

# 18-11 Implications of Lower Trend Productivity Growth for Tax Policy

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## Abstract

This paper considers the implications of a sustained period of low productivity growth for the design of tax systems. While the specific changes needed will vary by country and depend on how other features of the economic environment change, several broad conclusions emerge. First, lower productivity growth will exacerbate future fiscal shortfalls associated with aging populations; even assuming that interest rates are also lower, tax systems may need to collect more revenue per dollar of GDP to support their older populations. Second, with lower productivity growth likely to result in lower wages, labor force participation rates may drop further, bolstering the case for more tax incentives for working. Third, the potentially flatter lifetime income profiles associated with lower productivity growth, along with the possibility that fiscal strains will lead to government retirement benefits cuts, may warrant increasing tax incentives for retirement saving. Finally, the lower real interest rates that would likely accompany sustained low productivity growth may reduce the future efficacy of monetary policy as a macroeconomic stabilization tool, suggesting that countries would be well-served by building more automatic stabilizers into their tax systems.

**JEL codes:** E1, H2, H6

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## Introduction

The slow observed rate of productivity growth in recent years has been a source of disappointment, concern, and—to some extent—surprise in both the academic and policymaking communities. In the United States, annual labor productivity growth in the nonfarm business sector averaged just 0.8 percent between 2012 and 2017 (figure 1).

Low rates of capital investment in the wake of the Great Recession may be contributing to recent sluggishness, but the disappointing performance of productivity growth appears to have roots that predate the downturn. A growing body of research documents a downshift in the rate of US labor productivity growth and total factor productivity growth in the early 2000s (Fernald 2014, Fernald et al. 2017). Other studies demonstrate that the slowdown in productivity growth extends well beyond the United States (Adler et al. 2017). Many advanced economies have seen low productivity growth in recent years. In the OECD countries, for example, productivity growth averaged 0.8 percent a year from 2011 to 2016.<sup>1</sup>

Because part of the slowdown in productivity growth appears to be a hangover from the Great Recession, many analysts are optimistic that the extremely low productivity growth rates of recent years will not persist. But most forecasters do not foresee productivity growth returning to long-run historical averages. For example, in August 2018, the Congressional Budget Office (CBO) projected that under current fiscal policy, labor productivity growth in the US nonfarm business sector will pick up to 1.8 percent a year by the end of the coming decade, down from an average pace of 2.2 percent in the second half of the last century.<sup>2</sup> Results from the Survey of Professional Forecasters (SPF) suggest that many other forecasters foresee a similar shortfall in productivity growth relative to historical averages. The SPF results also suggest considerable downside risk to what forecasters expect on average. For example, about a quarter of SPF participants believe that productivity growth over the coming decade will be 35 basis points below the mean forecast and about one tenth expect productivity growth to be more than 1 percentage points below the mean.<sup>3</sup>

This paper considers the implications of a sustained period of low productivity growth for the design of tax systems. To some extent, it draws on the large body of related literature on how to reform tax systems to boost productivity growth (see, for example, IMF 2017). The central issue of interest in this paper is different from that explored in those studies, however. The reforms to tax systems examined elsewhere emphasize reforms that are always desirable from an efficiency point of view. In contrast, this paper explores changes that should be made in response to a decline in productivity growth relative to historical norms.

The paper is organized as follows. It begins by stipulating lower trend productivity growth and then discussing the key relevant economic implications. It then turns to the question of how to

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<sup>1</sup> This estimate is based on data on real GDP per hour worked from OECD.Stat.

<sup>2</sup> CBO forecasts for productivity growth are available under the heading “Potential GDP and Underlying Inputs” at <https://www.cbo.gov/about/products/budget-economic-data>.

<sup>3</sup> As of January 2018, the mean SPF forecast for average labor productivity growth over the following decade was 1.6 percent, the 25th percentile of forecasts was 1.2 percent, and the 10th percentile was 0.5 percent. The SPF data are available at [www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/data-files/prod10](http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/data-files/prod10).

adapt tax policy to these changes. The discussion is organized around the major objectives of tax policy: collecting revenue, incentivizing work and saving, redistributing income, mitigating business cycle fluctuations, and improving resource allocation in other ways, such as minimizing tax-based distortions and correcting for externalities. Slower productivity growth and related changes in the economy have consequences for each of these objectives that suggest that some change in policy will be needed. The paper concludes by summarizing the implications of a slowdown in productivity growth for tax policy.

## **Slower Productivity Growth and Key Economic Implications**

All of the papers in Posen and Zettelmeyer (2018) are conditioned on the assumption that both labor productivity and total factor productivity growth rates settle at paces that are a few tenths of a percentage point below historical norms in the baseline and 0.5 percentage points lower than the baseline in the downside-risk scenario. The downside-risk scenario is not implausible. Many forecasts of long-term productivity have been marked down by a similar amount over the last half decade.<sup>4</sup> (Much of the discussion is qualitative, so the precise assumptions about productivity growth are not crucial.)

A sustained period of lower productivity growth would lead to changes in other factors that are relevant for tax policy. In particular, lower productivity growth would lead to lower interest rates, somewhat lower inflation, lower wage growth, and less “real bracket creep” in the tax code, each of which is addressed below. Although much of the discussion that follows cites evidence from the United States, most of the changes are expected in other countries as well (with the exception of the result for real bracket creep, which depends on the nature of each country’s tax code).

### ***Interest Rates***

Economic theory predicts that the real interest rate will be lower when productivity growth is lower. Consistent with theory, forecasts of long-term real interest rates have been revised downward in recent years along with forecasts of economic growth over the longer run. Between 2012 and 2018, CBO reduced its projection of the real interest rate on 10-year Treasury notes as well as its projection of potential output growth (figure 2).

CBO’s 1.4 percentage point downward revision to the real interest rate is a good deal larger than its 0.5 percentage point downward revision to the growth rate of potential output. The larger revision to the real interest rate is perhaps not surprising given that the low real interest rates of recent years have drawn attention to other factors that may be weighing on rates. These factors include the aging of the population, changes in global preferences for safe assets, and higher income inequality.

Theory can offer some guidance on how much interest rates decline when productivity growth falls. The Ramsey model of optimal consumption and saving over time implies that the amount

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<sup>4</sup> For example, in its August 2012 forecast, CBO assumed that annual US labor productivity growth would settle at 2.1 percent over the longer run.

by which interest rates decline with the growth rate of the economy depends on preferences. A simple version of the model yields the following relationship:

$$r_{t+1} = \rho + \sigma g_{t+1},$$

where  $r_{t+1}$  equals the real interest rate on saving between periods  $t$  and  $t + 1$ ,  $\rho$  is inversely related to the rate of time discount,  $\sigma$  is inversely related to the intertemporal elasticity of substitution, and  $g_{t+1}$  is the growth rate of consumption between periods  $t$  and  $t + 1$ . In the steady state,  $g$  will be equal to the per capita growth rate of the economy, which is determined by productivity growth.

Reasonable parameter choices for  $\rho$  and  $\sigma$  imply that changes in real interest rates may have a roughly one-for-one relationship with changes in the growth rate of the economy, as a report by the Council of Economic Advisers (2015) shows. This result suggests that real interest rates might be between a few tenths (in the baseline scenario) and 0.75 percentage points (in the downside-risk scenario) lower than they would be if productivity growth were closer to its long-term historical average.

Of course, this calibration is sensitive to the underlying assumptions. If people are not very willing to substitute consumption over time, the model would imply even larger declines in real interest rates. Moreover, although other models of consumption and saving, such as the overlapping generations model, also suggest a link between productivity growth and the interest rate, the implied quantitative relationship could be different.

### ***Inflation***

The decline in interest rates that accompanies slower productivity will tend to make the effective lower bound on the federal funds rate more binding more of the time. This constraint on the ability of monetary policy to spur economic activity when aggregate demand is weak has a number of implications for macroeconomic performance (Kiley and Roberts 2017). It implies that inflation will be somewhat lower on average unless the Federal Reserve significantly alters its approach to policymaking or fiscal policy becomes significantly more countercyclical (a topic examined below).

### ***Wage Growth***

In the first three decades after World War II, wage growth in the United States closely tracked productivity growth. Since then the gap between aggregate productivity and various measures of average compensation has widened, even though the link between average productivity growth and average pay growth remained strong. The gap grew as a result of other factors that put downward pressure on workers' compensation (Stansbury and Summers 2018). A sustained productivity slowdown would be expected to further reduce wage growth.

A prolonged period of slow productivity growth could be particularly painful for workers at the lower end of the income distribution. The limited growth in the earnings of low- and middle-skill workers over the last several decades may partly reflect skill-biased technical change, which has

reduced these workers' relative productivity (Violante 2017). Low productivity growth in the aggregate might therefore be associated with even lower productivity growth—and even lower wage growth—for some types of workers.

Slower wage growth has implications in and of itself for tax policy; it may also affect lifetime income paths. Wages tend to rise with age for many workers, for a number of reasons, one of which is rising economywide productivity. A reduction in productivity growth would therefore be expected to result in some flattening of the path of income over a worker's lifetime.

### ***Real Bracket Creep***

Tax systems are often largely indexed for inflation (in the United States, e.g., the federal tax code has been largely indexed for inflation since 1986). Such indexing takes away the traditional form of bracket creep, by which increases in nominal incomes that occur as a result of inflation push taxpayers into higher tax brackets. However, over time real growth in incomes will still push taxpayers into higher tax brackets through what might be called “real bracket creep.”

It subjects an ever-larger portion of income to higher tax rates and pushes more taxpayers above the eligibility threshold limits for various tax credits.

Slower productivity growth reduces the extent of real bracket creep. Because real bracket creep is quantitatively significant, a reduction in its magnitude may be an important consideration in tax policy. For the United States, CBO estimates that tax revenues as a share of GDP will rise by 1.1 percentage points over the next 30 years as a result of structural factors, particularly real bracket creep (CBO 2016). Real bracket creep also explains a significant part of the projected rise in the marginal tax rate on labor income in coming years.

The effects of real bracket creep are larger for lower- and middle-income households, because they lose eligibility for targeted tax credits such as the Earned Income Tax Credit and the Child Tax Credit. Therefore, a reduction in the magnitude of real bracket creep helps those households more than others. Sheiner (2018) reports the results of a quantitative analysis of the effects on tax revenues of the changes in real bracket creep implied by the assumptions about productivity growth used in Posen and Zettelmeyer (2018).

### **Objectives of Tax Policy**

A straightforward way to think about the implications for tax policy of lower productivity growth and related changes in the economy is to consider each of the major objectives of tax policy:

- collect revenues,
- reduce disincentives for saving,
- minimize disincentives for work,
- redistribute income,
- mitigate business cycle fluctuations, and
- minimize tax-based distortions and correct for externalities.

## *Collecting Revenues*

A tax system needs to collect enough revenues to sustain government benefits and purchases of goods and services. In the United States and many other countries, population aging is putting significant pressure on government spending, because a significant share of government benefits goes to older people.

Old-age dependency ratios—which measure the size of the population over the age of 65 relative to the size of the working-age population—are rising around the world (figure 3). In most countries, government social insurance programs provide both income support and health care for older people. Even if productivity growth were to remain close to its historical average, these spending needs would be expected to strain government budgets.

In a recent effort to quantify the uncertainty surrounding projections for the US Social Security program, CBO reported the results of simulations based on different assumptions for productivity growth and other key economic and demographic variables. In nearly all of these simulations, the program (as currently financed) would not be able to pay all scheduled benefits beyond the mid-2030s (CBO 2015). A sustained period of productivity growth that is substantially below historical norms would sharply increase these budget challenges, because under the current structures of taxes and benefits, lower productivity growth reduces the incomes of the working-age population (and thus tax revenue) by more than it reduces government benefits and services.

In 2016 CBO projected the federal debt as a percentage of GDP under current fiscal policy for both a baseline scenario for productivity growth and an alternative scenario in which average annual productivity growth is 0.5 percentage points lower.<sup>5</sup> Even under the baseline scenario, federal debt is projected to rise on an unsustainable path; the problem is more severe if productivity growth is lower than in the baseline (figure 4). With lower productivity growth, federal debt would be roughly 30 percent of GDP larger 30 years from now. This projection incorporates the reduction in interest rates that CBO expects would result from lower productivity growth (which should offset some of the direct effects of lower productivity growth).<sup>6</sup>

The CBO analysis embeds particular assumptions for a single country. Similar results (at least in terms of the degree to which the budget projections worsen under the downside-risk scenario) would be expected in other situations for the United States and for other countries.

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<sup>5</sup> CBO published an updated but less detailed analysis in June 2018. Using that projection would have not have changed the discussion in the text, although the levels of projected debt in both the baseline and alternative scenarios would be somewhat higher because of the 2017 tax cuts.

<sup>6</sup> A natural question would be whether the greater fiscal imbalances in the downside-risk scenario reflect a smaller markdown in projected real interest rates than in assumed productivity growth, so that the projected unit cost of servicing the public debt is higher (see Mehrotra 2018 for a discussion of the relationship between debt servicing costs and fiscal sustainability). CBO did not publish its projections for interest rates in this scenario, so the question cannot be answered directly. However, footnote 9 of chapter 7 of the CBO document suggests that it may have changed its interest rate by slightly more than one-for-one with the change in assumed growth, suggesting that projected unit debt-servicing costs are lower in this scenario.

The CBO analysis implies that a sustained period of slower productivity growth would require a larger increase in taxes (or a larger cut in government spending) to keep government debt on a sustainable course. In the United States, if spending is not changed, taxes will need to be increased relative to their current level to make fiscal policy sustainable; they will need to increase by almost 1 percent of GDP more (or roughly 5 percent of the current level more) if productivity growth is 0.5 percentage points lower than expected.

### ***Reducing Disincentives for Work***

The reduction in wage growth that would likely accompany a sustained period of low productivity growth would be expected to reduce the incentive of people to work, although this “substitution effect” would likely be offset in part by the “income effect” arising from people having lower total lifetime income. Labor force participation by prime-age men has been falling for years in many countries, with the United States experiencing one of the largest declines (CEA 2016). Indeed, over the last 60 years, the prime-age male labor force participation rate has fallen by roughly 10 percentage points. Studies suggest that many factors are contributing to the decline. The lack of robust wage growth for less-skilled workers appears to be one of the primary drivers (Black and Powell 2017). Female labor force participation has risen in many countries. In contrast, like male participation, it has been on the decline in the United States since the turn of the 21st century.

Lower labor force participation because of lower productivity growth would increase the fiscal pressures described above. It would be associated with less tax revenue from the working population and greater spending for programs that support low-income families. Both factors would exacerbate the budget imbalances created as populations age, increasing the importance of encouraging work.

Increasing labor force participation is also important because it increases engagement with society and the assessment of self-worth. Recent research suggests that not participating in the labor force appears to be associated with undesirable social consequences, such as “deaths of despair” (Case and Deaton 2017) and addiction to opioid pain medication (Krueger 2017).

The implication of these considerations is that tax systems should be modified to reduce disincentives for work. Doing so is especially important for the groups whose labor supply appears to be most responsive to changes in after-tax earnings—second earners—and groups for which the social consequences of being out of the work force appear to be greatest—less-skilled men. For the former group, increasing child-care subsidies might increase labor supply. For the latter group, expanding the Earned Income Tax Credit could be effective.

The slowdown in real bracket creep that would result from lower productivity growth means that people’s incomes rise above the ranges in which those tax provisions apply more slowly than they otherwise would. As a result, these changes can be less aggressive than they would otherwise have to be.

## *Reducing Disincentives for Saving*

In considering the implications of slower productivity growth for tax disincentives to save, one should start by considering the implications of slower productivity growth for optimal national saving. In a Ramsey model, a reduction in trend productivity growth has an ambiguous effect on desired saving. The substitution effect (based on a lower return to saving) implies that less national saving would be desirable. The income effect (which arises from the fact that future generations are likely to be poorer) implies that more national saving would be desirable. Elmendorf and Sheiner (2016) report that, for their choices of parameter values for the Ramsey model, lower productivity growth in the United States today argues for slightly more national saving.<sup>7</sup>

One should also consider how lower productivity growth would affect optimal saving by individual households. If governments respond to the increased fiscal pressures in a low-productivity-growth world partly by cutting benefits for older people, people should save more while working. The flattening of lifetime income profiles that might arise from lower productivity growth would also argue for households saving more for retirement earlier in their working lives than they otherwise would.

The implications for tax policy are twofold. First, for the United States at least, given the desirability of slightly greater national saving, taxes should be raised (or spending reduced) by at least enough to fully offset the negative implications of lower productivity growth for the fiscal balance. Second, tax policy should be adjusted to provide further encouragement for household saving.

Why and how tax policy should be changed to encourage more household saving are complicated issues. Tax policy has an important role to play both because it can distort behavior and because even absent any tax-related distortions to behavior, many households appear to find it much more difficult to accumulate assets than traditional economic theory assumes (Dynan 2017). In principle, taxes on capital income can reduce saving. Empirical studies yield little evidence that reducing the marginal tax rate on investment and saving would materially raise saving, however, and doing so would have undesirable consequences on revenue collection and the distribution of after-tax income (see pages 8–9 of CBO 2014 for a discussion of this issue). The evidence suggests that defaults, nudges, and other aspects of behavioral design have much greater effects on the saving behavior of many households than do rates of return (Chetty et al. 2014). Therefore, encouraging saving through the tax code might best be done by offering tax

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<sup>7</sup> Their Solow model approach is implicitly predicated on the view that the economy will be at full employment. Under the “secular stagnation” view of low productivity growth, the economy will not consistently be at full employment, because of a persistent shortfall of aggregate demand. This view might argue for policies that reduce national saving (at least relative to the demand for loanable funds). With GDP now close to potential GDP in the United States, and with the recent tax cuts likely to stimulate aggregate demand further, it is not clear that the United States will suffer from secular stagnation—and there are other ways to address it (such as a revenue-neutral policy that raises public or private investment) if it does arise. Other countries may suffer from secular stagnation, but there are multiple approaches to solving the problem.

breaks to offset the costs of firms establishing well-designed retirement savings plans for their employees.

Lower productivity growth is associated with less real bracket creep. One manifestation would be that households lose their eligibility more slowly for tax provisions that increase the return on saving for the lower part of the income distribution, such as the Saver's Credit in the United States. Economic theory would predict that less loss of eligibility might increase the saving of this group, implying less need for tax changes that would encourage saving. However, the empirical evidence suggests that these programs have limited success at encouraging saving (Duflo et al. 2007). As a result, lower real bracket creep probably would not make much of a difference in this context.

### ***Redistributing Income***

Lower trend productivity growth implies that the distribution of changes in compensation would be shifted in a direction that increases inequality. Even with no change in the degree of dispersion around the mean, lower mean compensation growth means that more people would experience no growth in or lower compensation.<sup>8</sup> Such outcomes are especially harmful in countries where nominal financial commitments are common (as in the United States, given the prevalence of fixed-rate mortgages). If lower productivity growth resulted in lower inflation, the problem could be even worse, given that inflation erodes the real burden of fixed nominal financial commitments over time.

Perhaps more important than this consideration, many people may be frustrated by a persistent lack of improvement in their standard of living because they expect that standards of living should improve over time. In the United States, about close to 60 percent of people expect today's children to be worse off financially than their parents (Pew 2017); findings for other advanced economies are similar. One would expect this share to grow if wage growth were to decline further, creating yet more frustration and anger about the economic and political system. Such sentiments can be politically destabilizing and hinder countries' ability to adopt policies that would be good for overall economic growth, such as reducing restrictions on international trade.

These considerations argue for using tax systems to increase the level of income redistribution in a world with slower trend productivity growth. Doing so could take two broad forms: providing more insurance against bad outcomes and creating more widespread opportunity. To provide more insurance against bad outcomes, governments could make their tax systems more progressive or strengthen the insurance features of their tax codes (e.g., by adopting a tax-based wage insurance program such as the one Kling 2006 describes). To create more widespread opportunity, governments could provide more tax incentives for firms that provide training for their workers or more tax subsidies to finance higher education for low-income families.

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<sup>8</sup> Furman and Orszag (2018) argue that lower productivity growth may be associated with higher inequality. They note that the relationship is not causal (in either direction); rather, reduced dynamism and competition cause both. If inequality is higher in a low-productivity growth world, one might expect even more people to experience no or negative income growth.

The real bracket creep considerations in this context are mixed. On the one hand, people move into higher tax brackets more slowly with slower wage growth. As a result, the progressivity of the tax code rises more slowly absent explicit changes in the tax code, suggesting the need to increase its progressivity. On the other hand, lower-income people's incomes rise above eligibility thresholds for certain tax credits more slowly than they otherwise would, reducing the need to expand those credits.

### *Mitigating Business Cycle Fluctuations*

Tax policy has long been used to help stabilize the economy in the face of a negative shock to aggregate demand. For example, countries sometimes legislate explicit changes to tax policy such as an income tax rebate to spur consumer demand or larger deductions for the depreciation of new investment in order to encourage business spending. In addition, some regular features of tax systems provide automatic countercyclical stimulus without deliberate policy changes. For example, the progressive income tax system in the United States automatically reduces taxes more than proportionately to income when the country enters a downturn.

Many countries used monetary policy as their primary macroeconomic stabilization tool in the decades leading up to the financial crisis. The perceived dominance of monetary policy in this context partly reflected the lags associated with developing, legislating, and implementing fiscal policy. Disagreement in the empirical literature about how effective fiscal policy is for countercyclical purposes may also have helped push policy makers to opt for monetary policy (see Ramey 2011 and Auerbach 2012).

Lower productivity growth has reduced real interest rates. As a result, central banks reach the effective lower bound on their policy rates more quickly when they reduce rates in the face of negative shocks to aggregate demand. The Federal Reserve cut the federal funds rate by more than 5 percentage points in each of the past three recessions. Its projections of future federal funds rates imply that it will have much less room to cut rates in the next downturn.<sup>9</sup>

Central banks have other tools for easing credit conditions when policy rates near zero, such as making large-scale asset purchases (sometimes known as quantitative easing [QE]), changing forward guidance about policy rates, and pushing policy rates into negative territory. A growing body of literature is skeptical that these alternative tools are sufficient to offset the inability to lower policy rates substantially, however (Blanchard and Summers 2017).

With the countercyclical power of monetary policy blunted, countercyclical fiscal policy will be substantially more important in stabilizing macroeconomic conditions going forward, increasing the need to strengthen the automatic stabilizers in tax systems. Specific approaches deserve further study. In the United States, one possibility would be to legislate automatic reductions in payroll taxes when unemployment rates hit certain thresholds and coupling the measure with automatic general revenue contributions to Social Security to make up for the forgone revenue.<sup>10</sup>

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<sup>9</sup> As of June 2018, the median Federal Open Market Committee projection for the federal funds rate over the “longer run” was 2.9 percent.

<sup>10</sup> Blinder (2016) discusses other options along these lines.

Policymakers should also be prepared to take discretionary fiscal policy actions to counter economic downturns.

### ***Minimizing Other Distortions in Resource Allocation***

Tax policy should aim to minimize tax-based distortions in resource allocation and correct for externalities that distort the allocation of resources apart from taxes. A large body of literature documents ways in which current tax systems lead to misallocations of resources, including distorting investment across industries and asset types, the choice of financing for investment, and how businesses are organized and where they are located (IMF 2017). In addition, current tax systems often do not do enough to correct for both negative and positive spillovers of certain kinds of economic activity, such as the harmful effects of carbon emissions and other kinds of pollution and the beneficial effects of much research and technological development.

Improving tax systems to address these problems is important regardless of underlying productivity growth; it is especially important when productivity growth is weak. Making tax systems more efficient should be a high priority for policymakers if productivity growth falls 0.5 percentage points below the already modest baseline projections.

### **Conclusion**

A sustained period of very low productivity growth—together with various accompanying changes in the economic environment—would justify a number of changes in tax policy. Given aging populations, many countries could face significant fiscal shortfalls in coming years even if productivity growth were to rebound to historical averages. Lower productivity growth would reduce the income of the working population, exacerbating these challenges, because tax revenues would fall. Even assuming that lower productivity growth results in lower interest rates, tax systems will need to collect more revenue per dollar of GDP to support their aging populations.

Lower incomes are also likely to put downward pressure on labor force participation rates, increasing budget pressures (because tax revenues from the working population would be even lower and spending on social insurance programs might need to rise). This consideration suggests a need to increase tax incentives for working, particularly for groups that are very responsive to such incentives and groups for which the social consequences of dropping out of the labor force are most harmful.

Although the optimal level of national saving appears to be little changed by the assumption of lower productivity growth (at least in the United States), there would arguably be a need for lower- and middle-income households to start saving for retirement earlier given the possibilities of flatter lifetime income profiles. The potential for future cuts in government benefits also argues for more retirement saving incentives for such households. Research suggests that changing the after-tax return on saving would not have a large effect on the saving of this group and that changes in tax law that encouraged more well-designed workplace retirement savings plans are likely to have a larger effect.

The lower real interest rates that would result from sustained low productivity growth reinforce concerns about the future efficacy of monetary policy as a macroeconomic stabilization tool, lending support to the view that the tax system should build in more automatic stabilizers. The fiscal and social consequences of the lower income growth that would result from lower productivity growth raise the urgency of moving toward a tax system that minimizes distortions to resource allocation.

Even if future productivity growth were to follow the baseline assumption (only slightly below the historical average), it would probably be worthwhile for tax systems to move in many of the directions suggested in this paper. Many countries are already on track to experience fiscal imbalances, low income growth has already had many negative social consequences, concerns about the limits of future monetary policy are already widespread, and countries should always be seeking to minimize the distortions from their tax systems.

The specific tax system changes needed will vary by country and depend on how much a reduction in productivity growth would reduce interest rates and change income growth at different points in the distribution. One lesson of the last few decades is that changes in aggregate productivity growth may have very different impacts on incomes at different points in the distribution; such variation has social and fiscal consequences.

Political feasibility is another important issue. If the optimal policies cannot be achieved, policymakers should consider second-best alternatives.

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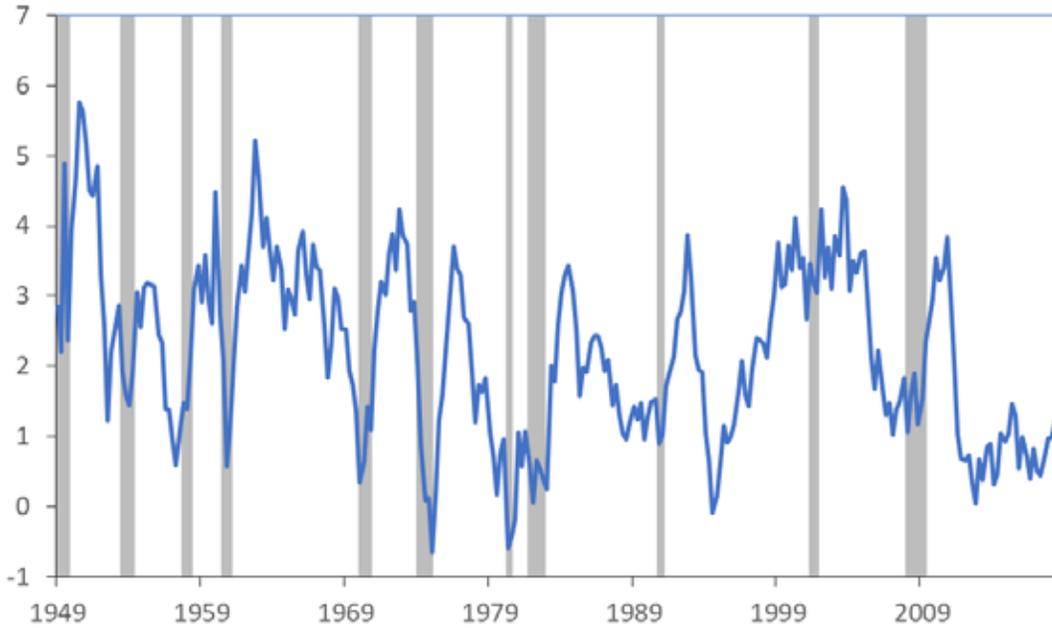
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**Figure 1 Labor productivity growth in the US nonfarm business sector, 1949–2018**

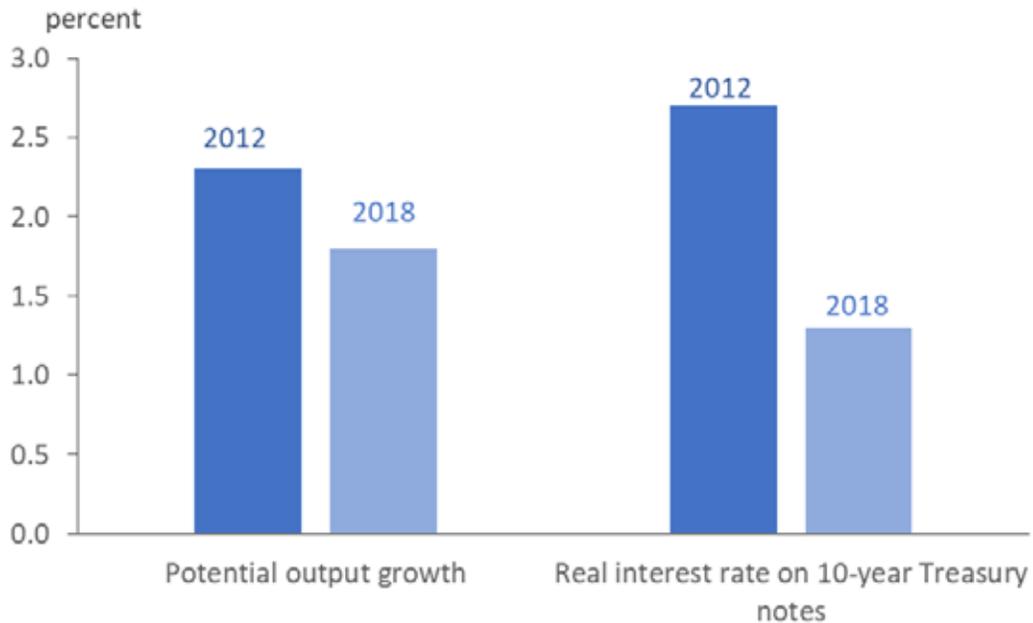
8-quarter moving average in percent



Note: Shaded bars correspond to recessions.

Source: US Bureau of Labor Statistics, [www.bls.gov/lpc/data.htm](http://www.bls.gov/lpc/data.htm).

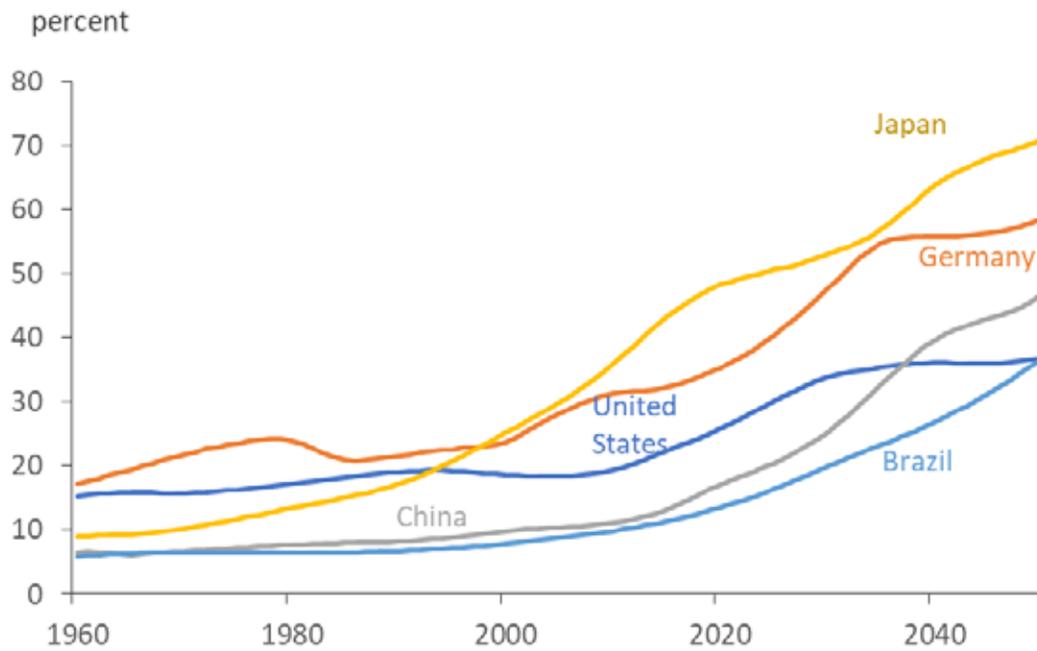
**Figure 2 Congressional Budget Office projections of real interest rate on 10-year Treasury notes and potential output growth, 2012 and 2018**



Note: Figure compares August 2012 forecasts with August 2018 forecasts.

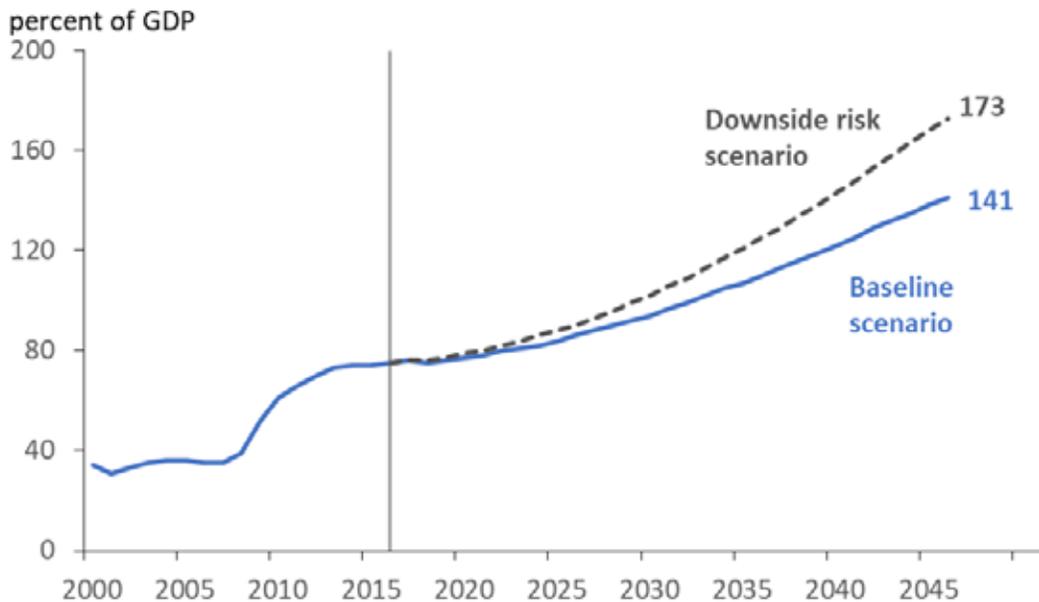
Source: Congressional Budget Office.

**Figure 3 Population 65+ and older as share of-working-age population in selected countries**



Source: World Bank, <http://databank.worldbank.org/data/source/health-nutrition-and-population-statistics>.

**Figure 4 Projected federal debt under baseline and downside risk productivity growth scenarios, 2000–46**



Note: Figure assumes fiscal policy as of March 2016.

Source: CBO (2016).