HOW DO TAX-RATE CHANGES IMPACT REVENUES?
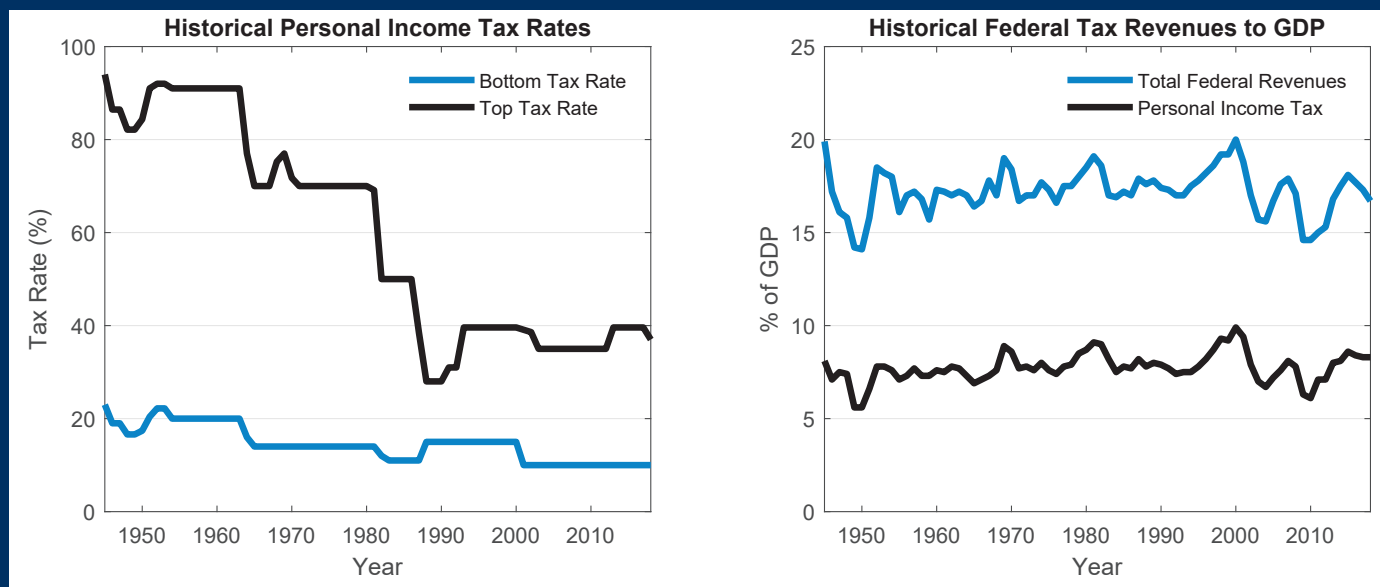
By Aaron Hedlund

KEY TAKEAWAYS

- A comprehensive look at the relationship between tax rates and revenue generation must consider the effects of policy not only on the tax rate, but also on the tax base.

- Any projection of the effects of a tax increase that accounts only for the expected behavior of primary earners is likely to overestimate the net revenue increase caused by the tax hike.

- Tax rates affect decisions about devoting time and resources into education and training in the hope that the long-term benefits will justify the near-term costs.

- Tax rates also influence the risk–reward calculation for those considering entrepreneurial ventures.

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Figure 1:
Historical Tax Rates and Revenue

Tax revenues as a share of GDP have remained stable despite large drops in the statutory top tax rate.

Sources: (Left panel) Tax Policy Center (https://www.taxpolicycenter.org/statistics/historical-individual-income-tax-parameters).
(Right panel) Office of Management and Budget, Table 2.3 (https://www.whitehouse.gov/omb/historical-tables/).

What are the limits to the amount of revenue government can raise through income tax hikes? Alternatively, must tax cuts necessarily create large shortfalls? Ever since the 1980 Republican presidential primary, when George H.W. Bush labeled Ronald Reagan's tax proposals "voodoo economics," a debate has raged about how changing tax rates impacts revenues—a debate which takes on particular salience now in light of recent proposals, including some by presidential contenders, to sharply increase taxes in order to finance a historic expansion in government spending. Although disputes over the effects of tax policy are often intertwined with and overshadowed by philosophical disagreements about the proper size and scope of government, assessing the impact of tax rate changes on economic performance and on revenues is ultimately an empirical rather than ideological exercise.

Basic economic principles establish that the relationship between rates and revenues is an inverse U-shape. When rates are low, tax increases produce additional revenue, whereas when rates are already high, further increases

reduce revenue—in short, the Laffer curve. Empirically, recent research provides a variety of estimates for the revenue-maximizing and welfare-maximizing tax rates, but one lesson that emerges is that analyses that only take into account the response of hours worked to tax increases are bound to greatly overestimate the amount of new revenue that can be raised while underestimating the economic damage from lost GDP growth and wages.
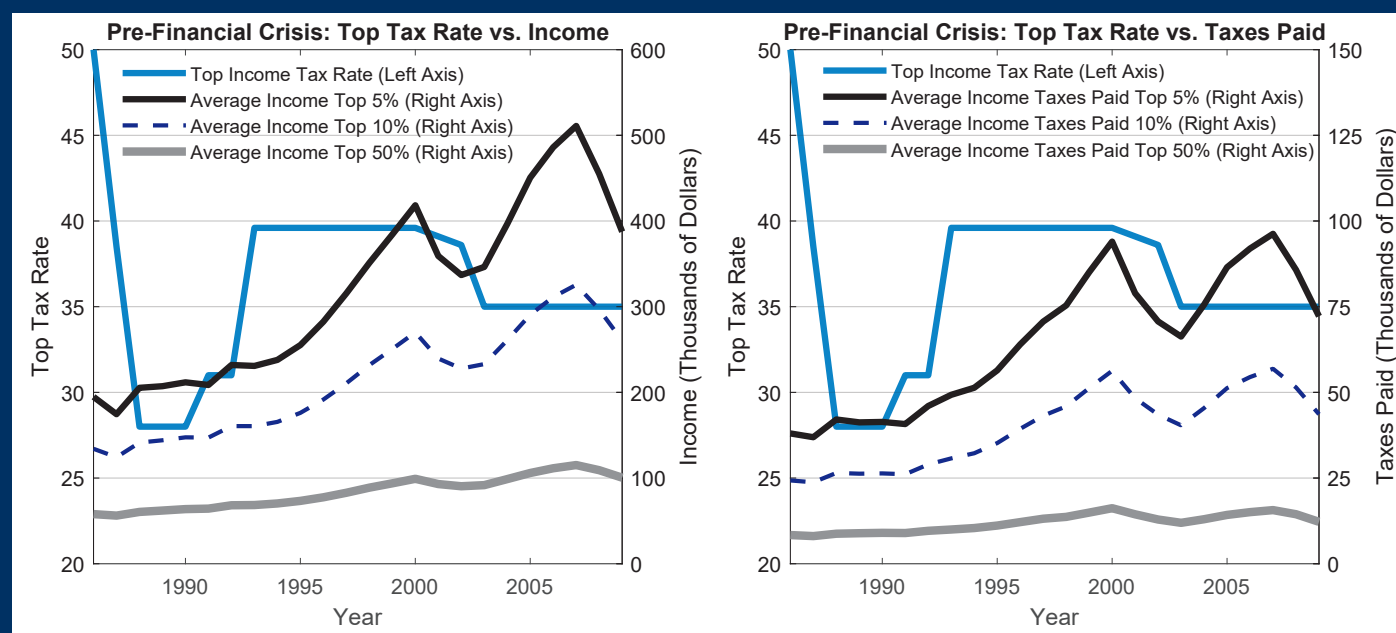
This paper examines the relationship between tax rates and revenue by taking a broader view that encompasses the responses of skill acquisition, entrepreneurship, innovation, and the labor market behavior of dual-earner families. The bottom line that emerges is that these additional margins of adjustment imply significantly lower revenue-maximizing and welfare-enhancing tax rates.

HOW CLOSELY DO TAX REVENUES TRACK TAX RATES HISTORICALLY?

Before delving into the underlying economic concepts, it is useful to examine the historical relationship between

Figure 2:
Taxes on Top Incomes

Average taxes paid by the top 5% of income earners have risen considerably since the 1980s despite cuts in the top income tax rate.

Sources: IRS Statistics of Income and Author Calculations (https://www.irs.gov/statistics/soi-tax-stats-individual-statistical-tables-by-tax-rate-and-income-percentile; https://www.irs.gov/statistics/soi-tax-stats-individual-income-tax-rates-and-tax-shares).

tax rates and revenues. Perhaps surprisingly, Figure 1 shows that personal income tax receipts and total federal revenues as a percentage of GDP have proven remarkably stable despite dramatic shifts in tax policy over the past half century. Furthermore, the largest swings in revenue have not come from policy changes, but rather from movements in the broader economy, particularly following the 2000s dot-com bust and the 2007–2009 financial crisis.

Looking beneath these topline numbers, the data reveal that average taxes paid by the highest-income households have actually risen sharply over the past three decades, even in the face of large rate cuts during the 1980s that dropped the top rate first from 70% to 50% and then again to 28% (Figure 2). Revenues from these households are also the most volatile, largely because their income is the most sensitive to economic conditions. For example, the average income of the top 5% of taxpayers fell by over $100,000 during the 2007–2009 financial crisis,
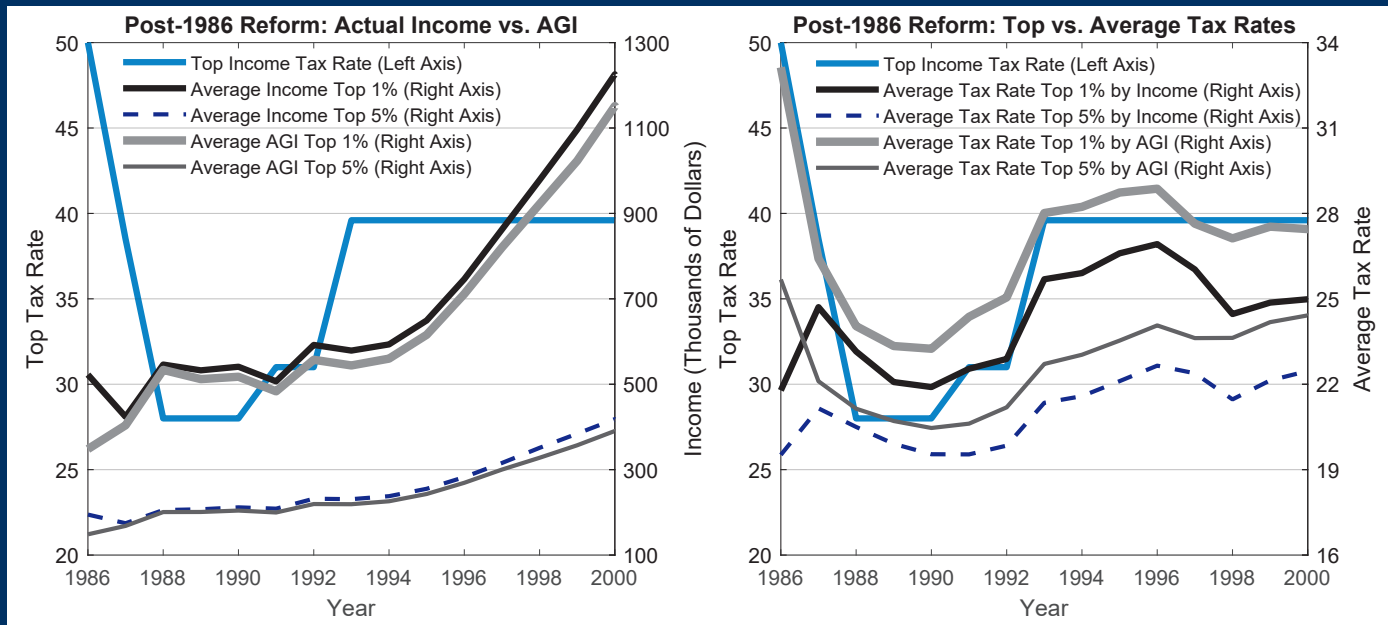
resulting in an average $25,000 decline in taxes paid by these households. By comparison, the average income of the bottom 90% of taxpayers fell by just over $1,000 during the financial crisis, and their tax bill shrunk by approximately $500.

THE IMPORTANCE OF THE TAX BASE

While much attention has understandably been paid to tax rates, equally important for revenues is the base of income that is subject to taxation. Specifically, there is a crucial distinction between an individual's actual income and their taxable income after deductions and exclusions. Over time, changes in how a taxpayer's adjusted gross income (the tax base for an individual) is determined have been just as significant as changes in the rates themselves. The U.S. experience following the landmark 1986 tax reform provides an important lesson about how the size of the tax base impacts the response of revenues to tax reforms. The basic structure of the 1986 reform was a

Figure 3:
The 1986 Tax Reform

When measured as a fraction of actual income rather than post-deduction taxable income, the tax burden of high-income earners remained mostly stable following the 1986 tax reform because its base-broadening provisions largely offset the cut in the top rate.

Sources: IRS Statistics of Income and Author Calculations (https://www.irs.gov/statistics/soi-tax-stats-individual-statistical-tables-by-tax-rate-and-income-percentile; https://www.irs.gov/statistics/soi-tax-stats-individual-income-tax-rates-and-tax-shares).

simultaneous reduction in the top tax rate from 50% to 28% and an expansion in the base of taxable income by limiting deductions and exclusions and removing certain tax shelters.[1] Between 1986 and 1988, the actual income of the top 1% rose only slightly, but the base-broadening provisions of the reform caused average adjusted gross income (AGI) for the top 1% to increase by nearly $200,000, as shown in Figure 3.[2] This distinction between AGI and actual income has stark implications for the analysis of tax law changes. In particular, looking only at AGI gives a misleading picture of how base-broadening tax reforms impact average tax rates. For example, when measured as the ratio of income taxes paid to AGI, the average tax rate fell sharply after the 1986 reform—from nearly 34% in 1986 to just over 23% in 1990. However, in light of the tremendous increase in the tax base from the reform, treating AGI the same before and after 1986 in the calculation of the effective tax burden is like confusing apples with oranges. Instead, when the average tax rate is measured as the ratio of taxes paid to actual income,

the data reveal essentially no change in the tax burden faced by the top 1% between 1986 and 1990. In other words, the reduction in tax revenues per dollar of AGI was almost exactly offset by an increase in AGI caused by the broadening of the tax base.

THE ORTHODOX, NON-VOODOO ECONOMICS OF THE LAFFER CURVE

This experience following the 1986 reform—which also has parallels in the first round of Reagan tax cuts as well as the Kennedy tax cuts decades prior—is an example of statutory base-broadening. However, equally important is the economic base-broadening that occurs when households and companies adjust their behavior in response to tax rate changes. The resulting relationship between tax rates and revenue is encapsulated in the Laffer Curve (Figure 4) which, despite its controversial invocation in the political sphere, is actually a conventional and well-established concept in economics.

The derivation of the Laffer Curve begins with considering two extremes. First, how much tax revenue would be raised with a 0% rate? Obviously, the answer is none. Now, how much revenue would be raised with a 100% rate? Although less intuitive, the answer is also none, because people would have zero incentive to engage in paid work. Most would instead increase their leisure or their volunteerism. Furthermore, among the relatively few who would continue going to the office despite no financial reward, their employer would have no incentive to waste funds on paying salary, knowing that the government would capture all of it. With these two points as extremes, the Laffer Curve then plots out an inverse U-shape relationship between rates and revenue. Somewhere in between 0% and 100%

Figure 4:

The Basic Laffer Curve Reflecting the Consumption–Leisure Tradeoff

The relationship between tax revenues and tax rates is an upside-down U shape. Revenues first rise with tax rates before eventually reaching a peak and then declining as even higher rates cause a contraction in economic activity and the tax base.
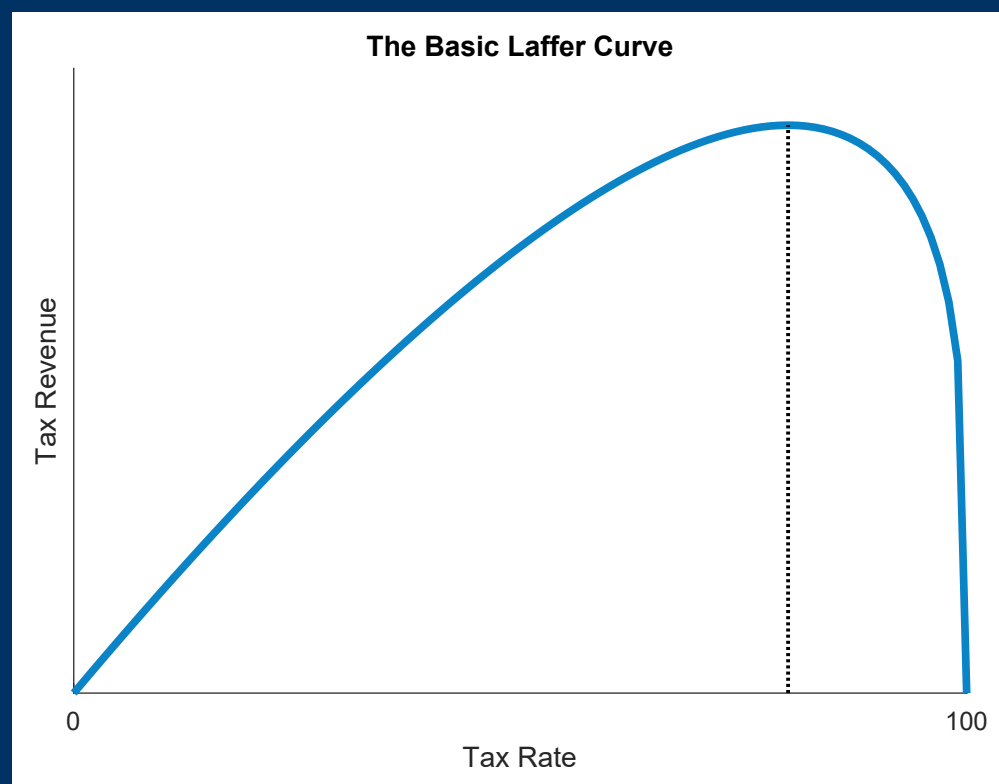

The Basic Laffer Curve

is the tax rate that maximizes revenues. Any rate beyond this point creates so much economic damage that revenues fall. While moral philosophy influences views about the optimal rate, the revenue-maximizing rate arguably represents the upper bound of plausibility.[3]

Traditionally, much of the economic analysis aimed at finding this peak rate has focused on how the income tax rate affects an individual's willingness to work, both with regard to hours worked and the decision to enter the labor force at all. Moreover, until the recent arrival of better data, much of the academic research considered only the response of heads of households. Perhaps unsurprisingly, these studies found the labor market behavior of heads of households to be relatively insensitive to tax rate changes.

Driven by the need to make ends meet and provide for their family, the main breadwinner tends to always seek out full-time employment regardless of the tax regime.

This assumption of tax rate insensitivity led economists Peter Diamond and Emmanuel Saez to conclude that the optimal—revenue maximizing—top income tax rate is 73%.[4] Moreover, in an analysis that also considers the social insurance benefits of progressive taxation—specifically, the ability of redistribution to soften the blow of unexpected economic hardship—economists Fabian Kindermann and Dirk Krueger provide justification for a top rate that approaches 90%.[5] However, both studies omit the many other margins of behavioral adjustment that accompany any significant change to tax rates. In

fact, Kindermann and Krueger even concede that "sports and entertainment stars as well as some entrepreneurs are likely well-described by our model, whereas high-earning professionals for whom long-term human capital investment decisions are crucial are likely not." To see just the impact of de-emphasizing their focus on luck as a driver of top earnings and allowing worker productivity to play a larger role, an otherwise similar analysis finds that taxing top incomes stops delivering higher revenues once the rate surpasses 42%.[6] Going further and incorporating a richer set of behavioral and long-run responses paints an even more limited picture about the government's ability to extract revenues through high rates.

TAKING THE FAMILY SERIOUSLY

An exclusive focus on the behavior of household heads also seriously underestimates the negative economic response to tax rate increases, resulting in dramatic overestimates of the amount of new revenue that can be raised. While this point may have been relevant in 1960 when only 25% of married households with children at home featured both spouses in the labor market, dual-earner families now account for more than 60% of households.[7] With the rise of this modern family arrangement, even though primary earners tend to pursue full-time employment more-or-less independently of taxes, the decision of their spouse both to seek formal employment and to work longer hours is much more sensitive to tax rates, especially when doing so may involve taking on added childcare expenses. Moreover, in the U.S. system where income is jointly taxed according to a progressive rate structure, the higher the income of the primary earner, the more heavily taxed is the income of both earners.

One recent study finds that raising top tax rates through a doubling of the progressivity of the income tax would reduce tax revenues by 7%, in large part because of estimates that the labor supply of married women would fall by nearly 20%, with half of the effect coming from reduced labor market participation and the other half occurring through a reduction in hours worked.[8] Operating in reverse, another study finds that moving toward a flatter income tax would lead to significant gains in labor force participation for married women.[9]

THE ROLE OF SKILLS AND EXPERIENCE

Before workers get to the stage of negotiating with a specific employer about the length of the workweek (i.e., their static labor supply), they must first select an occupation, taking into account the schooling and training required to enter the occupation of their choice. Not only do these human capital decisions precede job negotiations, but their economic payoff accrues over an entire lifetime rather than in one year's worth of paychecks. For example, an aspiring doctor may accrue hundreds of thousands of dollars in medical school debt only to face several more years after graduation of low pay as a medical resident. However, down the road, doctors are some of the most highly paid professionals in American society. More broadly, evidence from tax data indicates that three-quarters of private business profit can be classified as human capital income. In short, most top earners are part of the working rich.[10] By perpetually reducing these payoffs over a worker's entire lifetime, steep tax rates have the potential to greatly reduce the incentive to acquire skills, build human capital, and spend years accruing on-the-job experience in demanding and at times poorly compensated roles.

As evidence for the importance of human capital to the relationship between tax rates and revenue, one recent study disputes Diamond's and Saez's 73% preferred rate by showing that the reduced incentive to acquire human capital caused by raising taxes yields a much lower revenue-maximizing rate of 49%. This finding is in line with another study that attributes a decline in the revenue-maximizing rate from over 60% to nearly 40% because of the increased sensitivity of economic activity to tax rates through changes to skill accumulation and learning on the job.[11] Economist Ashley Craig shows that taking into account additional negative spillovers from tax-induced lower human capital cuts the optimal top tax rate by 13 percentage points.[12]

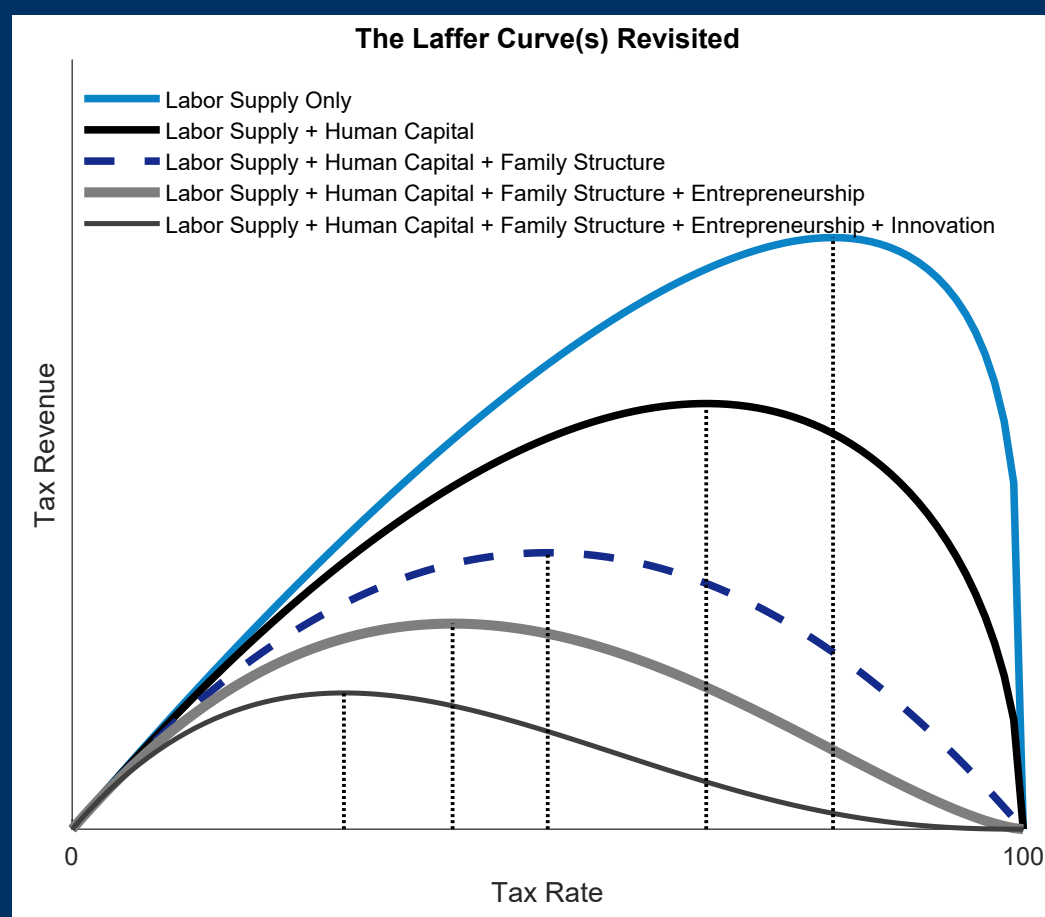## THE RESPONSE OF ENTREPRENEURSHIP AND INNOVATION

Income taxes also have far-reaching effects beyond the labor market. In fact, one of the shortcomings in the Diamond and Saez analysis behind the 73% revenue-maximizing rate is that it ignores long-run economic

growth effects. This omission matters greatly because the effect of growth on economic output—and hence on tax revenue—accumulates gradually, not unlike the way savings grow over time because of interest compounding. Thus, to the extent that taxes may have a deleterious impact on growth rates, raising tax rates will produce far less revenue than a purely static analysis would predict. Several recent studies demonstrate such a negative impact of high tax rates on economic growth through a decline in innovation and entrepreneurial activity. Although an array of factors contributes to the decision to become an inventor or entrepreneur, the prospect of large financial rewards plays a significant role as well.[13] Data from the Survey of Consumer Finances indicates that entrepreneurs comprise 40% of the top 1% of earners. As a result, when high taxes reduce the financial gains to innovation, fewer people pursue that career path. Moreover, those who choose to become entrepreneurs in spite of high tax rates are more likely to do so for non-financial reasons and to be on the lower end of the productivity spectrum.[14] In one study that accounts for the sensitivity of entrepreneurs to tax rates, increasing the progressivity of the income tax code leads to a revenue-maximizing top rate of only

Figure 5:
Successive Laffer Curves with More Forces Included

Incorporating the additional ways in which people respond to taxes causes the peak of the Laffer curve—that is, the threshold beyond which tax rate increases cause revenues to start declining—to shift to the left and occur at a lower tax rate.

The Laffer Curve(s) Revisited

- Labor Supply Only
- Labor Supply + Human Capital
- Labor Supply + Human Capital + Family Structure
- Labor Supply + Human Capital + Family Structure + Entrepreneurship
- Labor Supply + Human Capital + Family Structure + Entrepreneurship + Innovation

Tax Revenue

0   100

Tax Rate

33%.[15] Furthermore, in this case revenues only increase by 5%—amounting to less than one percentage point of GDP. Another study finds even starker results when looking at the subset of superstar entrepreneurs.[16] In an analysis that incorporates the positive spillovers of ideas and innovation on economic growth, economist Charles Jones finds that the revenue-maximizing tax rate may even be as low as 29%.[17] Furthermore, he shows that raising the top income tax rate to 75% could reduce GDP by over 8%, which would greatly blunt the impact on revenues by

shrinking the tax base. This result is consistent with other research which shows that the negative effects of taxes on growth accelerate as the rate rises. [18] Thus, if the goal is to raise revenue, expansions in the tax base are more likely to succeed and create less economic harm than confiscatory rates at the top.

COMBINING FORCES

Incorporating each of these margins—the adjustment of human capital, the behavior of dual earners in the presence of joint taxation, and the response of entrepreneurship and innovation—lowers the revenue-maximizing tax rate, as seen in Figure 5. Furthermore, the amount of additional revenue that the government can extract by raising rates diminishes. Instead, base-broadening reforms are more likely to succeed in raising additional revenue, whether the goal is to finance new spending, to pay down debt, or to reduce other taxes.

WHAT ABOUT STATE INCOME TAXES?

Although the previous analysis and quantitative results apply to the case of federal income taxes, states and localities can draw similar lessons. First, tax cuts in most cases are not "free" in the sense of yielding a net increase in revenue, but if designed properly, their fiscal impact should be less than $1-for-$1 as increased economic activity generates new revenue. Second, and as a corollary, tax hikes do not come for free either, because each $1 in static higher revenue is likely to be partly offset by countervailing revenue *losses* from worse economic performance. Despite there being currently fewer studies from which to derive a precise estimate of the revenue-maximizing *state* income tax rate, there is compelling economic logic to suggest that it is far below its counterpart at the federal level. In fact, one recent analysis of the state *corporate* income tax finds that current statutory rates are, on average, already near the revenue-maximizing tipping point. [19] Lastly, state policymakers should take heed of the tax base, as it is likely to be far more responsive to tax rate changes than at the federal level. In part, this greater state-level sensitivity arises from the ability of households and businesses to escape to greener pastures by moving across state lines if the tax burden becomes excessively onerous. In addition, detrimental income-shifting and tax arbitrage opportunities can arise if states make isolated adjustments

to either the personal or corporate income tax without considering their joint effects on revenue.

WHAT ABOUT A WEALTH TAX?

In light of recent proposals, it is also worth comparing the revenue impact of a *wealth* tax to more conventional taxes on interest, dividends, and capital gains income. At first glance, with suggested rates hovering in the range of 2% to 3%, a wealth tax may appear modest. However, because it repeatedly taxes the entire *value* of an asset—not just the flow of *income* generated by the asset—the wealth tax has a bigger bite than its low rate lets on. For perspective, consider that the most common type of wealth tax—the property tax—is set at a 2.4% rate in New Jersey, which has the highest property tax burden in the country. [20] As a back-of-the-envelope calculation, this rate implies that someone with a house valued at $500,000 owes $12,000 in annual property taxes. More generally, at current interest rates, the budgetary impact of a 2% wealth tax is equivalent to more than a 70% tax rate on the *income* generated by the underlying assets. [21]

Put another way, consider two scenarios. In the first, Scrooge McDuck is busy adding to his pile of wealth, and each year the tax collector comes by to take away a fraction of *the new amount added to the pile that year*. In the second case, the tax collector comes by each year to take away a fraction of *the entire accumulated pile*. Even a small rate in the second scenario that taxes wealth can easily produce a far larger tax bill than in the first case with income.

CONCLUSIONS

There is no simple "yes" or "no" answer to the question of whether tax cuts will pay for themselves or whether tax hikes will produce a significant surge in new revenue. Instead, economic analysis indicates that, for a given determination of the statutory tax base, revenues initially increase with rates up until some tipping point, and then revenues fall with further rate increases as changing household and firm behavior causes the economic base to contract. The question then becomes one of finding this revenue-maximizing rate and staying below it—how far below depending on other economic considerations and value judgments. Early studies that only look at how taxes affect the incentive to work of primary earners suggest that the United States is currently well below the revenue-

maximizing rate, implying that there is ample room to raise new funds. However, more recent research that incorporates additional margins of adjustment produces far lower estimates of the revenue-maximizing rate, suggesting that the federal government has only limited flexibility to raise revenue through narrow income tax rate hikes alone.

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ENDNOTES

1. See https://www.investopedia.com/terms/t/
    taxreformact1986.asp and https://taxfoundation.
    org/options-broadening-us-tax-base/ for more
    information.

2. The IRS provides a measure called the "1979 income
    concept" to compare income across time in a way
    that takes into account shifting income definitions,
    deductions, and tax rules.

3. For example, a utilitarian or Rawlsian outcomes-
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20. See https://taxfoundation.org/how-high-are-property-
    taxes-your-state/

21. The formula linking the wealth tax rate tw to its
    equivalent capital income tax rate ta is: $ta = (1 + r)/r \times tw$, where r is the interest rate. As of this writing,
    the 10-year treasury yield is 2.76%. Thus, $1.0276 / 0.0276 \times 0.02 = 0.744$.

NOTES