal: Economic Policy*, Vol. 4, No. 2, May 2012.

¹⁰⁰ Romer and Romer, 2010.

¹⁰¹ Alberto Alesina, Gualtiero Azzalini, Carlo Favero, Francesco Giavazzi, and Armando Miano, "Is It the 'How' or the 'When' That Matters in Fiscal Adjustments?" *IMF Economic Review*, Vol. 66, No. 1, 2018; James Cloyne, "Discretionary Tax Changes and the Macroeconomy: New Narrative Evidence from the United Kingdom," *American Economic Review*, Vol. 103, No. 4, June 2013; Jaime Guajardo, Daniel Leigh, and Andrea Pescatori, "Expansionary Austerity? International Evidence," *Journal of the European Economic Association*, Vol. 12, No. 4, August 2014; Bernd Hayo and Matthias Uhl, "The Macroeconomic Effects of Legislated Tax Changes in Germany," *Oxford Economic Papers*, Vol. 66, No. 2, April 2014; Mertens and Ravn, 2013; Mertens and Ravn, 2014; and Daniel Riera-Crichton, Carlos A. Vegh, and Guillermo Vuletin, "Tax Multipliers: Pitfalls in Measurement and Identification," *Journal of Monetary Economics*, Vol. 79, May 2016.

¹⁰² Blanchard and Perotti, 2002; Dario Caldara and Christophe Kamps, "The Analytics of SVARs: A Unified Framework to Measure Fiscal Multipliers," *Review of Economic Studies*, Vol. 84, No. 3, July 2017; and Mountford and Uhlig, 2009.

¹⁰³ Mertens and Ravn, 2014; Ramey, 2016; Ramey, 2019.

¹⁰⁴ Günter Coenen, Christopher J. Erceg, Charles Freedman, Davide Furceri, Michael Kumhof, René Lalonde, Douglas Laxton, Jesper Lindé, Annabelle Mourougane, Dirk Muir, et al., "Effects of Fiscal Stimulus in Structural Models," *American Economic Journal: Macroeconomics*, Vol. 4, No. 1, January 2012; Eric Sims and Jonathan Wolff, "The State-Dependent Effects of Tax Shocks," *European Economic Review*, Vol. 107, August 2018; and Sarah Zubairy, "On Fiscal Multipliers: Estimates from a Medium Scale DSGE Model," *International Economic Review*, Vol. 55, No. 1, February 2014.

¹⁰⁵ Ramey, 2019.

¹⁰⁶ Few papers have used DSGE models to study the impacts of defense spending on the economy or to compute a defense spending multiplier in particular. See Marco Lorusso and Luca Pieroni, "The Effects of Military and Non-Military Government Expenditures on Private Consumption," *Journal of Peace Research*, Vol. 54, No. 3, May 2017. The authors find negative impacts of military spending on output in their complete sample but find positive output effects of military spending for a subsample covering 1960 through 1979. Importantly, they do not use

their framework to estimate a tax multiplier. See Marco Lorusso and Luca Pieroni, “Disentangling Civilian and Military Spending Shocks: A Bayesian DSGE Approach for the US Economy,” *Journal of Risk and Financial Management*, Vol. 12, No. 3, September 2019. The authors find positive effects of military spending on output, but they do not explicitly compute a defense spending multiplier; they also do not estimate the output effects of taxes.

¹⁰⁷ Specifically, the researchers study the effects of both defense spending and average marginal income tax rates on output (Barro and Redlick, 2011).

¹⁰⁸ It is more common for studies to jointly study taxation and broader government spending, as opposed to defense spending in particular. Such studies are still few in comparison with those that assess taxation or spending in isolation. In one example, Caldara and Kamps, 2017, concludes that government spending has a greater positive impact on output than tax cuts do, although the authors do not focus on defense spending in particular.

¹⁰⁹ There might be important differences between defense and nondefense government spending for the tax multiplier. For example, increases in defense spending can be accompanied by price controls and patriotic increases in the labor supply (Ramey, 2016).

¹¹⁰ Ramey, 2016.

¹¹¹ Historically, tax cuts usually have not been made at relatively high debt-to-GDP ratios. There has also been analysis of the Tax Cuts and Jobs Act of 2017 that has suggested negative effects on growth, but this might be because of the nature of the cuts (Joint Committee on Taxation, *Macroeconomic Analysis of the Conference Agreement for H.R. 1, the “Tax Cuts and Jobs Act,”* Washington, D.C., JCX-69-17, December 22, 2017).

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About This Report

U.S. President Joseph Biden's administration will need to make difficult decisions on how to confront national security challenges at the same time that the federal budget is under pressure because of public health, debt, and infrastructure needs. This report discusses one part of this larger calculation by examining the relationship between defense spending and economic growth. The authors consider what the effect on economic growth would be if the United States were to adopt any one of three policy changes: reallocate funds between defense spending and infrastructure investments, change its overall level of defense spending and apply the difference to public debt, or increase taxes to finance defense spending. For policymakers, this report provides a valuable examination of the long-term economic impact of defense spending that should inform a holistic assessment of the appropriate level of defense spending for the United States. The authors also propose where deeper analysis is required to inform this assessment.

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