

# THE MACROECONOMIC CASE FOR A GREEN NEW DEAL



ISSUE BRIEF BY **J.W. MASON** | JUNE 2019

While the Green New Deal is most obviously motivated by the urgency of the problem of climate change and decarbonization, it is also a response to current macroeconomic conditions. In an economy that suffers from chronic demand shortfalls, and in which labor's share of income is steadily falling, there is a strong case for any program that involves increased public spending or that encourages private investment. In this case, the real resources required by the Green New Deal should be seen not as a cost but as a benefit.

In Section 1, we discuss the chronic shortfall of aggregate demand facing the US as the essential macroeconomic context for a program of crash decarbonization. In Section 2, we discuss how the program will be financed—what mix of new debt and taxation might plausibly offset the increased public spending involved.

## Overview

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While it is too early to put a definite number on the cost of the Green New Deal, we may be looking at additional spending (public and private) in excess of 5 percent of GDP, sustained over many years. Regulations, credit policy, and carbon pricing will substantially alter the composition of private spending, across activities, industries, and labor markets. One way or another, raising and redirecting spending on this scale will have major effects on labor markets and income distribution. The question is only whether these impacts come haphazardly or openly and deliberately. The economic impacts of a public spending program are often discussed in terms of “costs.” But, we argue, in an economy with substantial excess capacity, claims on real resources by the public sector should be seen not as costs but as benefits.

The link between public spending, aggregate demand, labor market conditions, and wage growth is important to unpack. Aggregate spending (or demand) determines the level of economic activity in the short term. In the absence of hard supply constraints, it may have a decisive impact in the medium to longer term as well; arguably, this is the case for the US economy today. The level of activity in turn determines the level of employment and labor market tightness, which plays a central role in the level and distribution of wage growth.

Textbook macroeconomic theory says that the wage share of national income is determined on the supply side—by the marginal product of labor as determined by human capital and production technology. But economists are increasingly recognizing that this textbook story misses the essential role played by both labor-market institutions, such as unions and regulations, and by labor market conditions as determined by aggregate demand. When tight labor markets lead to faster wage growth, this does not merely result in higher inflation but leads to a higher wage share in national income and, often, to faster productivity growth—both of which imply an increase in real and not just nominal wages. In this view, the stagnant wages for the majority of Americans and the secular fall in the wage share over recent decades are not the



inevitable result of automation or competition with low-wage countries abroad; they are a reflection of the weak bargaining position of American workers—weakness due in large part to chronic shortfalls in aggregate demand.

Prior to the recession of 2008-2009, it was widely believed that central banks could and should take sole responsibility for closing gaps between demand and potential output. Conventional monetary policy, using a single interest rate as its instrument, was supposed to be able to rapidly and reliably close any output gap. This view is much less widely accepted by economists today. Many would say that the experience of the Great Recession, in which unemployment remained above the Fed's target for seven full years despite the Fed's interest rate being at zero, has decisively refuted this view. And there is no reason to think that this recession was unique. In the economy we live in, aggregate demand seems to secularly fall short of the economy's potential output; monetary policy (quantitative easing as well as conventional policy) seems to have limited ability to close the gap; and to the extent that it is able to do so, it is at the cost of regular asset bubbles, which impose their own steep costs.

This situation is sometimes described as one of “secular stagnation” (Summers 2014). In an environment of secular stagnation, there is no reason to expect the level of demand to keep up with the economy's potential; productivity growth will fall short of what is technologically feasible; and with chronically weak labor markets, wages will fall short of even the depressed rate of productivity growth, leading to a declining share for labor out of national income. The only solution is systematic government action to raise the level of both private and public spending. An increasing recognition of this fact is leading even mainstream policy economists, like former Council of Economic Advisors (CEA) chair Jason Furman, to suggest that more expansionary fiscal policy should be adopted on an ongoing basis and not just in response to temporary downturns (Furman 2016). More broadly, it means that the real resources required by a massive economic program like deep decarbonization are not being withdrawn from other uses but rather will call forth production that would otherwise not take place.

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The case for substantially more expansionary macroeconomic policy is even stronger if we believe in “hysteresis,” as an increasing proportion of economists do (Ball 2009). Hysteresis refers to lasting effects of demand conditions—especially weak demand—on potential output. In a world with hysteresis, spending more money today not only boosts output and employment today, it also boosts output and employment in the future, even after the spending has ended. When relatively strong or relatively weak labor markets cause people to move into or out of the labor market, the effects are persistent beyond that period. Business investments in new production technology and worker training—or their absence—are likewise persistent beyond the period in which they take place. In a world with substantial hysteresis, it is entirely plausible that a massive program of decarbonization could—apart from its critical environmental benefits—leave output and consumption in other areas of the economy also substantially higher. The same people who are drawn into the labor force and acquire new skills and work experience



through a Green New Deal, will continue to benefit for the remainder of their working lives. Similarly, new equipment and software created, as well as new technologies and production processes developed, for purposes of decarbonization will continue to be available for the benefit of the economy well into the future. This also means that, as economist and former Treasury Secretary Lawrence Summers and others have argued, increased public spending can pay for itself, if it has even a modest effect on long-run growth (Fatás and Summers 2018).

We need to avoid the misleading idea that an economy is equivalent to an individual household or business, where spending in one area must come at the expense of spending somewhere else. In a chronically depressed economy, higher spending in one area can crowd *in*, rather than crowd out, spending in other areas. Just as important, at the macroeconomic level, spending has important distributional consequences. It is impossible to raise wages without a period of strong demand and tight labor markets. This is especially critical for those at the bottom of the income distribution—people who are at the end of the hiring queue because of a lack of education or other credentials, sex, race or ethnicity, geographic location, or other reasons, are precisely the ones whose employment and wages are most dependent on a strong labor market (Bivens and Zipperer 2018). While it is sometimes argued that decarbonization should not be linked to a broader egalitarian economic program, in fact a more egalitarian economy is a natural outcome of a program of rapid decarbonization—as long as it comes through increased public and private investment and not merely through carbon pricing.

Because the official unemployment measure is today below 4 percent—3.6 percent as of April 2019—some might argue that there is no significant slack in the economy. This would mean that labor and other resources required for a Green New Deal would have to be withdrawn from the private sector somehow, whether by higher taxes that discourage private spending, higher prices, or more direct controls. There is good reason to believe, however, that the historically slow growth rates of the past decade or more reflect weak demand. In this case, a program like the Green New Deal should be seen as a way of *raising* incomes and living standards, rather than it being a cost that must be subtracted from them.

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In the following subsections, we briefly summarize the evidence that the US economy does indeed face a chronic shortfall of aggregate demand. In summary: GDP remains well below its pre-recession trend. The employment-population ratio has fallen by more than can be plausibly explained by demographics, and wage growth is also slow. Inflation—the textbook signal of an economy approaching supply constraints—remains low. Despite high profits, business investment remains relatively low, while cash holdings and payouts are high, suggesting limited investment opportunities. Finally, it is important to keep in mind that a decarbonization program will extend across many years, a period during which a recession or deeper downturn is likely to occur. Therefore, the macroeconomic context for a program to greatly extend public and private spending should not be imagined solely in context of today’s relatively strong



economy; rather, it should be considered as a mix of current conditions and conditions of much weaker demand. Embarking on a program of rapid decarbonization today ensures that, unlike in 2009, there will be “shovel-ready” projects in the next cyclical downturn—areas where spending can be ramped up immediately without a long planning process.

## Section 1: The Case for Unused Capacity

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### GDP versus Trend

By the official measures of potential output, the US economy is today operating at full capacity, for the first time since 2007. Not much weight can be placed on this, however; the way that estimates of potential are constructed guarantees that output must eventually return to estimated potential. A standard way of correcting potential estimates for the possible impact of demand shocks is to look at estimates of potential that were made before the demand shock. In this case, that means looking at estimates from 2008 and before. When we do this, we see that official forecasters like the Congressional Budget Office (CBO) and Social Security Administration predicted that real GDP per capita would continue rising at close to the 2 percent annual rate that had prevailed historically—rather than the 1.3 percent rate we have actually experienced. In other words, the closing of the output gap over the past decade has come entirely through the downward revision of estimates of potential output. Relative to forecasts made before the crisis and recession, there has been no recovery. GDP remains more than 15 percent below the level forecast in 2008.

This estimate is supported by more sophisticated efforts to assess the impact of the crisis. Recent research suggests that the slow productivity growth of the past decade is in large part the result of weak demand (Anzoategui et al. 2016). For example, one study by economists at the San Francisco Federal Reserve bank observed that “over the past 10 years imply that actual US GDP ... converged on a new potential level ... that was about 12 percentage points below the level implied by its pre-crisis trend” (Barnichon et al. 2018). This gap, they suggested, has little or nothing to do with “structural” factors like demographics or technological exhaustion; rather, it represents the ongoing effects of the financial crisis and deep recession of 2008-2009. “Without the large adverse financial shocks experienced in 2007 and 2008,” they argue, “the behavior of GDP would ... most likely resemble the less severe 1991 recession, with GDP declining by only 1.5 percent and reverting to close to its pre-crisis trend level in a few years.” Thus, the Green New Deal should be seen as a program to address the climate crisis and the substantial macroeconomic crisis *simultaneously*.

If one takes estimates like these seriously, there is on the order of a 10 percent gap between the economy’s productive potential as of a decade ago and the level of output we are currently producing. This does not, of course, mean that federal spending could be increased by 10 percent overnight without generating any price increases or bottlenecks. The more rapidly spending is increased, the more affirmative non-market measures will be needed to redirect resources. However, this does suggest that if spending were ramped up over a number of years, it’s possible that aggregate spending on decarbonization could be raised by as much as \$2 trillion per year without any reduction in current public and private spending.

### Labor Markets

As with the output gap, there are good reasons to think that the official unemployment rate substantially understates the real slack facing the economy. Though headline unemployment is low by recent standards (though still well above the 1.7 percent of 1943-45), the labor force participation rate remains low at just 63 percent, well below historical levels such as 67 percent in the late 1990s (BLS 2019a). This means that the employment-population ratio (the fraction of the adult population with jobs) is just 61 percent,

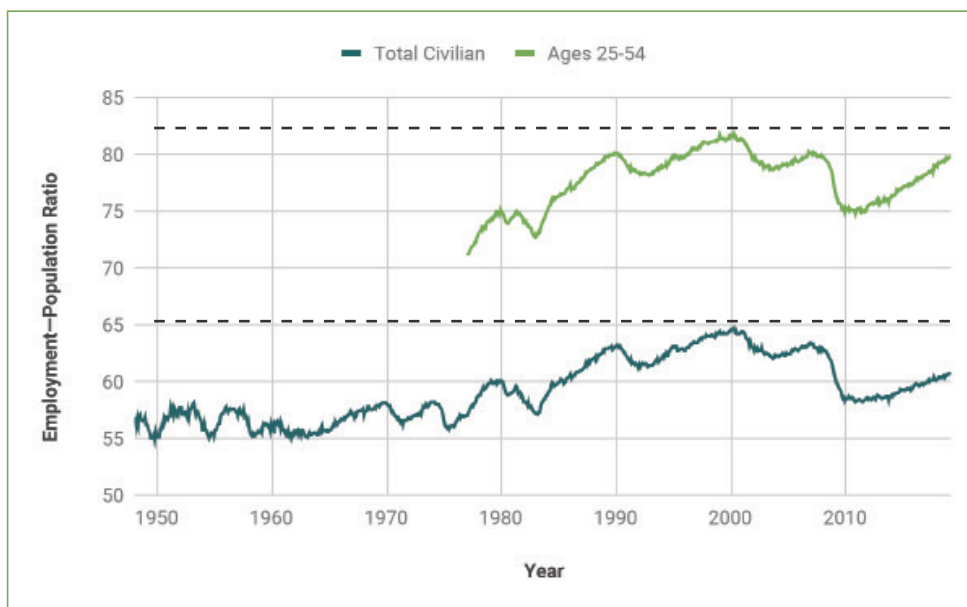


compared with 66 percent in 2007 and as high as 67.3 percent in 2000 (BLS 2019b). That represents approximately 15 million adults neither working nor seeking work. These kinds of considerations have led prominent economists like former International Monetary Fund (IMF) Chief Economist Olivier Blanchard (2018) to suggest that “there is a strong case ... to allow US output to exceed potential for some time, so as to reintegrate some of the workers who left the labor force during the last 10 years.”

FIGURE 1:

## Employment-Population Ratio, 1948-2019

The fraction of the population employed, for all civilians 16 years or older (lower line) and for those aged 25-54 (upper line). The horizontal lines show the historical peak values.



Source: BLS.

While some of this decline reflects the aging of the population, this is not the whole story. Even among “prime-age” (24- to 54-year-old) adults, the fraction in the labor force is 2 full points below its pre-recession level (BLS 2019c). Among young people (20 to 24), participation is down a full 6 points. There is strong evidence that much, if not all, of this decline represents the ongoing effects of the exceptionally weak labor market of the recession and jobless recovery. A recent Roosevelt Institute study suggested that at most half of the decline in labor force participation can be explained by demographic factors—a similar finding to those of studies by the CEA and the Levy Institute (Mason 2017b; Dantas and Wray 2017). It is notable in this context that the relatively strong labor market of the past couple of years has seen a slow but steady rise in labor force participation, suggesting that people who dropped out in previous years are slowly returning to the labor market. This implies that the increase in employment associated with the Green New Deal could mobilize currently underutilized labor rather than bidding workers away from existing private employers.

Another important sign that there is still substantial slack in the labor market is the weak wage growth in the current expansion. Labor’s share of income remains well below that of a decade ago and even further below the share in the year 2000 (University of Groningen and University of California, Davis 2016).

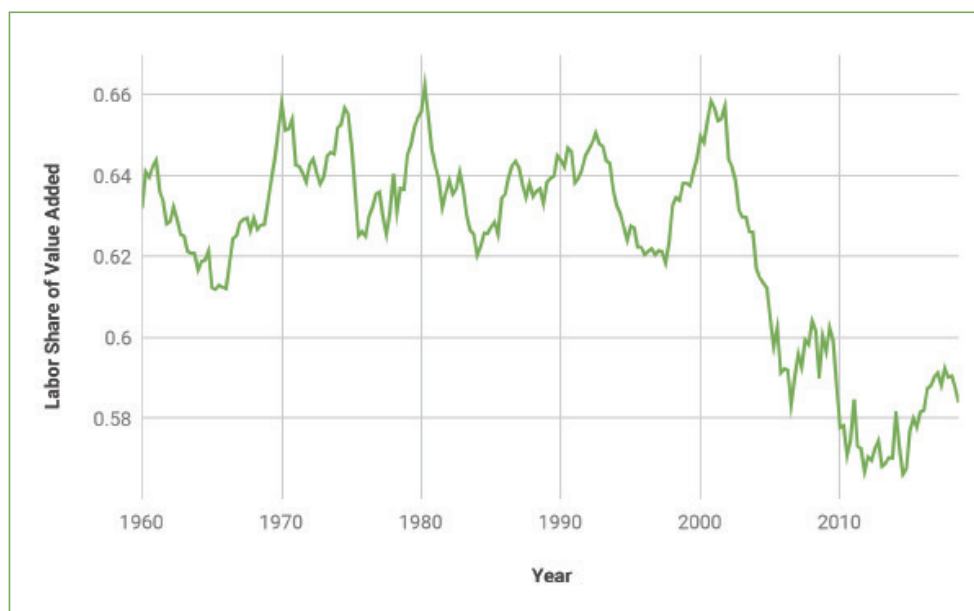


Nominal wages for nonsupervisory workers are up less than 3 percent per year over the past three years, significantly less than during the already weak 2000s expansion and much less than in the expansion of the 1990s (University of Groningen and University of California, Davis 2016). For anyone concerned with income distribution, this is a strong argument for policies to boost demand. The only way for labor's share to return to its levels of the 1990s is for the US to experience a sustained period of “overfull” employment, with wage gains regularly outpacing productivity. We are still far from that today (Bivens 2019).

FIGURE 2:

## Labor Share, Non-Financial Corporations, 1960-2018

Total labor compensation (wages plus benefits) as a share of value added in the nonfinancial corporate sector.



Source: BEA Integrated Macroeconomic Accounts.

There is strong statistical evidence that weak demand, and in particular weak wage growth, also has a depressing effect on productivity (Girardi et al. 2018). When workers are plentiful and customers are scarce, there is little reason for businesses to invest in labor-saving (i.e., productivity boosting) technology, and there are few opportunities for new, more efficient businesses to get underway. Conversely, when labor is scarce but markets are growing rapidly, businesses have a strong incentive to improve their production techniques as much as they can. Economic historian Gavin Wright (2006) argues that this is the true story of the productivity “miracle” of the 1990s. Many of the basic information-technology innovations (e.g., bar codes or electronic stock-tracking) that raised productivity in this period had been available for many years, but businesses only adopted them widely when wage growth made it cost-effective to do so. The converse story is visible in the decade since 2008, with low productivity growth the natural result of abundant labor and stagnant demand. If productivity depends on demand in this way, that suggests the existence of an intensive as well as extensive margin of unused capacity, which rapid decarbonization could unlock.



## Inflation

The most obvious sign that the economy is not yet facing supply constraints is the fact that inflation remains subdued. In an economy operating close to potential, we would see prices rising as more and more sectors found themselves unable to increase production in line with desired purchases. Until and unless prices begin to rise, it is hard to argue that the economy lacks the real resources to support additional public spending.

Even if inflation does rise, this need not lead to an out-of-control spiral into hyperinflation—which means the costs of higher inflation need to be weighed against the benefits of running the economy hot.

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The first point to take from this is that there is space in the economy for a substantial expansion of spending without offsetting taxes, without the risk of inflation. That is very important. But even more important is the second point—that an economy operating below potential creates massive costs in lost output, in productivity, technological progress, wage growth, unemployment, social stability, and well-being. These costs are systematically undervalued by orthodox policymaking. As Roosevelt Fellow Mike Konczal (2018) puts it, “when economists try to pick a ‘natural rate,’ they err in the same direction every time—the direction that hurts workers.” The goal of the Green New Deal is not simply to redirect resources on the assumption that aggregate output is given—the framework of far too much economic analysis of climate change. Rather, it is premised on the idea that one of our most urgent macroeconomic problems is a chronic shortfall of aggregate demand. In a world suffering from secular stagnation, aggregate output is not limited by real resources but by spending. In this setting, increased spending leaves us collectively richer—both financially and socially.

## Investment and Corporate Cash Holdings

There are signals indicating that large amounts of unused capacity on the business side exist as well. The Bureau of Economic Analysis’ (BEA) standard measure of capacity utilization shows lower values than in the previous two expansions (Board of Governors of the Federal Reserve System 2019). Business investment, while not weak in absolute terms, is still not as high as in previous booms, especially given today’s exceptionally high level of corporate profits. During the late 1990s and early 2000s, nonfinancial corporations invested as much as 75 percent of their gross operating surplus.<sup>1</sup> Today, that figure is less than 60 percent. This is an important benchmark since it gives us a sense both of the financial capacity of corporations to sustain a higher level of capital outlays and of the level of investment we might expect in a situation where major new technologies were being introduced and a fundamental reorientation of production was taking place (BEA IMA Table S.5.a.).

At the same time, corporate cash holdings and payouts to shareholders are both at record levels. Nonfinancial businesses today hold cash and equivalents equal to 15 percent of total value added, compared with a long-run average of under 10 percent. And shareholder payouts (dividends plus share buybacks) have averaged over 7

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<sup>1</sup> Gross operating surplus is equal to operating profits plus depreciation; it is the appropriate measure to compare with gross investment.



percent of value added in recent years, compared with a long-run average of under 3 percent (BEA IMA Table S.5.a.). Both of these developments suggest that corporate investment is fundamentally constrained by a lack of demand, rather than a lack of profits or financing.

Business investment responds not only to demand but to fundamental shifts in economic activity. Historical investment booms, for example, are invariably associated with the spread of new technologies that led to large-scale reorganization of production, from electricity in the 1920s, to the shift from rail to highways in the 1960s, to information technology in the 1990s. These shifts make large swathes of old capital obsolete and call forth massive new investment to replace it. Decarbonization promises to unleash a similar wave of creative destruction. By requiring or encouraging businesses to reorganize production and distribution to be carbon neutral, it will call forth a great deal of new private as well as public investment and activate the currently underused capacity—real and financial—for capital formation of corporate America.

## The Business Cycle

It is not enough to “allow” output to exceed potential. Affirmative measures must be taken to keep demand strong, especially when—as is certain to happen in the next few years—private investment begins to falter. The Green New Deal can play a critical role here.

Each of the past three recessions has been followed by long “jobless recoveries” in which unemployment remained well above the Fed’s target for four, five, or in the most recent cycle seven years after the end of the formal recession. Taking the official statistics at face value, since 1980, there have been 192 months when the unemployment rate was more than one point above the non-accelerating inflation rate of unemployment (NAIRU), and only 18 months when it was more than one point below. Given that record, we shouldn’t evaluate the desired level of public spending on the assumption that the risks of overshooting and undershooting potential are about equal. Since 1980, policymakers have struggled much more often to stimulate the economy than to restrain it.

The asymmetric macroeconomic risks facing us are well-illustrated by the experience of the past 10 years. Conventional monetary policy was unable to offset the effects of the crisis, at least in part because the short-term interest rate was stuck at zero—the familiar problem of the zero lower bound. The result of this was trillions of dollars of lost output and millions of people suffering years of unemployment and poverty. It’s worth recalling that the stimulus bill of 2009 was hampered by a lack of “shovel-ready” public projects—areas where spending could be ramped up immediately, without a long planning process. There is a strong argument for laying out an expansive public spending program now—before it becomes macroeconomically urgent in the next recession.

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## Section 2: Financing Decarbonization

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The Green New Deal will involve substantial outlays of both public and private money. While it is impossible to cost out these proposals in a rigorous way until they are embodied in legislation, it is still possible to discuss the options for financing it. The United States today has substantial capacity to increase both public debt and taxation; it should be possible to finance a decarbonization program of at least 5 percent of GDP a year, sustained over a decade or more, without significant economic dislocation.

All public expenditures must be financed—that is, for each dollar of spending, there needs to be a corresponding source of funds. This constraint, that total uses of funds must equal total sources of funds, applies equally to the public sector and to the private sector.

The financing question is important and should not be avoided. At the end of the day, however, the real constraint on the scale of decarbonization is not generating the appropriate money flows but the labor and other real resources available in the economy. The question of “Can we afford it?” is not a serious question if it means whether the government can generate the necessary sources of funds; it can. It is a serious question if it concerns the real resources available to the economy; here, again, we believe the answer is positive.

It is useful to subdivide the financing side into several parts.

On the public side, increased public spending on decarbonization will be matched by some mix of new borrowing, higher tax revenue, and reduced spending in other areas.<sup>2</sup> On the private side, a range of financing approaches will be involved. To some extent, regulation will simply lead to the redirection of existing private investment flows. Some private spending will be financed by public subsidies, financed in turn by the same mix of sources as other public spending. An important part of the financing puzzle for the private sector, which does not apply to public spending, is credit constraints; programs to redirect credit to green activity will be necessary, as discussed in Section 1 above.

We will discuss these issues in turn.

On the public debt side, perhaps the most important thing to understand is that today’s low interest rates make increased public borrowing much easier to sustain. When interest rates are higher than GDP growth rates, as in the 1980s and 1990s, maintaining a stable debt ratio requires “paying for” all public spending, in the sense that higher deficits in one year must be compensated for by higher surpluses in a later year to keep the debt ratio on track. When interest rates are lower than growth rates, as is true today, borrowing does not need to be paid for in this sense; after a period of high deficits, the debt ratio will stabilize on its own without any need for offsetting surpluses. If increased public spending boosts economic growth, that will further moderate any rise in the debt ratio. And there are good reasons to believe that for the US, a higher public debt-GDP ratio would not impose major economic costs and would have significant benefits.

At the same time, it may well be desirable to finance some part of increased public spending through tax increases (or spending reductions in other areas). “Pigouvian” taxes—taxes on social harms—could raise significant revenues. Since these taxes—such as carbon taxes, taxes on very high incomes and wealth, and financial transaction taxes—are desirable for their own sake, imposing them should not be regarded as a cost. Finally, to the extent that broad-based taxes are necessary or desirable, it is important to note that the US is currently a low-tax country compared with the rest of the rich world.

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<sup>2</sup> Financing options for an expanded public sector are discussed at greater length in the Roosevelt Institute issue brief, “Fiscal Rules for the 21st Century” (Mason 2019).



Both the public and private financing questions need to take into account the international role of the dollar. While issues of international trade and finance are typically treated as entirely distinct from those involved in a domestic initiative like a Green New Deal, in fact they are tightly linked. The demand for safe assets by central banks and private institutions in the rest of the world can be channeled into both public and—with appropriate guarantees and regulation—private liabilities financing decarbonization.

## Public Debt

As discussed in this report, the Green New Deal is a broad mix of initiatives whose relative impact will be hard to assess except through trial and error. It is a direction of travel, not a single specific policy proposal. So it is not possible to make more than a broad guess about the level of additional public spending involved. As a rough guideline, Robert Pollin suggests a figure of 1.5 percent of world GDP for a global Green New Deal involving broadly similar elements to those involved here (Pollin 2015). This number is probably too low for a Green New Deal in the US. This is partly because the US—as the largest rich country and the largest historical contributor to GHG emissions—should be expected to do more than its proportional share. (The US is also less constrained financially than most other countries, as discussed below.) This number is also likely low because the proposals under discussion today are even broader than those considered by Pollin. Though we do not believe it is possible to precisely cost out our proposals at this stage, we might use as a benchmark new public spending on the order of 3 to 5 percent of GDP—\$600 billion to a \$1 trillion—sustained over a decade or more.<sup>3</sup> How much of this could reasonably be financed through additional borrowing?

A common definition of debt sustainability is that the fiscal position be such that the debt ratio will stabilize at some finite value (i.e., that it will not rise without limit). In this sense, with interest rates less than growth rates ( $r < g$ ), any primary deficit is sustainable. A permanent increase in public borrowing, no matter how large, will always still result in the debt ratio converging to some finite value. And a temporary increase in borrowing, no matter how large, will always result in the debt ratio returning to its old value once the period of temporarily higher borrowing is over.

The idea that there is a tipping point, where deficits can lead to debt spiraling out of control, made a certain amount of sense in the 1980s and 1990s, when interest rates on public debt were indeed greater than GDP growth rates. But for the past 15 years, the average interest rate on government debt has been consistently below the growth rate of GDP, and there are good reasons to believe that this situation will continue indefinitely. A number of prominent macroeconomists have pointed out how this fundamentally changes the calculations around debt sustainability. This was the central point of Blanchard's keynote talk at the American Economic Association's annual meeting in January 2019: In a world of low interest rates, the costs of high government debt are much lower than many economists had previously believed. "Put bluntly," he says, "public borrowing may have no fiscal cost" (Blanchard n.d.). Lawrence Summers and Jason Furman recently made a similar argument in an article in *Foreign Affairs* subtitled, "Why Washington Should End Its Debt Obsession" (Furman and Summers 2019). Even Kenneth Rogoff, best known for a paper arguing that high government debt could have serious negative effects on the economy, recently repudiated its conclusions in a column titled, "Never Mind the Debt" (Rogoff 2019).

These conclusions are based on today's low interest and growth rates. If a program of debt-financed public spending could significantly boost growth, the effect of higher public spending on debt would be

<sup>3</sup> This is intended to cover the kinds of decarbonization initiatives discussed in this report, which are focused on the climate aspects of a Green New Deal. It is not intended to cover universal healthcare, a job guarantee, or similar broader economic justice proposals, outlined in the Green New Deal resolution. Those will require their own additional financing.



even less. First, most directly, higher GDP would raise the denominator of the debt-GDP ratio, leaving the ratio smaller. Second, faster growth leads to higher tax revenue, independent of any decision to change tax rates. Together, these two effects mean that if higher public spending has a sustained effect on GDP—even a small one—it is quite possible for it to substantially pay for itself, in the sense that even without any new tax increases the debt ratio will rise by considerably less than the accumulated deficits.

So the question of how much borrowing is reasonable to finance a Green New Deal, depends on our assumptions about interest rates and growth rates, and about the persistence of demand effects, as well as about what level of debt-GDP ratio is desirable.

This is clearer if we provide some numbers.

As of March 2019, the five-year, 10-year, and 30-year Treasury bonds are trading at 2.3 percent, 2.7 percent, and 3.0 percent, respectively. The average maturity of federal debt is just under six years, so the average interest rate on borrowings at today's interest rates is around 2.5 percent.<sup>4</sup> Nominal GDP growth rates have been around 5 percent since the end of the recession; this also is low by historical standards. Based on the evidence of the past decade, we can expect growth rates ( $g$ ) to be 2 to 3 points above interest rates ( $r$ ).

The CBO is currently projecting primary deficits of 2.7 percent of GDP over the next five years. At current interest and growth rates, that implies a gradual rise in the debt ratio; from its current 75 percent, it will reach only 83 percent a decade from now. The CBO's official projections call for a much larger rise in the debt ratio, to 93 percent by 2029. That is because they assume that over the next few years there will be a significant increase in the interest rate on government debt. It is important to recognize that this projected rise in interest rates, and not the primary deficit, is the most important driver of the CBO's forecast of a near 20-point rise in the debt ratio over the coming decade. At current interest and growth rates, the fiscal position, even after President Donald Trump's tax cuts, is close to balanced.

Now let's turn back to the Green New Deal. Suppose that today's 2.5-point gap between growth rates and interest rates is maintained. What kind of debt trajectory would be implied by significantly higher borrowing to fund spending on decarbonization? For concreteness, we will assume 4 percent of GDP additional borrowing, and current GDP growth rates and interest rates. The results are shown in Figure 3.

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<sup>4</sup> The average rate today is somewhat higher, though still below nominal GDP growth, because the current debt stock includes old debt issued when rates were higher.



FIGURE 3:

## Actual and Trend Per-Capita GDP, 1947-2019

Real per-capita GDP and a linear trend based on the period 1947-2007. Prior to 2007, all downturns were followed by a return to trend, but since 2007, the gap between actual GDP and the trend has only gotten wider.



Source: BEA, authors' analysis.

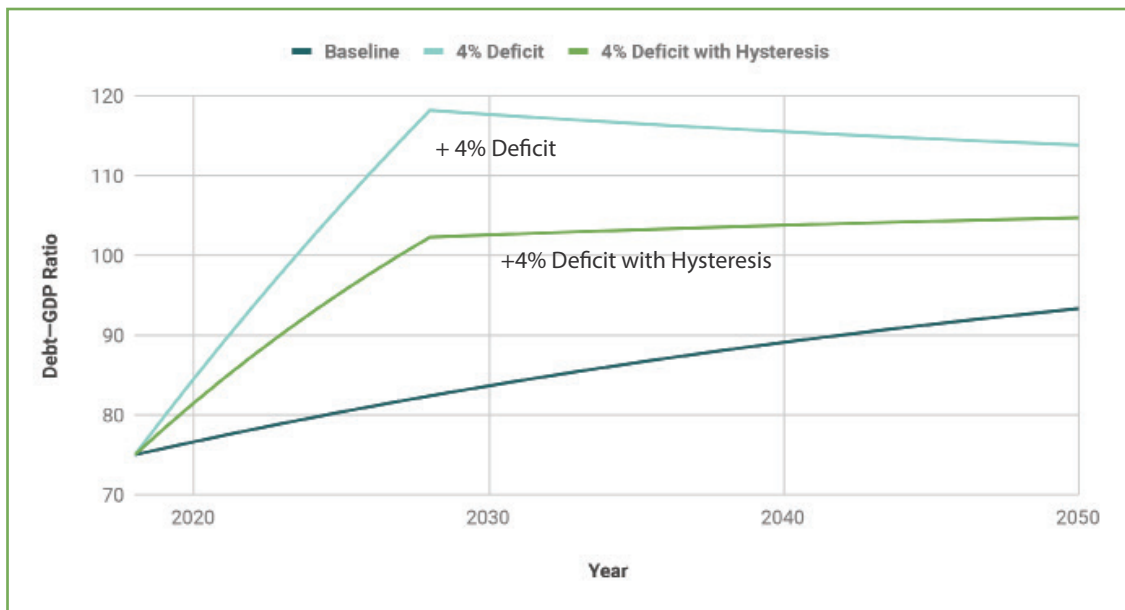
Figure 3 shows three trajectories of the debt-GDP ratio. The first line is the path of the ratio under current policies. (Note, again, that this is different from the forecast of the CBO because, unlike them, we do not assume that interest rates will rise steeply in the future; instead, we assume that they will remain at current levels.) The second shows the effect of additional borrowing equal to 4 percent of GDP, sustained for 10 years. (For simplicity, we have assumed the period of higher spending begins this year, but the results will be very similar if it begins a few years from now.) The third line shows the same scenario, but it now assumes that each point of additional public spending permanently raises GDP by 0.5 points. Two conclusions should be clear from the figure. First, with current interest and growth rates, there is no sense in which a period of even very high deficits places the debt on an unsustainable path. Rather, as soon as the period of high deficits comes to a close, the debt ratio begins to gradually decline—even though, in this scenario, today's primary deficits of 2.7 percent of GDP continue indefinitely. This is a clear visual demonstration of the fact that, in today's environment, increased public debt does not need to be paid down by subsequent surpluses. Second, if increased public spending can boost growth, the rise in the debt ratio will be much less than that suggested by the raw deficit numbers.

We should note here that we are not making a general claim about the effects of deficits on growth. The parameter of 0.5 used here is merely illustrative. That said, it is plausible that public investment and incentives for private investment are more likely to have persistent positive effects on output than many other forms of public spending.

FIGURE 4:

## Debt-GDP Ratio Under Various Scenarios

The bottom line shows the future path of the debt-GDP ratio given current interest rates, growth rates, and primary deficit. The top line shows the path given 10 years of additional deficit spending equal to 4 percent of GDP, after which primary deficits return to current levels. The middle line shows the same, but with the assumption that each point of government spending raises potential GDP by half a point.



Source: Authors' analysis.

In the case with no hysteresis, 10 years of additional borrowing equal to 4 percent of GDP brings the debt ratio to 118 percent, after which it gradually declines. In the second case, with strong hysteresis, the debt ratio rises to 103 percent and then stabilizes. These levels, while high, are not unprecedented. At the end of World War II, the US had a debt ratio of 120 percent. If we believe that the urgency of climate change is comparable to the urgency of World War II—a fundamental premise of the Green New Deal—then it is reasonable to contemplate a similar debt ratio. Many other developed countries have seen debt rise even higher relative to GDP, without the soaring interest rates, collapsing exchange rate, or runaway inflation that are the signs of truly excessive debt. Japan's public debt currently stands at 250 percent of GDP. In neither of these cases, nor in other episodes of extremely high debt ratios in developed countries, have we seen the negative macroeconomic effects that high debt ratios are supposed to lead to. (Low-income countries are a different story, especially when they borrow in a foreign currency.) Japan, with the world's highest debt-GDP ratio, continues to maintain extremely low interest rates while struggling with deflation and an exchange rate that is arguably too strong for its manufacturers to export successfully—exactly the opposite of the problems associated with excessive government debt.

Some may argue that today's low-interest environment may not last. But there are good reasons to believe that low interest rates are here for the foreseeable future.

In the first place, there is clearly the judgment of bond-market participants. The fact that bondholders are willing to hold 30-year Treasury bonds at 3 percent shows that they are very confident that rates will not rise significantly. Even a small chance of a rate increase on the 30-year bonds would imply expected losses greater than the 3 percent yield. The fact that 30- and 10-year rates are quite close is further evidence that market participants don't expect rates to rise. Any interest rate increase would imply larger capital losses on longer bonds, so if market participants thought that higher rates were more likely than lower ones, long bonds would need a higher yield to compensate. The fact that five-, 10-, and 30-year bonds currently trade at almost the same yield is clear evidence that the average bond market participant thinks that a further fall in rates is as likely as an increase. While bond markets are not omniscient, the information embodied in these prices should not be ignored.

In addition, it is important to realize that, historically, interest rates below growth rates are the norm and not the exception. Over the course of the 20th century, GDP growth was, on average, 2.4 points greater than the average interest rate on government debt—almost exactly the gap that exists today. In a longer perspective, it is the high-interest period between 1980 and 2000 that is anomalous. If our default assumption is that the relationship between interest and growth rates going forward will be similar to that which has prevailed historically—as is reasonable—then there is no reason to expect the future interest rate environment to be less favorable to public borrowing than is today's.

In short, there is relatively little reason for concern about the debt-ratio increase even if a large part of the public spending on decarbonization is financed by debt. There may be good reasons, as discussed in the next section, to use a mix of tax and debt financing, rather than to finance all of the increase in public spending with new borrowing. But even if the entire public spending component were financed with debt, there is no reason to believe the debt would be unsustainable.

***In short, there is relatively little reason for concern about the debt-ratio increase even if a large part of the public spending on decarbonization is financed by debt.***

## Taxes

To the extent that it is desirable to use a mix of tax and debt financing rather than pure debt financing, there is certainly space for the federal government to raise taxes. We do not consider carbon taxes or permits as a source of revenue; because of their regressive impact, it is better to rebate those receipts to the public as a carbon dividend. But other Pigouvian taxes may provide substantial revenue.

Pigouvian taxes are taxes on activities with negative externalities (i.e., activities that impose costs on the rest of society). Traditional examples include taxes on polluting industries or on goods with negative impacts on public health, such as alcohol and tobacco. One natural Pigouvian tax to consider is a financial-transactions tax (FTT). While financial transactions are not normally considered a social bad like smoking or air pollution, the manifest failure of speculation-driven financial markets to either deliver stable growth or to channel funds for investment to the most socially desirable uses suggests that they should be. The high incomes available through speculative trading also attract many of the most skilled workers in the economy, with scarce credentials, into unproductive activity in the financial sector.



Reducing incomes there would increase the available supply of scientists, engineers, managers, and other professionals that decarbonization will require. So a financial-transactions tax is a natural complement to the credit policies discussed earlier. An FTT of 0.5 percent on stock and bond transactions and 0.05 percent on derivatives could raise over 1 percent of GDP, depending on how much it reduced trading volumes.

Taxes on the highest levels of income, wealth, and inheritances, while less often discussed in these terms, can also be seen as justified by the social harms caused by the concentration of income and wealth. Sen. Elizabeth Warren's (D-MA) proposed wealth tax is estimated to raise on the order of 1 percent of GDP, or \$200 billion per year; a 70 percent tax on incomes over \$10 million, as floated by Rep. Alexandria Ocasio-Cortez (D-NY), might raise half of this. Together, these taxes could finance a substantial part of the increased public spending on decarbonization. Equally importantly, these taxes help to safeguard democracy against the outsized power of the wealthiest and to foster a more inclusive, egalitarian society.

If the public financing needs of a Green New Deal were much greater than 5 percent of GDP—for instance, if it incorporated universal health care and a job guarantee—or if there are political obstacles to borrowing on the scale required, then it may be necessary to consider a broader rise in income taxes. This is achievable. Even before the most recent federal tax cuts, the US was the most lightly taxed of large rich countries. As of 2017, taxes for all levels of government—federal, state, and local—totaled only 27 percent of GDP in the US, compared with an average of 34 percent for the Organization for Economic Cooperation and Development (OECD) countries as a group. Among the rich countries, only Ireland, a notorious tax haven, sees a smaller fraction of GDP collected in taxes. In France and several Scandinavian countries, taxes total more than 45 percent of GDP. Thus, even an increase in broad-based taxes on the order of 10 percent of GDP would bring the US only a bit above the OECD average, to around the current level of Germany or the Netherlands.

Such a broad-based tax increase is probably not necessary to finance the types of public spending described in this report. An extremely ambitious decarbonization program could reasonably be financed with a mix of debt and Pigouvian taxes.

The macroeconomic case for a Green New Deal is straightforward. On the one hand, there is overwhelming evidence that the economy's productive potential could support increased spending on decarbonization of at least 5 percent of GDP annually, without the need to crowd out any existing spending. In fact, the demands on real resources of decarbonization—if they take the form of targeted public investment, along with measures to channel credit and private spending—should properly be seen as one of the strongest arguments in favor of a massive program of decarbonization and not as an argument against it. And on the other hand, the financing problem—how to generate the sources of funds equal to the new uses of funds—can be straightforwardly solved with a mix of new debt and targeted tax increases. In an environment of interest rates well below growth rates, and given a plausible case that new public spending would generate significantly faster growth, there is no reason a decarbonization program should require tax increases except where these are desired for their own sake. If a Green New Deal includes broader spending—especially universal health care—as well as decarbonization, financing some part of it with broader income-tax increases is reasonable.



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