

Progressive Wealth Taxation*

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Final Draft: October 18, 2019

Abstract

This paper discusses the progressive taxation of household wealth. We first discuss what wealth is, how it is distributed, and how much revenue a progressive wealth tax could generate in the United States. We try to reconcile discrepancies across wealth data sources. Second, we discuss the role a wealth tax can play to increase the overall progressivity of the US tax system. Third, we discuss the empirical evidence on wealth tax avoidance and evasion as well as tax enforcement policies. We summarize the key elements needed to make a US wealth tax work in light of the experience of other countries. Fourth, we discuss the real economic effects of wealth taxation on inequality, the capital stock, and economic activity. Fifth, we present a simple tractable model of the taxation of billionaires' wealth that can be applied to the Forbes list of the 400 richest Americans since 1982 to illustrate the long-run effects of concrete wealth tax proposals on top fortunes.

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1 Introduction

Income and wealth inequality have increased dramatically in the United States over the last decades (Piketty and Saez, 2003; Saez and Zucman, 2016; Piketty, Saez, and Zucman, 2018). A long-standing concern with wealth concentration is its effect on democratic institutions and policy-making.¹ The view that excessive wealth concentration corrodes the social contract has deep roots in America—a country founded in part in reaction against the highly unequal, aristocratic Europe of the 18th century. Before 1776, the northern American colonies already taxed wealth including financial assets and other personal property, instead of land only as in England (Saez and Zucman, 2019, Chapter 2).

In the first part of the 20th century, the United States invented very progressive income and estate taxation, combined with heavy corporate taxation.² This led to a large and sustained reduction in income and wealth concentration that reversed after tax progressivity went away (Saez and Zucman 2019). There is a renewed political demand to use progressive taxation to curb the rise of inequality and raise revenue. A wealth tax is a potentially more powerful tool than income, estate, or corporate taxes to address the issue of wealth concentration as it goes after the stock rather than the flow.

Two major US presidential candidates have proposed wealth taxes in 2019. In January 2019, Elizabeth Warren, proposed a progressive wealth tax on families or individuals with net worth above \$50 million with a 2% marginal tax rate (3% above \$1 billion). In September 2019, Bernie Sanders proposed a similar wealth tax starting at \$32 million with a 1% rate and with substantially more progressivity within the billionaire class (with marginal tax rates growing from 5% for billionaires up to 8% for deca-billionaires). Such a tax would impose a much heavier burden on billionaires than all existing income, estate, and corporate taxes combined (Saez and Zucman, 2019). The key difference relative to earlier proposals or existing wealth taxes in other countries is the high exemption thresholds proposed. Less than 0.1% of US families would be liable for the Warren or the Sanders wealth tax (Saez and Zucman 2019b,c). The United States has never implemented a progressive wealth tax before, but other countries have. What do economists have to say about the merits and demerits of wealth taxation, and how it compares with other tax tools?

¹See, e.g., Mayer (2017), Page et al. (2018). Political contributions, for example, are extremely concentrated with 0.01% of the population accounting for over a quarter of all contributions (Drutman, 2013).

²The United States was the first country in 1917—four years after the creation of the income tax—to impose top marginal tax rates as high as 67 percent on the highest incomes. It was also the first country, starting in the 1930s, to impose high top tax rates (of 70% or more) on wealth at death. No European country ever imposed similarly high top inheritance tax rates (Plagege, Scheve, and Stasavage, 2011, p. 14).

We first discuss what wealth is, how it is distributed, and how much revenue a progressive wealth tax could generate in the United States. Wealth tax revenue depends on how much wealth there is at the top (which in turn depends on the amount of aggregate household wealth and the distribution of wealth) and on enforcement (the fraction of their wealth the rich could hide). Aggregate household wealth has increased from 3 times annual national income around 1980 to about 5 times national income in 2018. This increase has been driven by a rise in asset prices rather than capital accumulation, as the replacement-cost value of the capital stock has remained constant relative to national income. Meanwhile, wealth has become more concentrated. The share of wealth owned by the top 0.1% has doubled, from less than 10% in 1980 to almost 20% today. According to Forbes, the share of wealth owned by the 400 richest Americans has almost quadrupled from 0.9% in 1982 to 3.3% in 2018 (Zucman, 2019). We discuss the recent estimates of US wealth inequality, why they differ, and how to reconcile them.³ We show that the wealth tax base above the 99.9th percentile is large, about \$12 trillion in 2019 (about 60%-70% of national income). A 1% marginal tax on the top 0.1% would thus raise \$120 billion (0.6%–0.7% of national income). A well-enforced wealth tax has also significant revenue potential.

Second, we discuss the role a wealth tax can play in the overall progressivity of the US tax system. A well-enforced wealth tax would be a powerful tool to restore progressivity at the top of the US income and wealth distribution. It would increase the tax rate of wealthy families who can currently escape progressive income taxation by realizing little income relative to their true economic income. Despite the rise of inequality, the US tax system has become less progressive in recent decades. The three traditional progressive taxes—the individual income tax, the corporate income tax, and the estate tax—have weakened. The top marginal federal income tax rate has fallen dramatically, from more than 70% between 1936 and 1980 down to 37% in 2018. Corporate taxes (which are progressive in the sense that they tax corporate profits, a highly concentrated source of income) relative to corporate profits have declined from about 50% in the 1950s and 1960s to 16% in 2018. Estate taxes on large bequests now raise little revenue due to a high exemption threshold, many deductions, and weak enforcement. As a result, when combining all taxes at all levels of government, the US tax system now resembles a giant flat tax. All groups of the population pay rates close to the macroeconomic tax rate of 28%, with a mild progressivity up to the top 0.1% and a significant drop at the top-end, with effective tax rates of 23% for the top 400 richest Americans (Saez and Zucman, 2019, Chapter

³In particular, we show that taking into account the rising life expectancy differential between the very rich and the rest of the population (Chetty et al., 2016) goes a long way towards reconciling wealth concentration estimates obtained from estate tax data with other sources.

1).

Third, we discuss the empirical evidence on wealth tax avoidance and evasion, as well as tax enforcement policies. Several recent and well-identified empirical studies cast light on these issues. We discuss lessons learned from the experience of other countries. The specific form of wealth taxation applied in a number of European countries had three main weaknesses. First, they faced tax competition (moving from Paris to London extinguished the french wealth tax immediately) and offshore evasion (until recently there was no cross-border information sharing). Second, European wealth taxes had low exemption thresholds, creating liquidity problems for some moderately wealthy taxpayers with few liquid assets and limited cash incomes. Third, European wealth taxes, many of which had been designed in the early 20th century, had not been modernized, perhaps reflecting ideological and political opposition to wealth taxation in recent decades. These wealth taxes relied on self-assessments rather than systematic information reporting. These three weaknesses led to reforms that gradually undermined the integrity of the wealth tax: the exemption of some asset classes such as business assets or real estate, tax limits based on reported income, or a repeal of wealth taxation altogether.

A modern wealth tax can overcome these three weaknesses. First, offshore tax evasion can be fought more effectively today than in the past, thanks to a recent breakthrough in cross-border information exchange, and wealth taxes could be applied to expatriates (for at least some years), mitigating concerns about tax competition. The United States, moreover, has a citizenship-based tax system, making it much less vulnerable than other countries to mobility threats. Second, a comprehensive wealth tax base with a high exemption threshold and no preferential treatment for any asset classes can dramatically reduce avoidance possibilities. Third, leveraging modern information technology, it is possible for tax authorities to collect data on the market-value of most forms of household wealth and use this information to pre-populate wealth tax returns, reducing evasion possibilities to a minimum. We also discuss how missing market valuations could be obtained by creating markets. In brief, the specific way in which wealth was taxed in a number of European countries is not the only possible way, and it is possible to do much better today.

Fourth, we discuss the real economic effects of wealth taxes on wealth inequality, the capital stock, entrepreneurial innovation, top talent migration, family structure, and charitable giving. For many of these aspects, there is relatively little empirical evidence to draw on and we flag the most important avenues for future research.

Fifth, we present a new tractable model of wealth taxation of billionaires that can be applied to the Forbes 400 data since 1982. The model can be used to illustrate the long-run effects of

concrete wealth tax proposals such as those of the Warren and Sanders campaign on top fortunes and wealth concentration.

2 Wealth Inequality and Tax Potential

A progressive wealth tax is an annual tax levied on the net wealth that a family (or an individual) owns above an exemption threshold. Net wealth includes all assets (financial and non-financial) net of all debts. The tax can be levied at progressive marginal tax rates above the exemption threshold. For instance, the wealth tax proposed by Senator Elizabeth Warren in January 2019 would be levied on families (defined as a single person or a married couple with dependents if any) with net wealth above \$50 million. The marginal tax rate is 2% above \$50 million and 3% above \$1 billion. A family with \$50 million in net wealth would owe no tax, a family with \$100 million would owe \$1 million (2% of \$50 million), and a family with \$2 billion would owe \$49 million (3% of \$1 billion plus 2% of \$950 million).

Wealth tax potential revenue depends on the wealth tax base which obeys the simple informal equation:

$$\text{Tax base} = \text{total wealth} \times \text{top wealth share} \times (1 - \text{evasion rate}),$$

where total wealth is total aggregate wealth in the economy, the top wealth share measures the share of aggregate wealth held by the wealthy that would be targeted by the wealth tax, and the evasion rate measures the fraction of their true wealth that the wealthy could hide from taxation. Based on this basic equation, it makes sense to look consecutively at each of the three factors in the next three subsections.

2.1 What is Wealth?

The standard and broadest measure of household wealth includes all financial and non-financial assets valued at their prevailing market prices, net of debts. Assets include all property that is marketable or, even if not directly marketable, whose underlying assets are marketable.⁴ Financial assets include fixed-claimed assets (checking and saving accounts, bonds, loans, and other interest-generating assets), corporate equity (shares in corporations), and non-corporate equity (shares in non-corporate businesses, for instance shares in a partnership). Financial assets can be held either directly or indirectly through mutual funds, pension funds, insurance

⁴For example, claims on a defined benefit plan may not be sold but the underlying assets in the defined benefit plan (typically corporate stock and bonds) can. A trust might not allow beneficiaries to sell the underlying assets but the underlying assets (again typically corporate stock and bonds) generally are marketable.

companies, and trusts. Non-financial assets include real estate, i.e., land and buildings.⁵ Debts primarily include mortgage housing debt, consumer credit (such as auto-loans and credit card debt), and student debt. Assets owned by businesses, such as a headquarter building or a patent, contribute to household wealth through their effect on share prices. Net wealth does not include “human capital” such as future wages and pension rights that have not yet been accrued.⁶ Wealth also excludes the present value of future government transfers (such as future Social Security benefits or health benefits), which are not marketable.

Private wealth includes household wealth plus the wealth of non-profit institutions (university and foundation endowments, church buildings, etc.). The frontier between household and non-profit wealth is sometimes fuzzy, as in the case of private foundations controlled by wealthy individual donors, such as the Bill and Melinda Gates foundation. Our statistics exclude non-profit wealth.⁷ Private wealth is not the same as national wealth which also includes the assets owned by the government such as public land and infrastructure (net of government debt). In the United States, public wealth is about zero on net: public debt is about as large as public assets (Alvaredo et al. 2018).⁸

Table 1 displays the value of total US household wealth and its composition by asset class in 2018. The data comes from the US financial accounts published by the Federal Reserve Board. Total US household wealth reaches about \$90 trillion, or about 5 times national income (or 4.5 times GDP). The wealth tax base is thus potentially large.

Wealth arises from capital accumulation and price effects (changes in asset prices absent any net saving). Capital accumulation takes many forms: improved land, residences and buildings, equipment and machinery, intangible capital such as software. Capital accumulation is made

⁵We exclude consumer durable goods (such as cars, jewelry, collectibles) from our wealth statistics. In aggregate, cars are the largest item and this item is evenly and widely distributed. Contrary to popular belief, jewelry, collectibles, and private planes and boats are very small at the top relative to other forms of wealth. A well-functioning wealth tax, however, would have to include these assets (at least above some threshold) to prevent tax avoidance. A wealth tax that does not tax art collectibles could produce an art collectible price boom.

⁶It is only in slave societies that human capital can constitute marketable wealth. From the point of view of slave-owners, the value of slaves was a large component of US wealth before the civil war (Piketty and Zucman, 2014).

⁷As we shall discuss below, to limit tax avoidance opportunities it might be desirable to include wealth that is still controlled by the initial owner in the wealth tax base, even if this wealth has been pledged for charitable giving.

⁸In official balance sheets, public assets only include assets that can be sold. Natural resources and the environment are not included but there are efforts to try to incorporate them. Note that a country with a large public debt held by residents can have high private wealth and negative public wealth, and may have to devote significant fiscal resources to service the debt. In recent decades, public debt has increased in the United States, but a large fraction of this extra debt is held by foreign central banks as reserves (US Treasury, 2018). The interest rate paid on public debt is currently low, limiting interest payments.

possible by savings that are invested in growing the capital stock. The national accounts provide a measure of the capital stock—the replacement cost of capital, sometimes called wealth at book value—reflecting only past saving poured into the capital stock, net of the depreciation of capital and adjusted for general price inflation. This measure does not take into account changes in asset prices (such as increases in real estate prices or stock prices). By contrast, the measure of household wealth at market value published in the financial accounts captures such price effects.

The top panel of Figure 1 compares the evolution of household wealth at market value to the evolution of the replacement cost of private capital, both expressed as a percent of national income. Strikingly, the ratio of household wealth to national income has almost doubled from 270% in the mid-1970s to more than 500% in 2018, the most recent year available. By contrast, the replacement cost of the private capital stock has not increased since the mid-1970s and has remained around 250% of national income over the last four decades. This means that the rise in aggregate wealth relative to income is primarily due to price effects.⁹

While more capital is valuable (since capital makes workers more productive), a higher market value for private wealth is not necessarily desirable. A higher market value for private wealth is a positive economic development if the market value of wealth reflects expectations about the future income (or utility) stream that assets will generate. For instance, if businesses become more efficient, the value of corporate equity will rise even if the replacement cost of capital does not. But a rise in the market-value of wealth can also reflect an increase in the capacity of property-owners to extract economic resources at the expense of other groups of the population. This extractive power is constrained by regulations and can increase when regulations are removed. For example, a monopoly that can set its price freely is more valuable to its owners than the same monopoly whose price setting is regulated. But the higher value of the unregulated monopoly comes at the expense of consumers (with typically negative distributional implications) and at the expense of overall efficiency (monopoly prices are too high). When antitrust becomes laxer, private wealth can rise despite the fact that the economy becomes less efficient and less equal. Similarly, a patent generates wealth for its owner at the expense of the users of the technology. When a patent expires, the private wealth associated with the ownership of the patent goes to zero, but production becomes cheaper. Like antitrust, patent regulation affects the market value of wealth.

The value of businesses can also increase when owners more aggressively pursue profits by

⁹In principle, the discrepancy between the replacement cost of the private capital stock and the market value of household wealth could also be due to non-profit capital and to net foreign private assets. Both, however, are relatively small.

cutting workers' pay or increasing prices. The business of private equity firms is precisely to increase shareholder value by any means: productive improvements but also squeezing existing stakeholders such as workers, suppliers, or customers (Appelbaum and Bates, 2014).

The relative share of for-profit and not-for-profit organizations also affects the market-value of wealth. For-profit businesses represent wealth for their shareholders while non-profits do not have shareholders. A country with privatized for-profit education and health care will typically have a higher market-value of private wealth than a country where education and health is provided by the government or non-profit institutions.¹⁰ Yet there is no particular reason to presume that this extra wealth is socially valuable. Whether private for-profit, private not-for-profit, or government provision is best (even from a pure efficiency perspective) depends on the situation. To give one example from the financial sector where profit motives are generally thought to be crucial for incentives, consider the case of mutual funds. One of the largest for-profit mutual fund, Fidelity, manages \$1.4 trillion for its clients in 2018 (Morningstar, 2019). Fidelity stock has a substantial value (over and above the funds it manages on behalf of its clients). The founding Johnson family made a \$40 billion fortune from Fidelity and still owns half of the company. But there is an even larger not-for-profit mutual fund, Vanguard, which manages \$4.2 trillion but has no stock value (over and above the funds it manages on behalf of its clients). Vanguard developed the model of low-cost index funds, perhaps one of the most valuable inventions of the financial sector in recent decades. This invention created social value but hardly any marketable wealth. Vanguard's founder John Bogle had an estimated fortune of less than \$100 million, 400 times less than Fidelity founders. This example is particularly relevant for the analysis of wealth taxes, since mutual funds and pension funds fees constitute a significant "privatized wealth tax" for the middle class and upper-middle class. The average tax rate is 0.48% on \$17 trillion in assets, i.e., \$90 billion (Morningstar, 2019).¹¹

Ideally, one would like to know what part of the rise in the market value of private wealth (relative to the replacement cost of private capital) owes to expected extra future income streams due to real economic progress (expected new products or more efficient ways to produce), and what fraction owes to rent extraction from property owners at the expense of other stakeholders

¹⁰One example economists are familiar with is the example of scientific journals. Some journals are not-for-profit and price low while others, most notably those published by Elsevier, are for-profit and price high. For-profit journals create wealth for shareholders but at the expense of university budgets.

¹¹The tax rate is slowly going down (it was 0.94% in 2000) as the middle class slowly learns how to avoid this "tax." Absent Vanguard, the strongest force driving down fees on index funds, it is likely that for-profit mutual funds would charge more. See Malkiel (2013) for an overview of the industry. Without calling it a tax, he says: "the increase in fees is likely to represent a deadweight loss for investors," "the major inefficiency in financial markets today involves the market for investment advice."

(workers, consumers, or governments). It can be tempting, as a first order approximation, to treat the difference between the replacement cost of private capital and the market value of private wealth as an estimate of rent extraction. We stress, however, that such a naive computation is too simplistic and that more research is needed in this area.¹²

2.2 The Distribution of US Household Wealth

How is US household wealth distributed? There are four main sources to estimate the distribution of wealth in the United States: (1) the Survey of Consumer Finances (SCF), (2) named lists of wealthy individuals such as the Forbes 400, (3) estate tax data using the estate multiplier technique, and (4) income tax data using the capitalization technique. The capitalization method infers wealth from capital income by assuming a constant rate of return by asset class and year (estimated from macro data). The estate multiplier method reweighs each estate by the inverse probability of death (estimated by age \times gender cells) to recover the distribution of wealth in the full population. Each source and method has limitations and hence triangulating among sources is useful. The best source would be a well-enforced and comprehensive wealth tax in the same way that the development of the income tax created a crucial tool to measure the concentration of income in the United States.¹³ Zucman (2019) discusses the methodologies and sources in detail.¹⁴

Because the SCF by design excludes the Forbes 400, it is natural to add the wealth of the Forbes 400 to the wealth reported in the SCF when estimating top wealth shares. The Forbes 400 data are not perfect but they are the best estimates we have of wealth at the very top.¹⁵ The wealth of large shareholders of publicly traded companies (e.g., Amazon’s Jeff Bezos) is probably well measured. In 2018, 12 of the 15 richest Americans were shareholders of large public companies (see Table 4 below).¹⁶ Forbes might miss diversified wealth coming from inheritance (a point emphasized by Piketty, 2014) and might not value private businesses accurately (Donald

¹²One difficulty involves the measurement of intangible capital. Estimates of the replacement cost of private capital include some intangibles (software, research and development assets, and artistic originals), but not others (e.g., brand-name organizational capital). Another difficulty involves the treatment of privatization: part of the increase in household wealth reflects sales of public assets at potentially low prices (thus at the expense of government), but macroeconomic balance sheets do not reveal what the “right” price was (as government assets are typically valued at their current replacement cost).

¹³Before the start of the income tax in 1913, there were some estimates of how much revenue an income tax would bring, but these estimates were imprecise.

¹⁴Kopczuk (2015), Bricker et al. (2016), and Kennickell (2017) also discuss discrepancies between the SCF and estimates based on tax data.

¹⁵Refusing to use the Forbes 400 amounts to saying “we should not make any empirical statement about billionaires,” a nihilistic attitude we reject, although we recognize that the data are imperfect.

¹⁶The three exceptions were Charles and David Koch, and Michael Bloomberg.

Trump famously misrepresented his wealth to reporters to get into the Forbes list in the 1980s).¹⁷

The top panel of Figure 2 depicts the evolution of the top 0.1% wealth share according to (1) SCF data (with the Forbes 400 added back); (2) the estate multiplier method from Kopczuk and Saez (2004) updated in Saez and Zucman (2016), smoothed out after 2000, adjusted for more accurate mortality differentials by wealth groups in recent decades (Chetty et al., 2016), and using tax units (instead of individual adults) as units of observation;¹⁸ and (3) the capitalization method of Saez and Zucman (2016) updated to 2016 in Piketty, Saez, and Zucman (2018).¹⁹ All three series are based on taking 0.1% of all tax units (not individual adults).²⁰ Both the estate multiplier and capitalization series shows that wealth concentration was high in the 1910s and 1920s, with a particularly fast increase in the second half of the 1920s. The top 0.1% wealth share peaked at close to 25% in 1929. It then fell abruptly in the early 1930s (in the context of the Great Depression) and continued to fall gradually from the late 1930s to the late 1940s (in the context of the New Deal and the war economy). After a period of remarkable stability in the 1950s and 1960s, the top 0.1% wealth share reached its low-water mark in the 1970s. Since the 1980s, all series show a marked increase in wealth concentration, although there is some variation across sources in the magnitude of the increase. The capitalization method suggests an increase from 7% in the late 1970s up to 20% in recent years. The estate multiplier method suggests an increase from 7.5% to 16% over the same period. In the shorter period from 1989 to 2016, the top 0.1% wealth share estimated using SCF data increases from 13% to 20%. In

¹⁷Kopczuk (2015) further notes that debt or wealth controlled through charities are not well measured. But private foundation wealth is public information and can be linked to founders. Except for the Bill&Melinda Gates foundation, we have found that such private foundation wealth is negligible relative to the Forbes 400 wealth. Estate tax data show that debt is small among top wealth holders. According to Kopczuk and Saez (2004), debts represented 6.1% of wealth for the top 0.01% on average in 1991-2000. For estates filed in 2017, the latest year available, debt is 6.25% of gross estates for gross estates above \$50 million (data available online at <https://www.irs.gov/statistics/soi-tax-stats-estate-tax-statistics-filing-year-table-1>).

¹⁸See Figure 4 below for a step-by-step decomposition of these adjustments.

¹⁹Three improvements were made relative to Saez and Zucman (2016). First, the series is updated to reflect the latest version of the the macroeconomic household balance sheet published in the Financial Accounts of the United States. Second, the series includes a better treatment of wealth that does not generate taxable income, based on a more systematic use of the SCF. Third, it fixes an error in the computation of top wealth shares in the early 1930s; the new estimates show that wealth concentration fell more rapidly in the early 1930s than was originally reported. See Zucman (2019) for more complete details.

²⁰In the SCF, we select not the top 0.1% of the 130 millions households present the survey but 0.1% of the total 175 million tax units in the US. So we select effectively the top 0.135% of SCF households. There are fewer households than tax units because households may include more than one tax unit (e.g., adult children living with their parents). Typically, the SCF captures the wealth of the “economically dominant” tax unit in the household and misses wealth (or debt) from secondary tax units. This explains for example why the SCF captures only 70% of total student loan debt (in 2016, the SCF has \$0.96 trillion in student loans while the financial accounts have \$1.37 trillion in Q2). The sampling at the top for the SCF is made using tax data and hence selecting the top 0.1% of tax units (rather than households) provides the most accurate comparison across sources for top groups.

2016, both the capitalization method and the SCF (plus Forbes 400) have the same 0.1% wealth share of about 20%. The top 0.1% wealth share is around 16% in the estate tax data in 2011-2, the latest years available.

Sensitivity of capitalization estimates. As noted in Saez and Zucman (2016) and the subsequent literature, there are a number of potential limitations with the capitalization method. Two issues are particularly noteworthy. In this paper, we present modified capitalized-income top 0.1% wealth shares that account for these two issues.

Interest rate by wealth class. Interest rates may be heterogeneous across the distribution. If the rich own assets generating higher interest rates (such as risky corporate bonds), the capitalization method over-estimates fixed-income assets at the top. This could be particularly problematic in recent years, in a context of low overall interest rates.²¹

Figure 3 displays how the interest rate on fixed claimed assets (savings and checking accounts, taxable bonds) varies over time and by wealth class using linked income and wealth data sources: linked estate and income tax data and the Survey of Consumer Finances (SCF). The figure displays the aggregate rate of return economy wide used in the baseline Saez and Zucman (2016) series. The figure depicts the interest rate using estate tax returns matched to prior year income tax returns for non-married filers from internal tax data for large estates over \$20 million and between \$10 and \$20 million (from Saez and Zucman 2016, Figure Vb). The figure also depicts the interest rate observed in the SCF in aggregate and for top 1% and top .1% wealth holders. Overall, while somewhat noisy, the SCF data confirm the estate-income tax data that the interest rate for the wealthy tracks pretty closely the aggregate interest rate but is slightly higher. When interest rates are very low in recent years, this small difference however translates into a significant difference in capitalization factors. Therefore, we revise the capitalization method to incorporate these empirical findings as we did in earlier sensitivity analysis already presented in Saez and Zucman (2016).²² As in the Saez and Zucman (2016) Appendix B41c series, we apply higher interest rates to the top 0.1% to match the interest rate differential observed in matched estates-income tax returns for estates above \$20 million. Concretely, this correction reduces the fixed-income claims owned by the top 0.1% by a factor of 2 in recent years, consistent with the more recent SCF evidence depicted on Figure 3 as well.

²¹This issue is pointed out in Kopczuk (2015). More recently, Bricker et al. (2016, 2018) and Smith et al. (2019) estimate top wealth shares using the capitalization method and assign higher interest rates to the rich. Bourne et al. (2018) link estate and income tax data and make the reverse point that the very wealthy report low capital income relative to their wealth.

²²Saez and Zucman, 2016, Section IV.F, p. 547-551, and Appendix Tables B41, B41b, and B41c.

Finally, Figure 3 depicts the Moody AAA rate of return on corporate bonds used by Smith et al. (2019) revised capitalization method. The AAA rate is much higher (by about 3 points) than the empirical interest rate earned by the wealthy from estate-income and SCF data throughout the period implying that the AAA rate is not. In recent years with low interest rates, using this AAA rate for capitalizing interest greatly underestimates fixed claim assets at the top and hence under-estimates top wealth shares.²³

Value of pass-through businesses. A second known issue is that the official Federal Reserve Financial Accounts provide a low value for the value of private (i.e., unlisted) corporations. Innovatively, Smith et al. (2019) value the stock of S-corporations and other pass-through businesses (partnerships, sole proprietorships) using a formula based on profits, book value of capital, and sales that replicates what is done by financial analysts trying to value private equity. Switzerland also applies a similar method to administer its wealth tax. We follow their adjustment and increase the value of the pass-through businesses owned by the top 0.1% by a factor of 1.9 (adjusting the total wealth denominator accordingly). We apply the same 1.9 correction factor over time since 1962.²⁴

As shown by Figure 2, the adjustment for the higher interest rate of the rich and the higher value of pass-through businesses offset each other, except in recent years when the interest-rate adjustment slightly dominates. The benchmark Saez and Zucman (2016) top 0.1% wealth share, updated in Zucman (2019), is 19.6% in 2016. In the modified capitalized-income series presented in this paper, the top 0.1% share is 17.8%. In the SCF (with the Forbes 400 added) it is 19.3%, closer to the original Saez and Zucman (2016) series (in all three cases statistics are for tax units, similarly defined). The main difference is in terms of wealth composition. The share of fixed-income assets in the top 0.1% in 2016 decreases from 42% in the original Saez and Zucman (2016) series to 26% in the modified series. Meanwhile, the share of pass-through business wealth increases from 18% to 34%, which is more in line with what is observed in the Survey of Consumer Finances.

²³This reconcile our findings with Smith et al. (2019). We think that using the AAA return overstates the interest rate at the top because most of the bonds held by mutual funds are Treasury, agency, and foreign sovereign bonds (about 60%-70% vs. about 30%-40% for domestic and foreign corporate bonds in recent years, see Financial Accounts of the United States Table L.122) and the yield on sovereign and quasi-sovereign debt is lower than on private AAA bonds (about twice lower in recent years).

²⁴Smith et al. (2019) also implement 2 other changes: capitalizing equity using dividends and capital gains but putting a lower weight on capital gains (Saez and Zucman, 2016 also conducted such a sensitivity analysis); capitalizing property taxes using state specific multipliers (this has a minor effect on top wealth shares but is a useful innovation for creating state specific estimates).

Correcting estate multiplier estimates. The capitalized-income estimates of Saez and Zucman (2016) and the raw estate multiplier estimates of Kopczuk and Saez (2004) updated in Saez and Zucman (2016) track each other well from 1916 to 1985 but diverge thereafter. The raw estate multiplier estimates for recent decades are depicted in the bottom panel of Figure 4. They show a modest increase in the top 0.1% wealth share from 7.5% in the early 1980s to around 10% in recent years. A top 0.1% wealth share around 10% is similar to Denmark (Figure 2B in Jakobsen et al., 2019), one of the most equal countries on earth. How could the United States have the most unequal income distribution among advanced economies (Alvaredo et al. 2018) and the most equal wealth distribution? Something is wrong with the raw estate multiplier estimates.

As discussed in detail in Saez and Zucman (2016, Section VII.B), there are two main potential explanations for the diverging trends in recent decades. First, there might have been an increase in estate tax evasion. Second, the estate multiplier estimates of Kopczuk and Saez (2004) fail to incorporate the longevity gains of the rich (relative to average).

Longevity gains by the wealthy. The estate multiplier method blows up estates by the inverse probability of death. Mortality rates by age, gender, and year for the full population exist but the wealthy are likely to live longer. Kopczuk and Saez (2004) assume that the mortality rate advantage of the wealthy is the same as the mortality rate advantage of college graduates in the 1980s (Brown, Liebman, and Pollet, 2002). The correction factors of Kopczuk and Saez (2004) are depicted in the top panel of Figure 4 (for males). Male college graduates in their 40s have mortality rates only 55% of the population average (for males of the same age). The Kopczuk and Saez series use the same correction factors for all years, thereby ignoring the rising life expectancy differential by income groups documented for recent decades by, e.g., Waldron (2007) and Chetty et al. (2016).

Chetty et al. (2016) provide precise and granular mortality rates by income percentiles, age, and year. The top panel of Figure 4 depicts the mortality rates of upper income groups relative to average by age (for males) in 2012–4.²⁵ We depict three groups: the top 1%, the next 9%, and the next 10% (percentile 80 to 90). Two findings are worth noting. First there is a strong mortality gradient within the top 20%. This suggests that it is not enough to consider the relative mortality advantage of large groups such as college graduates when applying the estate multiplier method. More granular corrections are required. Second, the mortality rate for the top 1% is only about half of the mortality rate of college graduates used in Kopczuk and Saez

²⁵Income is measured 2 years earlier or at age 61 whichever is less. Income is measured at age 61 at the latest because income falls substantially after that age due to retirement.

(2004).

The Chetty et al. (2016) data also provide a short time series, from 2001-14. The time series shows that the mortality rate of the top 1% (relative to average) decreased from 40.6% in 2001-3 to 30.7% in 2012-4 (for individuals aged 40 to 63). Using Social Security data, Waldron (2007) shows that the life expectancy difference between males in the top half vs. bottom half of the lifetime earnings distribution at age 60 was only 1.2 years for the 1912 cohort but 5.8 years for the 1941 cohort. Therefore, the mortality differential between the wealthy and the rest was likely pretty small in 1980. Based on these data, it makes sense to use the Kopczuk and Saez (2004) mortality advantage up to 1980 but then assume that the mortality rate advantage increases (linearly) from 1980 to 2012 up to the level of the top 1% from Chetty et al. (2016). The Chetty et al. (2016) data imply that Kopczuk and Saez (2004) overstate mortality at the top by a factor 1.9 on average.²⁶

As noted by Kopczuk (2015), using a mortality rate that is too high by a factor $1 + x$ lowers the estimated top wealth share by a factor $(1 + x)^{1/a}$ where a is the Pareto coefficient of the wealth distribution, equal to 1.5 based on the Kopczuk and Saez (2004) estimates for recent years.²⁷ If we assume that the top 0.1% wealthiest Americans have the same mortality rate as the top 1% income earners from Chetty et al. (2016), then the mortality rate in Kopczuk-Saez is off by a factor $1 + x = 1.90$. This implies that the Kopczuk-Saez wealth shares should be inflated by a factor $(1 + x)^{1/a} = 1.9^{2/3} = 1.53$ in recent years. Concretely, instead of 10% in recent years, the top 0.1% wealth share should be 15.3%.

The bottom panel of Figure 4 shows a step-by-step correction of estate multiplier series. First, we start from the raw estimates from Kopczuk and Saez (2004), updated to 2012 in Saez and Zucman (2016). Second, we smooth the series after 2000 to reduce noise.²⁸ Third, we use the mortality differential of the top 1% from Chetty et al. (2016) in 2012 and the Kopczuk-Saez differential in 1980, with a linear adjustment between 1980 to 2012. Fourth, we convert the individual adult estimates coming from estates into tax-unit based estimates (using the same ratios of individual adult vs. tax unit top wealth as in Piketty, Saez, and Zucman, 2018). The

²⁶To compute this average, we weight each age and gender by their weight in the top 1% distribution from Chetty et al. (2016). Chetty et al. (2016) do not provide data for ages below 40 (who hold 4.0% of the top 0.1% wealth according to SCF) and for ages above 76 (who hold 11.5% of the top 0.1% wealth). For those below age 40, we assume the same ratio as for ages 40-41 namely 2.41 (as the small wealth there is in this group is likely concentrated among those close to age 40). For those above 76, we assume that the ratio is 1.27, which is the average of the age 75-76 ratio (1.54) and 1 (as the mortality advantage of the rich has to disappear for the very old). In net we have: $.040 \times 2.41 + (1 - .04 - .115) \times .675/.343 + .115 \times 1.27 = 1.905$.

²⁷The reasoning is the same as for the effect of tax evasion that we spell out below.

²⁸As explained in Saez and Zucman (2016), Steve Jobs, who died at age 56 in 2011, has a weight of 200, which means that his \$7 billion wealth (from the Forbes 400) would weigh \$1.4 trillion, or 3% of aggregate wealth—enough to explain the 2011 spike.

mortality adjustment (step 3) has a very large impact on the series.

In sum, improving the estate estimates with more accurate mortality rates has the potential to close about half of the gap between estate-based and capitalized-income estimates. It is important to note that the mortality of the super wealthy might not be the same as the mortality of high earners, as illness might reduce labor income (a flow) faster than wealth (a stock). Future work using internal IRS data could directly estimate mortality rates by capital income or capitalized income year by year. Since 2000, population-wide data would allow for precise and granular estimates (as in Chetty et al. 2016). From 1979 to 1999, mortality rates could be estimated more roughly as in Saez and Zucman (2016). Conditioning mortality rates on marital status would also likely improve accuracy.

Estate tax evasion. One simple way to measure the growth in estate tax evasion is to assume that this evasion is captured by the residual (growing) gap between the adjusted estate-based top 0.1% wealth share and the other series depicted in the top panel of Figure 2. While some forms of estate tax avoidance have always existed (see, e.g., Cooper 1979), it is likely that tax avoidance has increased substantially since the 1980s, as the political will for enforcement of the tax declined (Saez and Zucman, 2019, Chapter 3). For example, in 1975, the IRS audited 65% of the 29,000 largest estate tax returns filed in 1974. By 2018, only 8.6% of the 34,000 estate tax returns filed in 2017 were audited.²⁹ Researchers in the tax administration found that the wealth reported by decedents from the Forbes 400 richest Americans on their estate tax returns is only half the wealth estimated by Forbes magazine (Raub, Johnson, and Newcomb 2010). In 2017, estate taxes raised only \$20 billion or about 0.13% of the wealth of the top 0.1% richest households (in spite of a 40% tax rate above the \$5.5 million exemption threshold, which doubles to \$11.4 million in 2019). In 1976, the top 0.1% paid the equivalent of 0.7% of its wealth in estate taxes, primarily because of fewer deductions (especially no marital deduction), higher rates, and better enforcement.

2.3 Revenue Projections

As mentioned above, revenue projections for a wealth tax depend on three key elements: aggregate wealth, the share of aggregate wealth that the rich own, and finally what fraction of their wealth they could shelter from the tax. We will discuss in Section 4 the issue of tax evasion. Our main conclusion is that evasion depends on the design of the wealth tax and the

²⁹These auditing statistics are published by the IRS annually and available online (US Treasury, Internal Revenue Service, 2019, Table 9a for year 2018 and US Treasury, Internal Revenue Service, 1976, Table 2, p. 89 for year 1975).

strength of enforcement. It is a policy choice.³⁰ In this section, we consider various scenarios for enforcement.

Pareto distribution and revenue. It is useful to estimate the tax base of the top 1%, top 0.1%, and top 0.01% richest Americans. We also consider the tax base above fixed nominal cut-offs, \$10 million and \$50 million. The advantage of percentiles is that they are not tied to a specific nominal value or currency.

As is well known since Pareto (1896), the top tail of the wealth distribution is well approximated by a Pareto distribution. Let p be a fractile (such as the top 1%) and w_p the wealth at threshold p . The fraction of people with wealth above w is given by a power law of the form $1 - H(w) = p \cdot (w_p/w)^a$ where $a > 1$ is the Pareto parameter. The Pareto law relates two fractiles p and q and their corresponding wealth thresholds w_p, w_q as follows $p/q = (w_q/w_p)^a$ or $\log(p) - \log(q) = a \cdot [\log(w_q) - \log(w_p)]$.

A Pareto distribution has the property that the average wealth above a given threshold w is given by $b \cdot w$, where $b = a/(a - 1)$ is a constant. Empirically the US wealth distribution has a thick tail with a coefficient $a \simeq 1.4$ and hence $b \simeq 3.5$. Denoting by N the size of the population, the tax base above wealth threshold w_p (corresponding to percentile p) is $W_p = N \cdot p \cdot (b - 1) \cdot w_p = (N \cdot p \cdot b \cdot w_p)/a$ or $1/a$ times the total wealth of people with wealth above w_p . With $a = 1.4$, we have $1/a = 0.714 \simeq 70\%$. Concretely, if the wealth share of the top 0.1% is 20%, then the tax base above the top 0.1% wealth threshold is 70% of 20%, or 14% of aggregate wealth, i.e., \$13.1 trillion in 2019.

Evasion rate and revenue. How does tax evasion affect these computations? Suppose the rich can hide a fraction h of their wealth. We consider two polar scenarios: (1) *homogenous evasion*: everybody hides a fraction h of wealth, (2) *concentrated evasion*: a fraction h of taxpayers hide their entire wealth while a fraction $1 - h$ reports truthfully. The real world is in between these two polar cases.

For a wealth tax on the top fractile p , the tax base is scaled down by a factor $1 - h$ when evasion is homogenous, as the share of reported wealth at the top relative to true total aggregate wealth falls by a factor $1 - h$. When evasion is concentrated, the tax base is scaled down by less than $1 - h$.³¹

³⁰This is also the main conclusion from the analysis of tax evasion in the income tax context (see e.g., Slemrod 1994, Slemrod and Kopczuk 2002).

³¹With a Pareto distribution, the factor is $(1 - h)^{1/a} = (1 - h)^{0.7}$. For example, with $h = 0.2$, the scale down factor is 0.85 (instead of 0.80).

For a wealth tax above a fixed threshold w^* , the tax base is scaled down by a factor $1 - h$ when evasion is concentrated, as a fraction $1 - h$ of people with more than w^* vanish. When evasion is homogeneous, the tax base is scaled down by more than $1 - h$.³²

Therefore, a rough rule of thumb is that hiding a fraction h of wealth reduces revenue by a fraction h as well. If the exemption threshold is adjusted to always capture a given fractile, the fraction of revenue lost will be somewhat less than h . If the exemption threshold is kept fixed, the fraction of revenue lost will be somewhat higher than h .

Revenue projections. We project wealth tax revenue using the various wealth data sources depicted in the top panel of Figure 2. The unit is always the family tax unit, not the individual adult.³³ Table 2 presents the results. The first three columns present estimates of the base above specific percentiles (top 1%, top 0.1%, top 0.01%). The percentiles are defined relative to the total number of family tax units in the economy (175 million in 2019). For example, the top 1% represents the top 1.75 million families. The statistics are reported assuming no tax evasion (over and beyond tax evasion in the raw wealth data source). The last two columns display the base above fixed nominal amounts (in 2019 dollars): \$10 million and \$50 million.

The latest capitalized-income and SCF statistics are for the year 2016. We extrapolate them to 2019 assuming no change in the distribution and using the Federal Reserve financial accounts aggregates for 2019. Estates-based estimates are the average from years 2009-12, corrected for differential mortality (from Chetty et al., 2016), converted to tax units, and extrapolated to 2019 (assuming again no change in distribution).³⁴

The bottom rows show by how much the tax base would shrink if taxpayers can hide a fraction of their wealth (10% or 50%). We assume that tax evasion comes half and half from intensive and extensive margins. We assume that the percentile thresholds would be adjusted to always capture the same fraction of the population. In contrast, the nominal thresholds (\$10m and \$50m) are not adjusted, explaining why the revenue loss is larger. The last row shows the implied estate tax evasion rate that would fully explain the gap between the tax base from the capitalized-income estimates and the tax base from the estate multiplier estimates.

The tax bases are quite close across the first three sources. For example, the tax base above \$50 million is \$10.9 trillion according to the Saez and Zucman (2016) capitalized-income

³²With a Pareto distribution, the factor is $(1 - h)^a = (1 - h)^{1.4}$. For example, with $h = 0.2$, the scale down factor is 0.73 (instead of 0.8).

³³Recall that we converted estate multiplier estimates into family based estimates.

³⁴For estates-based estimates, the wealth denominator is about 10% lower because it excludes annuitized wealth (e.g., defined benefits pensions) that disappears at death. We conservatively assume that such annuitized wealth is negligible among top wealth holders.

series, close to \$9.4 trillion is the revised capitalized-income series, and \$9.7 trillion in the SCF. The tax base is about a third lower for the estate-based estimates (\$6.8 trillion). Above the \$10 million cut-off, the SCF tax base estimate is larger than capitalized incomes (\$25 trillion instead of around \$20 trillion). The SCF (after adding the Forbes 400) has slightly fewer super-rich than the capitalized-income estimates but it has more “merely rich”—rich but not super-rich—households in the \$10 million to \$50 million range. With a top 0.1% wealth share of 20%, a wealth tax with an exemption threshold at 99.9th percentile has a base of 14% of aggregate wealth, which is \$13 trillion in 2019 (assuming perfect enforcement). Top 0.1% wealth share from estate tax statistics is only 15%, suggesting that the evasion/avoidance rate for estate tax purposes is approximately 33% today. The estates-based wealth tax base is approximately 35% lower as well.

Reconciliation with Summers and Sarin. Summers and Sarin (2019a,b) argue that the wealth tax base above \$50 million would only be \$1.25 trillion (so that a 2% tax would raise only \$25 billion). All the estimates in Table 2, including the estates-based estimates, are much larger. The SCF and the capitalized-income estimates deliver estimates about 8 times larger than the Summers and Sarin estimates. Even the estates-based estimates deliver estimates 5.4 times larger than Summers and Sarin. The Forbes 400 alone represent (according to Forbes) a tax base of \$2.9 trillion in 2018, already more than twice the Summers and Sarin estimate. In other words, based on capitalized-income or SCF (plus Forbes 400) data, Summers and Sarin’s calculations amount to assuming an evasion/avoidance rate of 85%.³⁵

Why do Summers and Sarin (2019a,b) project such low revenue? They obtain their \$25 billion revenue estimate by noting that the estate tax collected only \$10 billion from estates above \$50 million in 2017 with a nominal tax rate of 40% (above \$10 million). They assume that 1 out of 50 rich people dies in a given year, so a wealth tax of 40% on the living population (instead of decedents only) would collect 50 times what the estate tax does. Hence a wealth tax at rate of 2% (1/20 of 40%) would collect 50/20 times what the estate tax does, i.e., \$25 billion.

The Summers and Sarin methodology under-estimates the revenue potential of a wealth tax for two main reasons. First, taxable estates are only one third of the net worth of decedents, due to the full exemption of spousal and charitable bequests.³⁶ But such deductions would not

³⁵Even if one takes the wealth estimates coming out of the raw estate multiplier method of Kopczuk and Saez (2004) at face value, one would still find a tax base about 3 times larger than what Summers and Sarin find.

³⁶For estates filed in 2017, total deductions are 67.9% of the net estate for gross estates above \$50 millions. Out of the 67.9%, 40 points come from the spousal bequest deduction and 20 points from charitable bequests (online at <https://www.irs.gov/statistics/soi-tax-stats-estate-tax-statistics-filing-year-table-1>).

apply for an annual wealth tax, which means that the Summers and Sarin estimate needs to be multiplied by a factor of three. Second, Summers and Sarin assume that 1 out of 50 rich people dies in a given year. This multiplier of 50 approximately corresponds to the mortality rate used in Kopczuk and Saez (2004). But we have seen that the mortality rate of the rich is lower than this by a factor 1.9. Using the correct multiplier would further increase the Summers and Sarin estimate by about 90%. Combining these two corrections increases the Summers-Sarin revenue projection by a factor of 5.7 (3×1.9). This is enough to approximately reconcile the Summers and Sarin revenue estimate with our estimate based on estates tax data in Table 2.³⁷

3 Role in Overall Tax Progressivity

3.1 Tax Progressivity

Wealth taxes are very progressive, because net wealth is more concentrated than income. Wealth taxes are more progressive than property taxes, because property taxes are only levied on real estate, which is more equitably distributed than net wealth (Saez and Zucman, 2016). Wealth taxes also more closely track ability to pay than property taxes because they allow people to deduct debts. The progressivity of a wealth tax depends on how high the exemption threshold is and on whether a graduated rate schedule is applied among taxpayers.

Saez and Zucman (2019) estimate effective tax rates (including all taxes at the federal, state, and local levels) by income groups using the data developed by Piketty, Saez, and Zucman (2018). We can use the same data on the joint distribution of income and wealth (Piketty, Saez, and Zucman 2018) to estimate the effect of the wealth tax on the overall progressivity of the current US tax system.

Tax rate on the top 400. One justification for a wealth tax is to increase the effective tax rate on the very wealthiest Americans who may not realize much income and hence may pay low effective tax rates today. Indeed, the two wealth tax proposals by Warren and Sanders target specifically billionaires (and multibillionaires) with higher rates.

As show in Table 4 below, the top of the Forbes 400 list includes founder-owners of large companies (Amazon’s Jeff Bezos, Microsoft’s Bill Gates, Berkshire Hathaway’s Warren Buffett, and Facebook’s Mark Zuckerberg). Of these four companies, only Microsoft pays dividends.

³⁷There are other smaller differences. Summers and Sarin implicitly score a wealth tax on individual (not family) wealth above \$50 million, which mechanically reduces the base by about a quarter according to SCF data for 2016. They use 2016 numbers and do not adjust to 2019 and nominal aggregate wealth has grown by about 25% from 2016 to 2019. Conversely, the estate tax applies starting at a lower threshold of \$10 million so there is an infra-marginal tax below \$50 million that should not be counted.

For as long as Bezos, Buffett, and Zuckerberg do not sell their stock, their realized income is going to be minuscule relative to their wealth and true economic income. For example, Buffett disclosed that his fiscal income—defined as adjusted gross income reported on his individual income tax return—is in the tens of millions. Since his wealth is in the tens of billions, the realized return on his wealth is on the order of 0.1%.³⁸ Bezos', Buffett's, Zuckerberg's, and Gates' companies are also multinational companies which can book a substantial share of their profits in tax havens to reduce their corporate income tax (Zucman, 2014).

How much the top 400 wealthiest Americans report in fiscal income—and hence pay in income taxes—is a central question for the desirability of a wealth tax. Absent direct evidence on the income taxes paid by the Forbes 400, we need to triangulate using various sources. We use three sources which turn out to provide consistent results. Table 3 summarizes the computations.

First, the IRS provides statistics on linked estate and income tax data. Bourne et al. (2018) study the link between wealth on the estate tax return for 2007 decedents and fiscal income over the last 5 years preceding death (2002-2006). In the highest wealth category they consider—\$100 million and above—reported capital income (averaged over 2002-6 and expressed in 2007 dollars) is 3.0% of 2007 wealth (their Figure 4). In national and financial accounts, the ratio of aggregate capital income in 2002-6 to aggregate wealth in 2007 is 5.9%. This suggests that reported capital income of the wealthiest decedents is only 51% of their true income (assuming conservatively that the wealthy obtain a return on their wealth equal to the aggregate return). One objection is that the wealthy may avoid realizing capital gains toward the end of their life, since unrealized capital gains benefit from the step-up of basis at death. Bourne et al. (2018), however, show that realized capital gains are very large in their sample, on average 45% of capital income (their Figure 2).

Second, the SCF provides information on the joint distribution of wealth in year t and reported income in $t - 1$. In 2016, the ratio of reported income to wealth was 3.21% for the top 0.001% wealthiest Americans (wealth above \$650 million, 86 records in the public SCF) and 3.20% for the top 0.01% (wealth above \$190 million, 465 records). This 3.2% rate of return is only 50% of the 6.4% aggregate capital-income-to-wealth ratio in 2016. Earlier waves of the SCF provide similar results, which is re-assuring given the small sample sizes. These SCF results are very similar to the IRS linked-estate-and-income-tax results, and not subject to the issue that

³⁸Buffett's fiscal income was \$63 million in 2010 when his wealth was \$45 billion and \$12 million in 2015 when his wealth was \$65 billion. Some billionaires do report substantial incomes (relative to wealth). In August 2019, candidate Tom Steyer disclosed that he reported on average \$133 million in annual income in 2009-2017 (for a total of \$1.2 billion) which is 8.3% of his \$1.6 billion wealth according to Forbes 400.

realized capital income might be particularly low within a few years before death.

Third, the IRS provides statistics on the top 400 highest earners, a group we call the IRS top 400. In 2014, the latest year available, the IRS top 400 had an average fiscal income of \$317 million. The Forbes 400 wealthiest have, by definition, less fiscal income than this on average. How much less? To address this question, we relate the fiscal income of top income earners to the fiscal income of top wealth holders in the SCF. In the 2016 SCF, the top 0.001% income earners (sample of 64) reported fiscal incomes that were 6.7% of the wealth of the top 0.001% wealth holders. This is approximately twice the income of the top 0.001% wealth holders mentioned above. Averaged across all SCF years from 1998 to 2016, this ratio is 2.3 on average.³⁹ This result shows that there is indeed substantial re-ranking in wealth vs. reported income. Based on this finding, we estimate that the Forbes 400 wealthiest Americans have a reported income of \$158 million (\$317 million divided by the ratio of 2). In 2014, the average wealth of the Forbes 400 was \$5.725 billion. So the fiscal income of the Forbes 400 was 2.77% of their wealth, which is only 41% of the 6.77% economy-wide return on wealth in 2014. If we make the conservative assumption that the return on wealth for the Forbes 400 is the same as the economy-wide return, fiscal income for the Forbes 400 is only 41% of their true economic income.⁴⁰

In sum, using three different sources and methodologies, we find that top wealth holders have a fiscal income that is slightly less than half of their true economic income (defined as wealth times the average macroeconomic return to wealth). In what follows, we assume that the Forbes 400 have a ratio of fiscal income to true economic income of 45% (population-wide, this ratio is around 70%).⁴¹ The super wealthy do not realize as much income as the average person, but on average they realize substantially more than what Warren Buffett publicly disclosed.

Naturally, our 45% estimate of reported income relative to full economic income is based on triangulating the best available sources and it could be refined in future work. We have applied this 45% ratio to estimate taxes paid by the top 400 retrospectively to all years since 1950 in Saez and Zucman (2019).⁴² We are fully aware that this triangulation is an approximation but it is the best approximation we could create using public sources. Given the importance of the policy question—how much do billionaires really pay in taxes?—we view it as important to

³⁹For the top 0.01% (instead of top 0.001%), this ratio is also 2.0 on average from 1998 to 2016.

⁴⁰Similar estimates would be obtained for other years using the same methodology.

⁴¹In the Piketty, Saez and Zucman (2018) micro-files, the ratio is about 65% for the top 400 in recent years. It is too high because wealth is imputed based on realized fiscal income. We plan to address this issue in future research.

⁴²In earlier decades when the corporate tax is particularly large, the direct computation from the micro tax data generates ratios of reported income to actual income that are lower than 45% in which case we do not adjust down reported income.

mobilize internal data to provide better estimates.⁴³

Effects of wealth taxation on overall tax progressivity. Figure 5 depicts the average tax rate by income groups in 2018, the year following the passage of the Tax Cuts and Jobs Act. All federal, state, and local taxes are included. Taxes are expressed as a fraction of pre-tax income, a comprehensive measure of income before governments taxes and transfers (other than Social Security) that adds up to total national income (Piketty, Saez, and Zucman, 2018). P0-10 denotes the bottom 10% of adults, P10-20 the next 10%, etc. The economy-wide average tax rate is 28%. Tax rates in the bottom seven deciles are slightly lower than average (25% instead of 28%). Tax rates between percentiles 80 and 99.9 are very slightly higher than average (around 29%). The tax rate peaks at 33% for P99.9-99.99 (i.e., the bottom 90% of the top 0.1%). The tax rate then falls above P99.99 and is lowest for the top 400 at 23%. Taking all taxes together, the US tax system looks like a giant flat tax with similar tax rates across income groups but with lower tax rates for billionaires.

A wealth tax such as the one proposed by Elizabeth Warren would have a large impact on progressivity within the top 0.1%. To illustrate this point, we use the capitalized-income wealth estimates and assume that the wealthy would hide 15% of their wealth. The tax rate on the top 0.1% excluding the top 0.01% would increase modestly by 4 points. The tax rate in the top 0.01% would rise by 14 points. Among the top 400, the tax rate would double from 23% to 46%. A wealth tax with a high exemption threshold (\$50 million) and a marginal tax rate of 2% (3% above \$1 billion) would have a major impact on progressivity. It would restore tax progressivity at the top to levels last observed in 1980 (Saez and Zucman, 2019, Chapter 7).

3.2 Alternatives

Several alternatives to increase tax progressivity have been proposed (see, e.g., Batchelder and Kamin, 2019 for a recent detailed discussion).

Taxing realized capital gains better. There is a widespread recognition that capital gains are not taxed systematically. The step-up of basis at death is the largest and most inefficient loophole (charitable giving of appreciated property is another). Conversely, the fact that price inflation is not taken into account when computing realized gains adds a “wealth tax” rate layer

⁴³For example, linking the Forbes 400 to income tax data would allow for a direct estimation of the fiscal income of the 400 richest. Similar linking for research purposes has already been done in the context of estate tax data by Raub, Johnson, and Newcomb (2010). A well-enforced wealth tax would be an even better source to study this question in depth and make sure the Forbes 400 estimates are themselves accurate.

(equal to the rate of inflation times the tax rate on realized gains). But it is a capricious wealth tax that varies with the inflation rate and hits only gains eventually realized. Most economists agree that closing the step-up of basis loophole and adjusting gains for inflation would be a good idea. This would make the tax base less elastic (as everybody eventually dies or disposes of assets), allowing for an increase in the capital gains rate and possibly an alignment with ordinary tax rates. The key remaining issue would be that the tax might come with substantial delay for very wealthy individuals who are still fairly young and do not need to sell their stocks (e.g., Mark Zuckerberg).

Taxing capital gains on accrual. One solution to remedy the delayed realization problem is to tax capital gains on accrual (or mark-to-market taxation).⁴⁴ The main difficulty is that there is a lot of year-to-year fluctuations in assets prices.⁴⁵ An appreciation of 20% (which is not uncommon) taxed at 40% could amount to a very large wealth tax of 8%. The tax would be particularly heavy on entrepreneurs. For example, Zuckerberg has experienced a 40% annual growth in wealth since 2008; a mark-to-market tax at 40% would amount to a 16% annual wealth tax. Taxing capital gains on accrual means a heavy tax on entrepreneurs growing a successful business and building up wealth. In contrast, the wealthy rentier or heir who is invested in bonds or mature stock might not be taxed much. This is in contrast with a wealth tax which is based solely on wealth and not returns.

Merging wealth taxation and capital gains taxation. Taxing realized capital gains only means that the tax is delayed. Taxing capital gains on accrual means capricious taxation based on the ups and downs of volatile financial markets. An intermediate solution would be to track unrealized capital gains and have a pre-paid withholding tax kick in whenever such unrealized gains exceed a chosen amount. For example, unrealized real capital gains above \$1 million would face a recurring annual tax of 2%, but the tax would be credited back when capital gains are realized. The withholding tax could be made progressive with higher tax rates on very large amounts of unrealized gains.⁴⁶ Such a tax would ensure more timely payment, and, since it is a withholding tax, the issue of imperfect or imprecise valuation is less critical. In practice, such a withholding tax on unrealized capital gains would look quite similar to a wealth tax (except

⁴⁴See Weisbach (1999) for a detailed proposal.

⁴⁵For hard to value assets, such as private equity, generally, the mark-to-market tax is applied only when the asset is sold retrospectively. The tax can be computed as if a tax had been owed each year, what is called “retrospective taxation” an idea originally proposed by Auerbach (1991) (see Batchelder and Kamin, 2019 for a recent discussion and Evans and Kleinbard 1997 for the practical difficulties it can generate).

⁴⁶And the tax would apply only if cumulative tax paid is below the tax owed upon realization of all gains.

that the withholding tax is refundable upon realization and does not hit large wealth holdings with no unrealized gains).⁴⁷ This tax would be particularly useful for state income taxes that are based on residence (the current capital gains tax can be avoided by leaving a high tax state such as California and becoming a Florida resident before realization).

Constitutionality: The wealth tax as a minimum income tax. The key advantage of the wealth tax is that it hits the implicit return on wealth even if the realized return on the individual income tax is low. This can also be achieved through an income tax based on the presumptive income from wealth defined as a fixed return on wealth, as in the Netherlands. Colombia's income tax is based on the maximum of reported income and presumptive income defined as 3% of wealth (Londoño-Vélez and Avila, 2019). The advantage of this system is that such a tax would clearly be constitutional.⁴⁸ In this system for example, if Warren Buffett's wealth is \$65 billion, then his presumptive income would be \$1.95 billion, much higher than his actual reported income, and hence his income tax would be computed based on presumptive income and not reported income.

4 Tax Enforcement

4.1 Tax Avoidance and Evasion

A natural starting point to think about tax avoidance is the experience of the many countries that have implemented a wealth tax.

Overall responses. A number of studies estimate the response of reported wealth to a change in the wealth tax rate. Note that such estimates do not directly tell us how much tax avoidance or evasion there is overall but instead how changes in the tax rate affect the level of wealth reported. Short-run responses likely capture tax avoidance/evasion (as real responses are expected to take longer).

Bunching studies. A wealth tax above a given threshold creates incentives to report (or reduce) wealth to just below the threshold to avoid the tax. Hence, there should be bunching in the distribution of wealth at the exemption threshold. The amount of bunching is proportional to the size of the behavioral response and can be used to recover the elasticity of reported wealth

⁴⁷Such a tax could also be integrated with the estate tax by making it creditable for estate tax purposes as well so that it also represents a pre-payment on the estate tax that comes late by definition.

⁴⁸The constitutionality of a straight wealth tax is debated among legal scholars and hence would effectively depend on the make-up of the supreme court (see, e.g., Ackerman 1999).

with respect to the tax rate (see Kleven 2016 for a survey of this bunching methodology). Seim (2017) finds clear evidence of bunching at the exemption threshold for the Swedish wealth tax. This implies that there is a behavioral response to the wealth tax but it is quantitatively small: a 1% marginal wealth tax rate reduces reported wealth by 0.2% only. The response comes from self-reported assets suggesting that it is driven by avoidance/evasion rather than real response. Jakobsen et al. (2019) also use a bunching design in the case of the Danish wealth tax and find even smaller elasticities. Londoño-Vélez and Avila (2017), also using bunching methods, find larger avoidance/evasion responses: a 1% marginal wealth tax rate reduces reported wealth by about 2-3% in the context of Colombia where third party reporting is much less developed than in Sweden or Denmark. In both cases, the bunching methodology provides very compelling evidence of behavioral responses but perhaps not its full magnitude. If many filers ignore the exact details of the tax system but still respond to the overall tax, the total response could be much larger.⁴⁹

Diff-in-diff studies. In Denmark where third-party reporting is extensive, Jakobsen et al. (2019) use a difference-in-difference approach as well and find estimates substantially larger than their bunching estimates. In particular, they find a growing effect of wealth taxes on reported wealth (possibly through a combination of avoidance and real responses). In Switzerland, where there is no third-party reporting of financial wealth (due to bank secrecy), Brulhart et al. (2016) find very large responses to wealth taxation: a 1% wealth tax lowers reported wealth by 23-34%. This extremely large estimate is extrapolated from very small variations in wealth tax rates over time and across Swiss cantons and hence is possibly not as compellingly identified as the other estimates based on larger variations in the wealth tax rate.

Exploiting asset exemptions. Wealthy taxpayers can take advantage of asset exemptions to avoid the wealth tax. Alvaredo and Saez (2009) provide a striking illustration in the case of the Spanish wealth tax which exempted closely held stock when the business owner is substantially involved in the management and owns at least 15% of the company stock (but such exempted stock remained reportable). In 1994, the first year the exemption was introduced, exempted stock represented only about 15% of total closely held stock reported by the top 0.01% wealth holders. By 2002, the fraction had grown to 77%. The time series from 1993 to 2002 shows stability in the value of taxable plus exempt closely held stock among top wealth holders, implying that the behavioral response comes from shifting from taxable to non-taxable closely held stock rather than a supply side effect of more business activity (Figure 10, p. 1159). This

⁴⁹This issue affects bunching studies in income tax contexts as well as discussed in Kleven (2016).

example shows that exempting assets can seriously undermine the wealth tax.

Hiding assets abroad. Wealthy individuals can try to hide assets abroad to evade income and wealth taxes. Zucman (2013, 2015) and Alstadsæter, Johannesen, and Zucman (2018) provide evidence on the amount of wealth held in tax havens for each country in aggregate. They estimate that US residents hold about 9% of US national income in offshore wealth or about 2% of total US household wealth.

Recent evidence from customer lists leaked from offshore financial institutions matched to administrative wealth tax records (in Scandinavia and Colombia) shows that offshore tax evasion is highly concentrated among the rich. Alstadsæter, Johannesen, and Zucman (2019) show that, in Norway, about 75% of wealth hidden offshore is owned by the top 0.1%. This implies high rates of tax evasion at the top: the wealthiest 0.01% of households evade about 25 percent of their taxes through offshore tax evasion. Londoño-Vélez and Avila (2019) shows a rise in the use of offshore entities following the reintroduction of wealth taxation in Colombia. The use of offshore accounts is also extremely concentrated in Colombia. Interestingly, the Panama papers leak generated a 800% surge in the use of voluntary disclosure Amnesty scheme. All in all, 40% of individuals in the top 0.01% used the Amnesty scheme implying that offshore tax evasion is very high but also very responsive to policy enforcement in Colombia.

Extrapolating these findings to the US would imply that, of the 2% of total US household wealth hidden in tax havens, about 1.5 points are owned by the top 0.1%, which would increase their wealth share from 20% to 21.1% ($=21.5/1.02$). This implies that all our previous tax base estimates already factor in this baseline offshore evasion of about 7.5% for the top .1% ($=1.5/20$).

Wealth concealment is a serious enforcement concern. However, just like legal avoidance, illegal evasion depends on policies and can be reduced through proper enforcement. Key to reducing evasion are (i) the collection of comprehensive data, (ii) sanctions for the suppliers of tax evasion services (the countries and financial intermediaries that facilitate it), and (iii) proper resources for auditing. In terms of data collection, the United States has taken an ambitious path forward with the 2010 Foreign Account Tax Compliance Act (FATCA) that requires all foreign financial institutions to identify and report their U.S. customers to the IRS. Future research will analyze whether FATCA has had a significant impact on compliance.

Expatriation. Another way to avoid taxes is to expatriate. There is some evidence that residential decisions of the wealthy are sensitive to taxes on wealth. Moretti and Wilson (2019)

show that the Forbes 400 residential decisions are sensitive to state level inheritance taxes (using as identification the repeal in 2004 of the federal estate tax credit for state inheritance taxes that made state level taxes relevant after 2004). Martinez (2017) shows, in the Swiss context, that a sharp decrease in the income tax progressivity in the canton of Obwalden in 2006 did increase the share of rich taxpayers in the canton by 20-30% relative to neighboring countries. There is a recent body of work showing that the residential decisions of high earners—football players in the EU, innovators, or highly skilled workers—are sensitive to taxes (see Kleven et al. 2019 for a recent survey). In all cases where large responses are found, however, three conditions are met: (1) mobility is easy (such as across Swiss cantons or US states), (2) mobility is allowed (EU football players did not move much in response to tax differentials before teams were freely allowed to hire foreign players, Kleven et al. 2013), and (3) mobility reduces taxes. These conditions may be affected by policy, especially the last one.

In particular, avoiding taxes through residential mobility is particularly difficult for U.S. citizens because it requires renouncing U.S. citizenship, since U.S. citizens living abroad are liable for U.S. taxes (with credits for foreign taxes paid). The United States also currently has an exit tax to deter expatriation by individuals with over \$2 million in net worth. Individuals renouncing their citizenship are required to pay income tax on all their unrealized capital gains. Building on the existing exit tax, Sen. Warren’s proposal would introduce an exit tax of 40% of net worth, which would greatly reduce incentives to expatriate for tax reasons. Therefore, the threat of expatriation is primarily a policy variable.

4.2 Why Have Wealth Taxes Been Abandoned in a Number of European Countries?

As pointed out in the recent study of progressive wealth taxation by the OECD (2018), 12 OECD countries (all of them in Europe) had progressive wealth taxes in 1990, but only 4 still had wealth taxes in 2017 (Switzerland, Spain, France, and Norway). As of 2019, four OECD countries levy a progressive wealth tax on individuals.⁵⁰ The decline of wealth taxation abroad is one of the main arguments from skeptics in the US debate (see e.g., Summers and Sarin, 2019a, b). It is important to understand why wealth taxes have been repealed in a number of European countries.

⁵⁰France has eliminated its progressive wealth tax (and replaced it by a real estate property tax) and Belgium has introduced a modest wealth tax.

Mobility. In the European public debate, the concern that the rich or their wealth will flee abroad is the most frequently used argument by opponents. For example, French President Macron transformed the French wealth tax into a real estate property tax in 2018, arguing that real estate cannot move abroad while people or financial wealth can. The rich can evade the wealth tax by putting their wealth in offshore tax havens (e.g., Switzerland), which do not share information with foreign tax authorities. This is evasion, since wealth taxes are based on the global wealth of residents regardless of the location of the assets or the financial institutions managing the assets. The rich can also avoid the wealth tax by moving their residence to foreign countries, as wealth taxes are generally based on residence. These two issues are potentially serious in the European context. There is clear tax competition across EU countries, which try to attract high earners or high wealth residents from other countries with special tax breaks. Most of these tax breaks are focused on high earners (see OECD 2011 for a description of such tax breaks) but some are focused on high wealth individuals. For example, Switzerland works out customized deals with wealthy individuals. Portugal and Italy provide income tax breaks for retirees (which is most valuable for high pension retirees).⁵¹

In the public debate, mobility of the wealthy vs. mobility of their bank accounts vs. mobility of the capital they ultimately own is often confused. Because progressive wealth taxes are based on the worldwide wealth of individual residents, wealth taxes do not generate incentives to move capital abroad. Hiding wealth abroad does reduce taxes but this is tax evasion and in general the underlying assets (stocks and bonds) can be the same whether the wealth is held through offshore vs. domestic bank accounts.

However, the central point is that this “European context” is not a law of nature but results from policy choices (or non-choices). Other choices could lead to radically different outcomes in terms of tax evasion and tax competition.

First, EU efforts at curbing offshore tax evasion have been weak. As shown for example by Johannesen and Zucman (2014), half-hearted tax enforcement efforts can be easily circumvented and end up having minimal effects on tax evasion. In contrast, the US took a bold step toward enforcement in 2010 with FACTA, which imposes steep penalties on foreign financial institutions that fail to report accounts of US residents to the US tax authorities (see Zucman, 2015 for a detailed discussion). It is possible to curb offshore tax evasion because such evasion is done through large and sophisticated financial institutions that keep records and know the ultimate owners of the accounts (even if such accounts are held through offshore shell corporations to

⁵¹Since 2009, Portugal exempts foreign pensions from taxation. Starting in 2019 in Italy, new immigrants who receive foreign pensions benefit from a special low tax rate of 7% only for their first 6 years of residence in Italy.

make it more difficult for tax authorities to link the accounts to owners). As the recent leaks from HSBC, UBS, and the Panama Papers have shown, such financial institutions maintain the names of their clients. Such data can easily be linked to tax data (indeed this is what the recent research studies by Alstadsæter, Johannesen, and Zucman, 2019 and Londoño-Vélez and Avila 2019 have done). The multiplicity of leaks also shows that clients are at risk of seeing their accounts disclosed.

FATCA follows the route of policing directly foreign financial institutions but with the difficulty that the US tax authorities have less power to audit effectively foreign financial institutions than home financial institutions. Another route is to get foreign governments to share the information they can collect from their financial institutions. The second route is best in the long-run but likely more difficult to establish, as it requires international cooperation.⁵²

Second, the degree to which residential decisions of the wealthy are affected by taxation is also heavily dependent on policy. The EU is organized to foster such tax competition. Individual income and wealth taxation depends solely on current residence. Hence, when France had a progressive wealth tax before 2018, moving from Paris to London would immediately extinguish progressive wealth tax liability (except for domestic real estate assets). Contrast this with US policy: US citizens remain liable for US income taxes for life and regardless of residence (but with full credit for foreign income taxes paid). The only way to escape the US income tax is to renounce US citizenship and even then, the US imposes a substantial exit tax. The exit tax, formally known as the expatriation tax, is essentially a tax on all unrealized capital gains upon expatriation. It applies to high income (incomes over \$160,000) and/or high wealth (wealth above \$2 million) expatriates. It applies to citizens who renounce citizenship and also to long-term residents who end their US resident tax status.⁵³ While the EU and the US are the two polar opposites along this tax competition dimension, midway solutions are possible and probably preferable.⁵⁴ For example, movers could remain tax liable in their country of origin (but with full foreign tax credit) for a certain number of years (for example 5 years). This would essentially negate the effects of special, often temporary schemes set up to attract high income foreigners.

While countries in the EU generally have bigger governments, more social spending, and

⁵²At the level of the EU, it is almost impossible to make progress on this front as any change requires unanimous agreements of all EU countries, some of which are net beneficiaries of lax enforcement.

⁵³See <https://www.irs.gov/individuals/international-taxpayers/expatriation-tax> for a description of the expatriate tax regulations. The Sanders and Warren wealth tax plans further strengthen the exit tax with a 40% wealth tax on expatriates' assets.

⁵⁴The US system imposes a lifetime tax filing burden to US citizens who have lived abroad sometimes for decades and who might not be very rich.

more regulations than the U.S., the EU super-structure actually promotes policies constraining subcentral governments more than in the U.S. This is true for tax competition, but also for government deficits and monetary policy.

Fairness. Opposition to the wealth tax also arises from a feeling of unfairness: “the wealth tax aggravates millionaires without bothering billionaires.”⁵⁵ Aggravated millionaires are taxpayers wealthy in illiquid assets (or at least wealthy enough to be above the exemption threshold) but poor in cash. As a result, such taxpayers feel the wealth tax as a heavy and unjust burden. In France, for example, some retired farmers on Ile de Ré living on a small pension but owning very valuable land, due to the real estate boom for secondary residences, became liable to the wealth tax. In Denmark, there were complaints that historical castles’ owners were liable to the wealth tax but had no income to pay the tax. The United States does not have a progressive wealth tax but has a long experience with real estate property taxes. The property tax also generates strong opposition when rapid tax appreciation leads to increasing property tax bills hitting people on fixed incomes (such as retirees or widows) hard.⁵⁶ A classical complaint against the US estate tax is that it can force the sale of family businesses or farms that have high market value but little in liquid assets.

Obviously, to an economist, such complaints do not make sense, since wealth is by definition marketable, and credit markets are supposed to function well when there are collateral assets. But humans often do not behave as the standard perfectly rational economic model predicts: people may not want to sell family estates or businesses, or even borrow against them. Such “behavioral effects” have consequences and need to be taken into account for policy making.

Indeed, in practice, stories of “aggravated millionaires” can fuel successful lobbying against wealth taxation. This leads to three types of reforms of the wealth tax that undermine the integrity of the wealth tax.

Limitations based on fiscal income. First, a number of countries have introduced tax limitations whereby the sum of the wealth tax and the income tax cannot exceed a certain percentage of total fiscal income. As we discussed above, this precisely defeats the main purpose of the wealth tax, as the ultra rich can find ways to report very low fiscal income relative to their true wealth or true income. As a result, this type of tax limitation ends up exempting billionaires.

⁵⁵This statement was made by Dominique Strauss-Kahn in 1997 when he was Minister for Economics, Finance and Industry in the French center-left government of Lionel Jospin: “l’impôt sur la fortune embête les millionnaires sans gêner les milliardaires”.

⁵⁶Wong (2019) shows that indeed property tax increases following re-appraisals increase financial hardship measures such as delinquencies on mortgages.

Base erosion. Second, special treatment is introduced for assets more likely to be illiquid such as real estate assets and business assets. For example, the French and Spanish wealth taxes exempted business assets when the owner is substantially involved in the business. As mentioned above, when Spain exempted business assets from its wealth tax in 1994, top wealth holders were able to increase sharply the fraction of wealth held in the form of business assets, creating both efficiency costs and reducing the tax progressivity (Alvaredo and Saez, 2009). In France, the very richest taxpayers were typically able to incorporate and deduct such assets from wealth taxation. In the case of wealth taxation, exempting some asset classes is particularly damaging as marketable wealth can by definition be traded and hence converted into tax exempt wealth.⁵⁷

Non-market values. Third, a number of countries have also used non-market values for some asset classes such as real estate. As discussed in Piketty (2014, Chapter 15), the early progressive wealth taxes in Prussia and Sweden used assessed values for real estate linked to the land/real estate registries (“cadastral values”) and typically not updated with market prices. However, with rapid inflation, such assessed values can quickly lag behind market prices. Spain today, for example, uses low assessed values for wealth tax purposes. While this can provide relief to some of the aggravated millionaires, in the long-run, this undermines the horizontal equity of the wealth tax. Indeed, the German wealth tax was repealed in 1997 following a ruling by the Constitutional Court that demanded equal taxation of all property. As US states know, there is a tension between using market prices for real estate property taxes vs. introducing property tax assessment limits. The use of market prices in a context of fast price increases led to the famous tax revolt Proposition 13 in California in 1978 that froze real estate assessment for property taxation to purchasing prices (with only a 2% annual adjustment). Four decades later, the property tax in California has huge horizontal inequities: long-term residents can pay one-tenth of what a new resident pays for identical homes. A number of US states have also passed some forms of property tax assessments limits, often following ballot initiatives.

The cleanest solution to liquidity issues is to increase the exemption thresholds so that mere millionaires are not liable. This route was followed for the US estate tax. The exemption was increased from \$1 million to \$5 million by the Bush administration. The main argument was that the “death tax” was also killing family businesses or family farms. With the higher exemption threshold, the estate tax is harder to kill, as this argument is much harder to make. For example, the recent tax reform of the Trump administration, TCJA, did not eliminate the

⁵⁷While there can also be income shifting for income tax purposes when some income forms are treated preferentially, such shifting is likely to be more limited than for wealth. Most wage earners, for example, would not be able to transform their income into corporate profits, dividends, or capital gains.

estate tax even though this was an initial goal of the reform. Instead, the reform doubled the exemption level to \$11.2 million (in 2018). The recent wealth tax proposal by Elizabeth Warren also has a very high exemption level of \$50 million—50 times higher than typical European progressive wealth taxes. As a result, the policy debate on the proposal has not emphasized the issue of illiquid wealth and lack of cash.⁵⁸

What lesson do we draw from the decline of progressive wealth taxes in Europe? First, history shows that wealth taxes are fragile. They can be undermined by tax limits, base erosion, and weak enforcement. When wealth taxes were repealed in Europe, it was primarily because policymakers took the view that tax competition and offshore tax evasion were a given, making a wealth tax too hard to enforce. This somewhat nihilistic view is, however, incorrect: tolerating tax competition and tax evasion is a policy choice. Developing policies to curb evasion and tax competition was hard for a single country, in a context where until recently little was done to tame tax competition and offshore evasion at the EU level; but the US context today is different. European wealth taxes were also undermined because of a poor policy response to complaints by merely rich taxpayers. Instead of increasing the exemption threshold, the responses eroded the base and created tax limitations that benefited billionaires the most. Drawing lessons from this experience, a US wealth tax could avoid this pitfall.⁵⁹

4.3 Enforcing a US Wealth Tax

The key to successful modern income taxation is information reporting by third parties such as employers and financial institutions (Kleven et al. 2011). This reporting allows the tax administration to get direct information on most income sources so that self-reporting is reduced to a minimum. The same principle should be followed for the wealth tax. Taxpayers and the IRS would receive information returns from financial institutions showing the value of their assets at the end of the year. For administrative success, it is essential that such third-party reporting cover the widest possible set of assets and debts (just as the income tax is most successfully

⁵⁸Another possibility that seems most natural to economists is to provide credit (if markets fail to provide such credit) to “aggravated millionaires.” One simple way to do so would be to allow taxpayers to borrow from the government to pay the wealth tax and repay the loan when the illiquid assets are sold or transferred. For example, the US estate tax allows for spreading payments over 15 years at low interest for illiquid estates. Some state property taxes also allow tax deferral in special cases (such as elderly or disabled homeowners in Texas). In practice, such tax deferrals are rarely used. Aggravated millionaires or homeowners dislike borrowing to pay taxes whether it is borrowing on the private market or from the government (Wong, 2019). Therefore, it is probably economists’ fantasy to believe that creating credit markets will resolve the issue.

⁵⁹If the tax exemption threshold were lowered considerably, complaints from the merely rich would easily arise. In this case, one potential solution would be to provide credits for local property taxes paid which would effectively protect real estate assets, the most common form of illiquid assets among the merely rich, from the federal wealth tax.

enforced on the types of income with third-party reporting). A wealth tax also requires policies regarding information reporting, the valuation of assets, the treatment of trusts, among other design considerations. We discuss these below.

Information reporting. The most important extension of the current information reporting system would be to require financial institutions to report year-end wealth balances to the IRS. In some cases, this could be combined with existing information reporting for capital income payments, while in others it would require new forms. For many types of assets, this information is already stored by third parties (typically financial institutions), so reporting it to the IRS would be straightforward. Information reporting requirements could be readily applied to many types of assets and liabilities including checking and savings accounts and publicly listed stocks, bonds, and mutual funds.

- Interest-bearing assets (deposits, saving accounts, bonds, etc.): Information returns 1099-INT already provide information on all interest income. They could also report the outstanding balance. This requirement could be extended to non-interest paying accounts such as zero-interest bank deposits.
- Publicly listed stock: Forms 1099-DIV for dividend income would report the market value of the corresponding stock holdings (and this requirement could be extended to non-dividend paying stock).
- Assets indirectly held through mutual funds: Mutual funds already provide information returns on income earned through mutual funds. It would be easy to add a balance reporting requirement on all mutual funds held by U.S. residents.
- Defined contribution pension assets: The current reporting requirement of IRA balances (form 5498) could be extended to all defined contribution plans such as 401(k)s.⁶⁰
- Defined benefits pension assets: Pension distribution forms 1099-R could report whether the distribution is an annuity (so as to be able to compute the value of defined benefits pensions for current pensioners).
- Vehicles: States already systematically register vehicles (including luxury vehicles such as boats and planes). Such databases could be used to generate assessed values (based on initial value and standard depreciation schedules).

⁶⁰Form 5498 in particular already requires valuations of closely held business assets in IRAs.

- Mortgage balances: Mortgage interest payments are already reported on form 1098. Mortgage debt balances have been reported on forms 1098 since tax year 2017.
- Other debt balances: Student loan balances could be reported on forms 1098-E (following the model for mortgages). Consumer credit debt is already reported to the credit bureaus and the IRS could require the credit bureaus to provide information returns on outstanding balances.
- Closely held business ownership: The ownership of closely held businesses organized as partnerships and S-corporations is already reported through K1 forms that report the business income for each partner or shareholder.⁶¹ This ownership reporting requirement should be extended to closely held businesses that are C-corporations. The information is already stored in depositories (deposit trust corporation) and could be shared with the IRS.

4.4 Valuation

The general principle guiding valuations should be that all assets should be assessed at their prevailing market value. In the majority of cases, market values are easy to observe by the IRS with proper information reporting. Here we discuss the cases that raise challenges. Two general points should be kept in mind. First, value arises from the expected income stream and expected sale value in the future. The current and past income stream can be observed. Second, values are often eventually revealed by the market when a sale takes place. If the revealed value is significantly different from values used for wealth tax purposes, it is always feasible to apply a retrospective wealth tax correction at the time of sale.⁶²

Valuing closely-held businesses. As discussed above, it is likely that the share of private businesses among top .1% wealth holders is fairly large—probably around one third—and hence the valuation of closely-held businesses is very important. It is useful to distinguish between large vs. small closely-held businesses.

Large private businesses. For large private businesses, it is possible to draw on the financial system to put market values on many of these assets. Large private businesses (such as Uber or

⁶¹The recent work of Cooper et al. (2016) shows that the reporting system for partnerships is not perfect and ought to be improved as they were not able to allocate about 15% of income to any final individuals (most likely because of the use of offshore partnerships for tax avoidance).

⁶²Various cantons in Switzerland use such retrospective corrections, which are called “supplementary net wealth taxes” (Lehner 2000, p. 670).

Lyft before their IPOs) are typically valued on secondary markets and their stock transactions are centrally registered. Making such transactions reportable to the IRS would allow the tax administration to value such stock systematically. More broadly, the financial industry regularly values private businesses (in the context of venture capital funding, mergers and acquisition, or share issuance). These valuations could be made reportable to the IRS for the purpose of administering a wealth tax and could be used to value assets retrospectively.⁶³ More ambitiously, in case of disagreement about valuation for large private businesses between the IRS and the owners, owners should pay in stock, and the government can then create the missing valuation market when selling back the stock. A defining feature of modern capitalism is precisely the ability to divide business ownership with dispersed shareholding. Creating a valuation market is the best solution, since any asymmetry in treatment between comparable publicly traded corporations vs. private corporations would create incentives to game the system and, in particular, to remain private if private equity gets preferential treatment.⁶⁴

Small private businesses. For smaller businesses for which no information exists within the financial industry, there already exists a section of the Internal Revenue Code (409A) that values private businesses for the purpose of taxing stock options or valuing IRAs.⁶⁵ These valuations can be perfected based on best international practices. Switzerland is the best example of a country that has successfully taxed equity in private businesses by using simple formulas based on the book value of business assets and multiples of average profits in recent years. The IRS already collects data about the assets and profits of private businesses for business and corporate income tax purposes, so it would be straightforward to apply similar formulas in the United States. Smith et al. (2019) are a recent example of how to use administrative data to systematically create valuations for S-corporations using formulas based on profits, book value, and sales.

This means that, when the business is owned by a very wealthy individual above the exemption threshold, the business faces a higher tax through the wealth tax that takes the form of a profits surtax, a property surtax, and a sales surtax. The important point is that no costly valuation would be required each year, as the calculation would be entirely formula based. Also note that few small businesses are owned by the 75,000 families with net worth above \$50 million,

⁶³Of course, taxpayers have an incentive to under-value their business for tax purposes. This is why the IRS should use systematically existing valuations for business purposes.

⁶⁴Allais (1977) and Posner and Weyl (2018) have a more radical proposal where the government can buy any asset at its reported value (plus some premium), which sharply reduces incentives to under-report but would likely generate backlash (as many people do not want to be bought out even at prices above market).

⁶⁵The IRS issued Ruling 59-60 (in 1959) as guidance on how to credibly value a closely held business. This ruling has in turn influenced private valuations.

meaning that such surtaxes would apply only to a small fraction of small businesses.⁶⁶

A number of intangible assets (such as property rights on patents and trademarks, royalty rights for books) are owned directly by individuals. In this case, the simplest would be to consider such ownership as a business (producing income) and value it using the standard formula. Some closely held businesses, especially large ones, own financial assets. For example, the largest private businesses such as Bloomberg LP or Koch industries own large chunks of publicly traded stock. In this case, it seems desirable to value financial assets separately at the value of the underlying securities. This effectively shuts down the ability of mask the value of underlying assets by using intermediate shell corporations (see below).

Wealth held through intermediaries. Some assets are held through intermediaries such as trusts, holding companies, partnerships, etc. Current estate tax enforcement allows taxpayers to claim valuation discounts for assets repackaged into such intermediaries. But this opens the door to widespread avoidance.⁶⁷ The model to follow is the income tax model where dividends, realized capital gains, and interest paid by stocks and bonds flow through intermediaries (trusts, partnerships, mutual funds, etc.) to the individual income tax return of the ultimate beneficiary. Third-party reporting of balances like the third-party reporting of income would enable the same procedure for the wealth tax. Trust income distributed to beneficiaries is considered income for beneficiaries and taxed as such. Trust income that is retained within the trust is taxed directly at the trust level with very narrow brackets so that the top tax rate is quickly reached.⁶⁸ The rationale is to avoid progressive tax avoidance through splitting one's wealth into many smaller trusts (see below).

Wealth control vs. benefits. In contrast to income, there can be a separation between who controls wealth and who benefits from wealth. For example, private foundations are often controlled by their wealthy funders (the Bill and Melinda Gates Foundation is the most prominent recent example), but the funds can only be used for charitable causes.⁶⁹ Foundations often survive their funder and operate as independent entities. A trust allows for separating (a) control, (b) who receives the income stream, and (c) who might be the ultimate recipient of the

⁶⁶Based on our estimates (Piketty, Saez, Zucman 2018), families with wealth above \$50 million receive only 1.7% of total schedule C (sole proprietorship) income. They receive 19% and 25% of partnership and S-corporation income, respectively.

⁶⁷Repetti (2000), p. 613 notes "These devices currently result in valuation of interests in the partnership that are approximately 30% to 40% less than the value of the partnership's underlying assets."

⁶⁸In 2018, trust income above \$12,500 is taxed at the top tax rate of 37%.

⁶⁹On a smaller scale, donor advised funds function in the same way.

fund (when the grantor dies, for example). How should such trusts and foundations be treated for wealth tax purposes?

To prevent tax avoidance, there need to be clear rules that allocate such wealth to the individuals who control or benefit from it. For example, the Sanders plan assigns trust wealth to the original funder. Assigning wealth in priority to the wealthiest person involved (such as the funder if she retains control over the use of funds) and with lowest priority to non-taxable entities (such as a charitable organization, which may use the funds or will eventually be able to use the funds) is the best way to curb tax avoidance. In all cases and to avoid liquidity issues, the wealth tax liability created by the trust should be paid nominally out of the trust fund itself.

More broadly, a progressive wealth tax (like a progressive income tax) raises the issues of using straws—individuals who legally own the wealth but who do not control or benefit from it in practice. This issue looms larger in developing countries where property rights are not as clearly established as in advanced economies.

Valuing real estate. Local governments maintain registers of real estate property for the administration of local property taxes. Such property taxes are based on assessed value. In most states, assessed values closely follow market value. Commercial websites such as Zillow have also developed systematic methods to estimate real estate values. Therefore, the technology to systematically obtain reliable real estate values exists, and these values could be reported to the IRS. This would also help improve local governments assessments for property tax purposes, which are often highly imperfect and hence discriminatory (Avenancio and Howard, 2019).

Work of art and other valuables. Valuables such as works of art are often mentioned as hard-to-value assets. In reality, they are quantitatively small, and they are most often insured, which generates a valuation. There are also systematic catalogs of the most valuable art and other collectibles.

Valuing defined benefit pension assets. In the case of defined benefit pensions not yet in payment, the value of assets could be apportioned in proportion to the accrued benefits of each worker using simple formulas based on current salary, tenure, and age. The key requirement is that the total current value of each defined benefit fund should be distributed across beneficiaries.⁷⁰

⁷⁰Most pension wealth is owned on a pre-tax basis, which means that pension contributions were exempt from income taxation, but pension benefits are taxed at withdrawal. As a result, the government has a claim

5 Economic Effects

All economists agree that, to the extent that it would not be entirely avoided, a progressive wealth tax would have real economic effects.

5.1 Optimal Tax Theory

A significant body of work has analyzed the problem of optimal capital taxation. In a basic model with homogeneous return r on all assets, a capital tax at rate τ_K is equivalent to a wealth tax at rate $\tau_W = r\tau_K$ as both result in the same net of tax return $\bar{r} = r(1 - \tau_K) = r - \tau_W$.

Zero capital tax results. Two famous zero capital tax results have been highly influential.

In the Atkinson and Stiglitz (1976) life-cycle model where people earn and save when young and consume their savings when old, the optimal capital tax is zero because there is no heterogeneity in wealth, conditional on labor income: any combination of labor and capital taxes can be replaced by a more efficient tax on labor income only that leaves everybody better off (Kaplow 2006, Laroque 2005). In the real world however, there is enormous heterogeneity in wealth, conditional on labor income history. Such heterogeneity arises because of inheritances, heterogeneous rates of returns, and preferences for wealth accumulation. In this case, taxing capital becomes desirable (Piketty and Saez 2013, Saez and Stantcheva 2018).

In the Chamley (1985) and Judd (1987) model, the optimal capital tax is zero in steady state because long-run capital supply is infinitely elastic. As is well known, taxing infinitely elastic bases is not desirable. However, the infinite elasticity assumption is not backed-up by empirical evidence. Introducing finite elasticities in the Chamley-Judd model leads to positive taxes on capital income that follow classical inverse elasticity rules (Saez and Stantcheva 2018).

In basic models, taxing consumption is equivalent to taxing labor income and initial wealth, but exempting capital income. Therefore, the zero capital tax recommendation is often expressed as “we should only tax consumption.” Concrete policy proposals have been made in this direction (see, e.g, the flat tax proposal by Hall and Rabushka 1985 and more recently by Viard and Carroll 2012). On normative grounds, there is a long standing philosophical debate (at least since Hobbes) over whether it is better to tax consumption or income. Empirically, savings are concentrated at the top of the distribution (see, e.g., Saez and Zucman 2016). There-

on such pension wealth (in contrast to wealth owned outright or post-tax pensions such as Roth IRAs). Some downward adjustment to pre-tax pension wealth could be made to restore balance. Pension assets are small at the top (Saez and Zucman 2016), but this issue could become significant in the case of a wealth tax with a lower exemption threshold.

fore, taxing consumption allows the income-rich to defer taxation (relative to an income tax). For example, Jeff Bezos' recently accumulated fortune may not be consumed before decades or even longer if wealth is bequeathed across generations. Is it fair that Bezos pays low taxes if his personal consumption is low? For the ultra wealthy, personal consumption is likely to be modest relative to economic power and hence seems almost beside the point when thinking about their proper tax burden. The progressive wealth tax goes after accumulated wealth before consumption takes place or even sometimes before income happens (for example when a start-up is created and expected to be lucrative in the future).

Wealth in the utility function. Carroll (2000) notes that it is a challenge to explain wealth accumulation at the very top with standard preferences that depend only on consumption. Saez and Stantcheva (2018) show that wealth in the utility function can be micro-founded in several ways. It can arise from bequests motives, from a utility flow of running a business, or from direct service flow from wealth (such as housing services or liquidity value). Adding wealth in the utility function changes dramatically the analysis of optimal capital taxation as shown by Saez and Stantcheva (2018). In this case, the response of wealth accumulation with respect to the net of rate of return is finite, and a capital tax is desirable if society puts low social marginal welfare weights on wealth holders, and follows the standard inverse elasticity optimal tax rules.

Heterogeneous returns. Guvenen et al. (2019) consider a model with heterogeneous returns on wealth where wealth taxation differs from capital taxation. A wealth tax bears more heavily on low return assets (such as low yield bonds or unused land) than a capital income tax. Under capital income taxation, entrepreneurs who are more productive, and therefore generate more income, pay higher taxes. Under wealth taxation, entrepreneurs who have similar wealth levels pay similar taxes regardless of their productivity, which expands the tax base, shifts the tax burden toward unproductive entrepreneurs, and raises the savings rate of productive ones. In a calibrated model, they show that replacing the capital income tax with a wealth tax in a revenue-neutral fashion increases aggregate productivity and output (7.5% in consumption-equivalent terms). They conclude that wealth taxation has the potential to raise productivity while simultaneously reducing consumption inequality.⁷¹

⁷¹This idea of the greater efficiency of wealth taxation had been made informally for a long time, at least since the 1940s by Maurice Allais (see Allais, 1977) and more recently in the book by Posner and Weyl (2018).

5.2 Effects on Wealth Inequality

A well-enforced wealth tax would reduce wealth concentration. That seems to be a consensus view among economists: in the IGM poll on wealth taxes, 73% of economists agreed and only 12% disagreed with such a statement (results weighted by self-reported expertise).⁷²

The reason is simple: if the rich have to pay a percentage of their wealth in taxes each year, it makes it harder for them to maintain or grow their wealth. Changes in consumption vs. saving can exacerbate this effect. With a wealth tax, wealthy taxpayers may decide to spend more today and save less (this is the substitution effect: consuming now rather than later becomes relatively cheaper). Changes in consumption vs. saving could conversely dampen this effect if the wealthy decide to spend less to preserve their wealth (this is the wealth effect, as the wealth tax reduces economic resources of the taxpayer). In any case, the wealth of people subject to the tax is expected to rise slower after the introduction of the wealth tax than before. There is relatively little empirical work evaluating whether a progressive wealth tax can reduce wealth concentration. One recent exception is Jakobsen et al. (2019), who exploit compelling identification variation with the Danish wealth tax and find that the long-run elasticity of wealth with respect to the net-of-tax return is sizable at the top of distribution.

5.3 Effects on the Capital Stock

A potential concern with wealth taxation is that by reducing large wealth holdings, it may reduce the capital stock in the economy—thus lowering the productivity of U.S. workers and their wages. This conclusion certainly arises from the standard economic model where savings decisions are driven by rational inter-temporal maximization and are therefore very sensitive to the after rate of return on capital as in the Chamley-Judd model discussed above. However, these effects are likely to be dampened in the case of a progressive wealth tax for several reasons.

First, the United States is an open economy and a significant fraction of U.S. saving is invested abroad, while a large fraction of U.S. domestic investment is financed by foreign saving. Therefore, a reduction in U.S. savings does not necessarily translate into a large reduction in the capital stock used in the United States. In the extreme case of a small open economy model, a reduction in domestic saving has no effect on domestic investment (as it's fully offset by an increase in foreign investment).

Second, calibrated models that add heterogeneity, risk, and finite life can shrink the response of capital to capital taxation (see e.g., Conesa, Kitao, Krueger 2009). Therefore, in the end, the

⁷²See <http://www.igmchicago.org/surveys/wealth-taxes>.

response of the capital stock to wealth taxation has to be an empirical question.

Last, even if the empirical response is large, increased savings from the rest of the population or the government sector could possibly offset any reduction in the capital stock. This argument does not make sense in a fully rational model where each actor saves optimally but there are strong reasons to believe that society plays a big role in savings decisions that standard models do not capture.

A large body of recent academic work in behavioral economics has shown that institutions and non-tax policies can have major effects on middle-class saving. Middle-class wealth consists primarily of pensions, housing (net of mortgage debt), consumer credit debt, and student loans. Each of these components have historically been directly affected by government regulations. Government-sponsored 30-year mortgages increased home ownership rates and provided an effective tool to save over a lifetime. Regulations encouraged employer-provided pensions in the post-World War II period. Student loans are affected by public funding for higher education. Changes in government regulations since the 1980s have contributed to the decline in middle-class saving. The rise in middle-class debt took place in a context of financial deregulation and decline in the public funding of higher education. The surge in mortgage refinancing before the Great Recession was associated with equity extraction (refinancing into a larger mortgage) and amortization extensions (starting a new 30-year mortgage), both of which reduce saving.

The recent behavioral economics literature has shown compellingly that behavioral nudges such as changing default choices for pension savings, or commitment choices, are much more effective ways to encourage retirement savings than traditional tax incentives exempting returns on pension funds from taxation. Madrian and Shea (2001) showed extremely large and persistent effects of default choices on 401(k) pension contributions for new hires. Chetty et al. (2014) showed that defaults in Denmark not only change retirement savings but also affect overall savings, as individuals do not adjust their non-retirement savings; in contrast, the traditional policy of exempting returns from taxation has minimal effects on overall savings, as (sophisticated) individuals just shift non-retirement savings into retirement savings.

In the standard economic model, where people maximize intertemporal utility, most of the institutional forces affecting saving would be offset by individual decisions (barring corner solutions). In modern societies, however, government is always heavily involved in the key consumption smoothing decisions: education for the young, retirement benefits for the old and disabled, health benefits for the sick, and insurance for the unemployed. It looks like societies know better than individuals how to smooth consumption. Economists mistakenly assume that individuals should know equally well how to smooth consumption.

5.4 Effects on Entrepreneurial Innovation

A wealth tax would reduce the financial payoff of extreme business success (we will illustrate this quantitatively in the last section), and hence could potentially discourage innovation. Smith et al. (2019) show that the typical top earner derives most of her income from human capital, not financial capital. The Forbes 400 list also shows that many of top wealth holders built up their fortunes through entrepreneurship (see below).

There are many calibrated models that can capture the effects of wealth taxation on entrepreneurship and wealth accumulation (see e.g., Cagetti and De Nardi 2006, 2009) but unfortunately little direct evidence on whether wealth taxation dampens incentives to start a firm in the first place. The key parameter we would like to estimate is the elasticity of entrepreneurship with respect to the wealth tax rate.

There is however a larger body of work of the effects business income taxation on entrepreneurship (see Rosen, 2005 for a survey). There is clear evidence that credit constraints affect entrepreneurship. For example, inheriting wealth increases the likelihood to become an entrepreneur (Holtz-Eakin, Joulfaian, and Rosen, 1994). But a wealth tax with a high exemption threshold by definition spares the credit constrained.

There is also evidence that innovators move to avoid taxation. Akcigit, Baslandze, and Stantcheva (2016) find that superstar top 1% inventors are significantly affected by top tax rates when deciding in which country to locate. Akcigit et al. (2018) exploit variation in state tax policies and find that higher personal and corporate income taxes negatively affect the quantity and quality of inventive activity and shift its location. Business-stealing from one state to another are important but do not account for all of the effect. Both papers also find that concentrated activity due to agglomeration effects dampens the effects of taxes on location choices. This suggests that a wealth tax in a large country with worldwide taxation based on citizenship like the US is likely to have much smaller effects than a wealth tax in a small jurisdiction with residency based taxation (such as a state or a small European country).

It is harder to evaluate whether high taxes on success (such as a wealth tax) would discourage young innovators to start with. The literature has found conflicting results on the effect of progressive income taxes on risk taking (Gentry and Hubbard 2005 find negative effects while Cullen and Gordon 2007 find the reverse).⁷³ Therefore, more empirical and well identified research is needed to resolve this key question.

To foster innovation, it is key to encourage young—and not yet wealthy—people to become

⁷³Theoretically, taxation makes the government a shareholder in the business venture (and cushion failure with more generous transfers) so that entrepreneurs might be willing to take more risk.

entrepreneurs. Bell et al. (2019) have shown that exposure to innovation during childhood has significant causal effects on children's propensities to become innovators themselves later in life. Building on these results, Bell et al. (2019b) present a stylized model of inventor career choice. The model predicts that financial incentives, such as top income tax reductions, have limited potential to increase aggregate innovation in a standard intertemporal expected utility model. In contrast, increasing exposure to innovation (e.g., through mentorship programs) could have substantial impacts on innovation by drawing individuals who produce high-impact inventions into the innovation pipeline.

Established businesses typically devote a lot of their resources to protect their dominant positions by fighting new competition. A progressive wealth tax hits wealthy owners who have already established their businesses, while it does not immediately affect emerging businesses. Other policies, like antitrust, should also play a major role in leveling the playing field. Large businesses with diluted ownership can also be anti-competitive (even if the rents accrue to a large number of middle-class owners rather than a few super wealthy owners). Antitrust was typically thought of as a market-efficiency policy blind to distributional considerations. In practice, monopoly rents are concentrated at the top of the wealth distribution, and therefore the bad distributional consequences of monopoly power are likely more important than the efficiency consequences. The antitrust movement of the early 20th century was famously fueled by anger at the Robber Barons.

5.5 Charitable Giving

A wealth tax that does not apply to private foundations or public charities could spur an increase in charitable giving among the extremely wealthy. This increase would reflect both an acceleration in the timing of donations that would otherwise have been made later in life and an increase in the overall level of charitable giving. This increase in charitable giving would also reduce wealth concentration.

To prevent abuse, donor advised funds or funds in private foundations controlled by funders should be subject to the wealth tax until the time that such funds have been spent or moved fully out of the control of the donor. For example, assets in the Bill and Melinda Gates' foundation should be counted as part of the wealth of Bill and Melinda Gates' wealth. If the foundation receives funding from others such as Warren Buffett, this wealth would also be part of the Gates' wealth. More generally, how to treat wealth held in foundations not controlled by the original funder (who may have passed away) is a difficult question. To the extent that the foundation is controlled primary by one person or family (as opposed to a board that rotates), such wealth

constitutes concentrated individual power and it makes sense to make such wealth taxable. At the same time, because such wealth is pledged to charitable giving, it could arguably receive preferential treatment. Currently, private foundation wealth is slightly above 1% of total US wealth (1.2% in 2012 from Saez and Zucman, 2016) so this is relatively small relative to the 20% owned by the top .1%.

Charities no longer related to a living founder, such as universities or older foundations, can also accumulate wealth. Indeed, their long-life puts them at an advantage to patiently accumulate and take advantage of the high rate of return on expertly managed assets. This type of accumulation can snowball as explained by Piketty (2014). A wealth tax is potential tool to curb this risk. Allowing charities to pay in-kind in the form of giving some control rights to society is avenue to explore. For example, instead of paying 2% of its wealth in cash, a charity could instead cede 2% of its board seats to representatives of the public.⁷⁴

5.6 Inter-vivos Giving

A progressive wealth tax could also accelerate giving to children. However, gifts trigger gift tax liability and result in a real de-concentration of wealth, thus generating tax revenues while achieving one of the goals of the wealth tax—reducing wealth concentration. In some situations, it is possible that such splitting could be done on paper while not changing how wealth is controlled or used. For example, a business founder could give parts of his wealth to his children while effectively running and controlling the business. The wealth of minor children should be added to the wealth of their parents.⁷⁵ Adult children may waste the wealth away, a significant concern of wealthy parents. Indeed, in the U.S. estate tax context, Poterba (2001) shows that only about 45% of the wealthy take advantage of the opportunity for tax-free inter-vivos giving.

The exemption levels for married vs. single families can also create tax arbitrage (either toward marriage or toward divorce). The Warren tax proposal has the same brackets for singles and married creating a marriage penalty (splitting wealth through divorce reduces taxes). The Sanders wealth tax halves the brackets for singles creating a marriage subsidy (a wealthy single gains by marrying a poorer spouse). It is well known that a tax cannot be (1) progressive, (2) marriage neutral, (3) and be family based. Resolving this impossibility requires to move to individual taxation (instead of family taxation). Absent this, some average of the Warren and Sanders treatment of couples can reduce marriage penalties or subsidies on average and is for

⁷⁴Similar proposals have been made in the corporate context to give workers stakes on the board of their companies.

⁷⁵Children's trust funds that are still controlled by parents should also be taxed with parental wealth.

example how the US individual income tax traditionally operates (singles brackets are less than the married brackets and more than half of the married brackets).⁷⁶

5.7 Other Effects

Effects on Top Talent Migration. Would a wealth tax deter the talented from coming to the United States? This issue looms large in the public debate but there is scant empirical evidence on this issue (we have reviewed evidence above that once they become rich, the wealthy do move to avoid taxes). Many factors affect the migration of top talent. Top universities and research centers are a key factor in attracting and retaining talented foreign students. The number of skilled foreign workers is regulated through immigration and visa policies. The United States is currently restricting top talent migration through its immigration policy. In principle, a change in any of these policies could reverse any adverse effect of steeply progressive wealth taxation on immigration in the United States.

Macroeconomic stabilization. A wealth tax would be pro-cyclical as the stock of wealth is more pro-cyclical than income (see the top panel of Figure 1). Furthermore the most pro-cyclical components of wealth is corporate equity, which are even more concentrated than wealth. Therefore, a wealth tax would add to automatic macro-stabilizers.⁷⁷

6 Optimal Billionaire Taxation

In this section, we would like to consider the specific problem of optimal taxation of billionaires' wealth. It has the advantage of addressing a pressing issue, the surge of large fortunes, for which there are actually data created by Forbes magazine's lists of the wealthy. It is important to keep in mind that the Forbes 400 data are far from perfect, but they are the best we have for billionaires (while waiting for a well-enforced wealth tax). Another advantage is that, when talking about billionaires, it is immediately obvious that issues of consumption smoothing are irrelevant, forcing us to depart from the traditional model of intertemporal utility maximization.

⁷⁶Some countries with wealth taxes (such as France) treat cohabiting partners in a non-marital relationship as a single tax unit for wealth tax purposes to avoid couples splitting wealth through divorce.

⁷⁷Corporate profits and especially realized capital gains are even more pro-cyclical than wealth. This cyclicity raises issues for states that have budget balanced requirements. In this context, a wealth tax construed as a pre-payment on future realized capital gains might be helpful to reduce tax revenue cyclicity.

6.1 Basic Positive Model

Forbes magazine has created a useful panel of the 400 richest Americans since 1982 that tracks their net worth year after year. The data offer a fascinating, almost four-decade-long view of how billionaires arise, how their wealth can grow explosively as they create new corporate behemoths (like Google, Amazon, or Facebook), how it matures as their businesses remain dominant (e.g., Microsoft), and how it is split among heirs (e.g., Walmart or Mars).

Suppose person i has (real) wealth trajectory $W_{i1}, ..W_{it}, ...W_{iT}$ from time $t = 1$ to time $t = T$ absent the wealth tax. Let us denote by $1 + r_{it} = W_{it+1}/W_{it}$ real wealth growth from t to $t + 1$. r_{it} capture the full return of wealth (price effects and income) net of any consumption (or transfers to heirs or charities). For billionaires, it is likely that consumption is small relative to wealth.

Suppose that at time 1, we introduce a wealth tax at average tax rate $\tau > 0$ on individuals with net worth above \$1 billion. We assume that the tax rate applies to total wealth (and not just wealth above \$1 billion), as in the Colombian wealth tax analyzed in Londoño-Vélez and Avila (2019). Let us denote by $W_{i1}^\tau, ..W_{it}^\tau, ...W_{iT}^\tau$ the wealth trajectory of person i under the billionaire wealth tax at rate τ .

Absent tax evasion and avoidance, in the first year of the tax, billionaire i pays τW_{i1} reducing her wealth by a factor $1 - \tau$ so that $W_{i1}^\tau = W_{i1} \cdot (1 - \tau)$. For example, if Bill Gates held 10% of Microsoft in year 1, with a tax of $\tau = 1\%$, he would hold only 9.9% of Microsoft after the tax in year 1.

Let us make the simple assumption that the wealth tax does not affect the return r_{it} on wealth after the tax has been paid in period t and before the tax has to be paid in period $t + 1$. In the case of Bill Gates, this amounts to assuming that the Microsoft stock price evolves in the same way with or without the tax: Bill Gates makes the same executive decisions, and the wealth tax rate is small enough that it does not affect Bill Gates' ability to remain CEO and chair. This also amounts to assuming that Bill Gates scales down by a factor $1 - \tau$ his consumption, giving, and hence savings decisions due to his reduced wealth. For billionaires, consumption decisions are likely small relative to the stock of wealth. Giving could potentially be affected by the tax in a non-proportional form. If giving only happens at the end of life, the proportional assumption holds. It is conceivable that Bill Gates could accelerate giving to avoid the tax. He could also slow down giving if his goal is to keep ownership control of Microsoft longer. Therefore, the proportionality assumption seems like a natural benchmark to start with.

Therefore, if we carry these assumptions up to year t , wealth in year t is going to be $W_{it}^\tau =$

$W_{it} \cdot (1 - \tau)^t$. Hence, t years of taxation at rate τ reduce wealth by a factor $(1 - \tau)^t$. The reduction is exponential with time. If person i is exposed only t' years to the tax over the t year period (because she might not be a billionaire for the full period), then wealth would be $W_{it}^\tau = W_{it} \cdot (1 - \tau)^{t'}$.

It is important to note that the simple multiplicative assumption makes sense for billionaires but would break down for less wealthy individuals. For people of more modest wealth, savings is driven to a much larger extent by labor income rather than returns from wealth. As a result, it is likely that the wealth tax would have less than a proportional impact on savings. For example, a homeowner whose wealth is only her home equity is likely to pay for the property tax out of labor income (and reduced consumption) rather than downsizing her home.

Hence, the elasticity of the individual billionaire with respect to the net-of-tax rate $1 - \tau$ is simply the number of years exposed to the tax. The wealth of a young billionaire, like Zuckerberg, is less elastic than the wealth of a more mature billionaire wealth, like Buffett. For heirs, e.g., members of the Walton family, the elasticity is not only the number of years they have faced the tax but also includes the number of years their parents have been exposed to the wealth tax as well.

In sum, young billionaires' wealth is inelastic and affected less by the wealth tax, as it has not been exposed long to the tax, while old billionaires' and their heirs' wealth is very elastic, as the wealth tax has had more time to erode wealth.

Let us denote by B the set of billionaires in year T and by $W^A(1 - \tau)$ their collective wealth under a tax at rate τ since time 1. Let $T(i)$ be the number of years that billionaire i has been exposed to the wealth tax from year 1 to year T . We have

$$W^A(1 - \tau) = \sum_{i \in B} W_{iT} \cdot (1 - \tau)^{T(i)}.$$

Therefore, the elasticity e_T of the billionaire tax base with respect to the net-of-tax base after T years of taxation is given by:

$$e_T = \frac{1 - \tau}{W^A} \frac{dW^A}{d(1 - \tau)} = \frac{\sum_{i \in B} T(i) \cdot W_{iT} \cdot (1 - \tau)^{T(i)}}{\sum_{i \in B} W_{iT} \cdot (1 - \tau)^{T(i)}}.$$

e_T is simply the average number of years billionaire fortunes have been exposed to the wealth tax (weighting each billionaire by wealth).⁷⁸

⁷⁸This computation is an approximation because it assumes that a marginal change in τ does not affect neither the $T(i)$ nor the set B . We ignore such issues for simplicity of exposition. The rigorous way to obtain this formula would be to consider a continuum with a smooth wealth density and assume that the wealth tax applies to all individuals above a fixed percentile (in this case reshuffling due to a marginal tax change has only second order effects, as people falling below percentile p are replaced by people with approximately the same wealth).

This average length of exposure e_T is less than T and grows with T . Presumably, it converges to some long-run e_∞ . If wealth rankings were frozen, as in the standard dynastic model with no uncertainty, then $e_\infty = \infty$. That is, the progressive wealth tax would eradicate all billionaires in the long-run (a point made by Piketty 2001 and Saez 2012). In contrast, with uncertainty, there would always be new billionaires arising and hence the tax base would not shrink to zero and $e_\infty < \infty$. In other words, a country where billionaires come from old wealth will have a large e_∞ and a hence a very elastic billionaire tax base. Conversely, a country where new billionaires constantly arise and replace older ones will have a low e_∞ and a hence a fairly inelastic billionaire tax base.

With the Forbes 400 data, it is possible to simulate the path of wealth under a billionaire at rate τ starting in year 1982 and trace out the effect on the tax base to compute the elasticity e_T . In the Forbes 400 data, 2018 billionaires have been on the list for 15 years on average, implying that $e_T = 15$ for $T = 36$.

Here, we have considered a single average tax rate τ but it is possible in simulations to consider more complex tax systems with several brackets. More complex tax systems, however, do not lend themselves to simple analytical expressions.

6.2 Revenue Maximizing Tax Rate

What is the wealth tax rate τ that maximizes wealth tax revenue? In our basic setting, this is a very simple question to answer. Wealth tax revenue is given by $R = \tau W^A(1 - \tau)$. A small increase $d\tau$ generates a change in revenue dR given by:

$$dR = W^A d\tau - \tau \frac{dW^A}{d(1 - \tau)} d\tau = \left[1 - \frac{\tau}{1 - \tau} \cdot e_T \right] \cdot W^A d\tau$$

which is the classic expression from tax theory: the mechanical revenue effect is reduced by the behavioral response effect. The revenue-maximizing rate τ^R is such that $dR = 0$, i.e., the mechanical and behavioral response effect cancel out. It is given by $e_T \cdot \tau / (1 - \tau) = 1$, which can be re-arranged into the standard inverse elasticity rule:

$$\text{Revenue-maximizing billionaire wealth tax rate: } \tau^R = \frac{1}{1 + e_T}.$$

In words, the revenue-maximizing wealth tax rate for billionaires is the inverse of one plus the average number of years billionaires have been subject to the tax.

Naturally, with a new tax, the revenue-maximizing wealth tax rate is large. It is actually 100% in the first year of operation of an (unexpected) wealth tax. In the long-run, τ^R converges to $1/(1 + e_\infty)$. If, like in the US, billionaires have been around for about 15 years on average, the

long-run revenue-maximizing (annual) wealth tax would be around 6.25% which is higher than the Warren tax proposal of 3% on billionaires and in the ballpark of the Sander tax proposed with graduated rates from 5% to 8% for billionaires and multi-billionaires. Several points are worth noting.

First, we are computing the rate that maximizes revenue from the wealth tax. To the extent that billionaires pay other taxes (such as corporate or individual income taxes), the wealth tax rate that maximizes *total* tax revenue would be lower.⁷⁹

Second, our theory is predicated on the key assumption that savings is in proportion to wealth among billionaires. If billionaires accelerate giving or increase (enormously) their own consumption, then the elasticity would be higher and τ^R correspondingly lower.

Third, we have assumed that the wealth tax can be perfectly enforced. But it is easy to use our simple model of tax evasion/avoidance laid out in Section 2.3 to extend the analysis to the case with evasion/avoidance.

Empirical illustration. Table 4 lists the name, source of wealth, and wealth in 2018 of the top 15 richest Americans (Forbes magazine estimates). The last three columns show what their wealth would have been if a wealth tax had been in place since 1982. The first column considers the Warren wealth tax that has a 2% marginal tax rate above \$50 million and a 3% marginal tax rate above \$1 billion. The second column considers the Sanders wealth tax that has a 1% marginal tax rate above \$32 million, 2% above \$50m, 3% above \$250m, 4% above \$500m, 5% above \$1 billion, 6% above \$2.5b, 7% above \$5b, 8% above \$10b. The last column considers a radical wealth tax with a 2% tax rate above \$50m and a 10% marginal tax rate above \$1b. The tax thresholds apply in 2018 and are indexed to the average wealth per family economy wide in prior years. The wealth tax has a much larger cumulative effect on inherited and mature wealth than on new wealth. Young billionaires like Bezos or Zuckerberg would still be decabillionaires even with a 10% tax rate above \$1 billion. More mature billionaires like Gates or Buffett would be hit much harder, having faced the tax for over three decades.

With a wealth tax, top wealth would look younger and more actively entrepreneurial. This also means that the stake owned by founders (or their heirs) would shrink faster with a wealth tax, and hence they might lose a control of the business faster. In principle, founders who remain active managers could be hired as CEOs even if they no longer control their company (like Apple's Steve Jobs, who famously lost control as founder but was later re-hired as CEO).⁸⁰

⁷⁹Lower top wealth generates a negative fiscal externality in the public economics jargon (Saez, Slemrod, and Giertz 2012).

⁸⁰Steve Jobs restarted as Apple CEO with no Apple stock. At the end of his life, through CEO compensation,

On the negative side, separation of control and ownership can create agency costs, but U.S. capitalism has historically resolved the issue of control and ownership separation well (which is not the case in many countries, especially developing economies). On the positive side, external CEOs might be more competent than family heirs. Perez-Gonzalez (2006) shows that U.S. firms where incoming CEOs are from the family of the departing CEO, founder, or large shareholder underperform relative to firms that promote unrelated CEOs.⁸¹

What would be the consequences for top wealth concentration? Figure 6 depicts the share of total wealth owned by the top 400 richest Americans since 1982 from Forbes magazine. We adjust for growth in the number of total US families by picking exactly the top 400 in 2018 but correspondingly fewer rich people in earlier years. As is well known, the share of wealth going to this top group, approximately the top 0.00025% richest US families, has increased dramatically from 0.9% in 1982 to 3.3% in 2018. The figure also depicts what their wealth share would have been if various wealth taxes had been in place since 1982. The Warren wealth tax has a 2% marginal tax rate above \$50 million and a 3% marginal tax rate above \$1 billion. The Sanders wealth tax has a 1% marginal tax rate above \$32 million, 2% above \$50m, 3% above \$250m, 4% above \$500m, 5% above \$1 billion, 6% above \$2.5b, 7% above \$5b, 8% above \$10b. The radical wealth tax has a 2% tax rate above \$50m and a 10% marginal tax rate above \$1b (as discussed in Saez and Zucman, 2019). The bracket thresholds apply in 2018 and are indexed to the average wealth per family economy-wide in prior years.

With the Warren wealth tax in place since 1982, their wealth share would have been 2.0% in 2018. With the Sanders wealth tax in place since 1982, their wealth share would have been 1.3% in 2018. With a radical wealth tax, it would have been about 1.0% in 2018, as in the early 1980s. By 2018, the Warren wealth tax would have raised \$49 billion from the richest 400 families, the Sanders wealth tax would have raised \$62 billion, and the radical wealth tax would have raised \$66 billion. This confirmed that, as our theoretical discussion above showed, that the long-run revenue maximizing tax rate is quite high. Even the Sanders wealth tax with its high 8% top tax rate (above \$10 billion) remains slightly below the revenue maximizing rate. The radical wealth tax of 10% (above \$1 billion) is approximately the revenue maximizing tax (it achieves an annual average wealth tax rate of about 7.2% on the Forbes 400).

he had accumulated a stake of about .1% of Apple.

⁸¹Bennedsen et al. (2007) confirm this finding in the Danish context using gender of founders' first child as an instrument for family vs. external CEO succession.

6.3 Normative Discussion

Is the revenue-maximizing rate a good normative criterion for taxing billionaires? For economists who believe in utilitarianism and decreasing returns to consumption, it is natural to assume that the marginal utility of billionaires' wealth is close to zero. As a result, revenue considerations—and consequences on the rest of the economy—should be the only relevant issue from a normative perspective. Another way to arrive at the same conclusion is to note that billionaires are negligible demographically (around 900 Americans or 0.0005% of all US families) relative to the wealth they own (around 4-5% of total US wealth): billionaires are about 10,000 times more important economically than demographically. The suffering from one multibillionaire losing a billion dollars cannot be 10,000 times worse than the suffering of an ordinary American family losing \$100,000. As a result, the revenue consequences of taxing billionaires outweigh the costs on the welfare of billionaires.

There are three main arguments made against higher taxes on the super wealthy. First, such taxes could not be enforced. Second, such taxes would hurt the economy and hence ordinary people. Third, such taxes would undermine respect for property rights and lead to a slippery slope of spoliation: today billionaires, tomorrow millionaires, and then everybody.⁸²

In our model old wealth is more elastic than new wealth because the wealth tax has cumulative exponential effects with time. From a revenue maximizing perspective and applying the classical Ramsey reasoning that elastic tax bases should be taxed less, this would imply that old wealth should be taxed less than new wealth. Normatively, however, this conclusion feels wrong as old wealth is more likely to come from inheritances than be self-made.

The wealth tax accelerates the process of dispersion of stock ownership for very successful businesses that make their owners-founders billionaires. Dispersed stock ownership has been a feature of US capitalism and is a key reason why taxing wealthy business owners is feasible. Importantly and in contrast to labor income, this dispersion does not mean that economic activity disappears. There might not be even any effect on the wealth stock if the government uses the wealth tax proceeds for public investment, debt reduction, or to create a sovereign fund. The wealth disappears only if the government cannot save the money and cannot encourage middle-class saving.

⁸²Piketty (2019) presents a broad history of such property right-sacralizing ideology.

7 Conclusion

What can we conclude from our analysis about the prospects for progressive wealth taxation in the United States?

First, the wealth tax is likely to be the most direct and powerful tool to restore tax progressivity at the very top of the distribution. The greatest injustice of the U.S. tax system today is its regressivity at the very top: billionaires in the top 400 pay less (relative to their true economic incomes) than the middle class. This regressivity is the consequence of the erosion of the corporate and estate taxes, and the fact that the richest can escape the income tax by reporting only half of their true economic incomes on their individual income tax returns. A wealth tax with a high exemption threshold specifically targets the richest and could resolve this injustice.

Second, our analysis shows that the wealth tax has great revenue- and wealth-equalizing potential in the U.S. context. Household wealth has grown very large in aggregate (5 years of national income in 2018) and the rich own a growing fraction of it (20% is owned by the top 0.1% of families). The wealth tax, if the tax rates are high enough, is also a powerful tool to de-concentrate wealth. Wealth among the Forbes 400 has grown about 4.5 percentage points faster annually than average since 1982. A wealth tax of 2 or 3% per year can put a significant dent into this growth rate advantage. With successful enforcement, a wealth tax must either deliver revenue or de-concentrate wealth.⁸³ Set the rates low (1%) and you get revenue in perpetuity but little (or very slow) de-concentration. Set the rates medium (2-3%) and you get revenue for a long time and de-concentration eventually. Set the rates high (significantly above 3%) and you get de-concentration quickly but revenue does not last long. Which is best depends on one's objectives.

Can a wealth tax be successfully enforced? Our review of past and foreign experiences in addition to recent empirical work tells us that enforcement is a policy choice. We certainly have plenty of evidence showing that a poorly designed wealth tax generates a lot of avoidance and little revenue. But we have also learned lessons about how to design a wealth tax well. First, cracking down on offshore tax evasion, as the U.S. has started doing with FATCA, is crucial. Second, taxing expatriates, as the US currently does, is also very important to prevent the mobile wealthy from avoiding the tax. Third, systematic reporting of wealth balances (instead of relying on self-assessments as for the estate tax) is a necessary condition for good enforcement,

⁸³If neither materializes, it means that enforcement is not successful. Or we learn that, in contrast to what all the data sources tell us, U.S. wealth is equally distributed.

as the income tax amply demonstrates. Finally, the issue of valuation of closely held businesses is key for the integrity of the wealth tax. Our view is that the government has to create the currently missing (or highly private) markets for equity of large closely held businesses. It is often the case that accounting rules develop in synergy with the tax system.

As a caveat, it is important to note that progressive wealth taxes are fragile and susceptible to being undermined. The left could undermine its political support by lowering the exemption threshold too much and creating hardship for the illiquid merely rich. The right could then undermine its effectiveness by providing exemptions (and hence loopholes) for certain asset classes, or by imposing tax limitations based on income.

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Table 1: Aggregate Household Wealth and Its Composition, 2018

	Amount (\$ trillion)	Percent of total net worth	Percent of national income
Total net worth	88.7	100%	503%
Assets	107.7	121%	611%
Housing	32.4	37%	184%
Business Assets	9.7	11%	55%
Equities (direct holding)	18.6	21%	105%
Publicly listed	13.6	15%	77%
Privately listed	4.9	6%	28%
Fixed income assets	16.1	18%	91%
Interest bearing	14.9	17%	84%
Deposits and currency	1.2	1%	7%
Pensions and Insurance	30.9	35%	175%
DB and DC pensions	17.0	19%	96%
IRAs	8.8	10%	50%
Life insurance	5.1	6%	29%
Liabilities	19.0	21%	108%
Mortgages	14.3	16%	81%
Student loans	1.6	2%	9%
Other consumer credit	2.5	3%	14%
Other	0.7	1%	4%

Notes: This table reports aggregate statistics on household wealth in 2018 (average over the 4 quarters). Housing and mortgages include both owner occupied and tenant occupied housing. Equities and fixed income assets exclude those held indirectly through pension and insurance funds. Source: Financial accounts of the United States. Reproduced in Piketty, Saez, and Zucman (2018), aggregate series appendix Table TB1 updated to 2018.

Table 2: Wealth Tax Base Estimates, 2019

	Top 1% cut-off	Top .1% cut-off	Top .01% cut-off	\$10 million cut-off	\$50 million cut-off
Capitalized incomes					
Threshold (2019 \$ millions)	5.9	30.8	171.8	10.0	50.0
Base above threshold (2019 \$ trillions)	25.9	13.0	6.3	21.3	10.9
As a percent of aggregate wealth	27.7%	13.9%	6.8%	22.8%	11.6%
As a percent of national income	140%	70%	34%	115%	59%
Revised capitalized incomes					
Threshold (2019 \$ millions)	5.3	28.0	156.2	10.0	50.0
Base above threshold (2019 \$ trillions)	23.6	11.8	5.8	18.4	9.4
As a percent of aggregate wealth	25.2%	12.6%	6.2%	19.7%	10.1%
As a percent of national income	127%	64%	31%	99%	51%
SCF+Forbes 400					
Threshold (2019 \$ millions)	9.0	40.6	172.3	10.0	50.0
Base above threshold (2019 \$ trillions)	27.5	11.5	5.5	24.8	9.7
As a percent of aggregate wealth	29.4%	12.2%	5.9%	26.5%	10.3%
As a percent of national income	148%	62%	30%	134%	52%
Estates with multiplier					
Threshold (2019 \$ millions)		25.5	123.6	10.0	50.0
Base above threshold (2019 \$ trillions)		8.9	4.3	14.2	6.8
As a percent of aggregate wealth		9.5%	4.6%	15.1%	7.2%
As a percent of national income		48%	23%	76%	37%
Base reduction with tax evasion					
Strong enforcement: 15% evasion rate	13.0%	12.9%	12.7%	17.7%	17.7%
Weak enforcement: 50% evasion rate	44.6%	44.4%	43.8%	56.1%	56.2%
Estate tax implied evasion: 33%		31.6%	32.2%	33.5%	37.8%

Notes: This table reports statistics on the wealth tax base above specific thresholds from various data sources. A 1% wealth tax above the threshold would therefore raise 1% of the amount reported (multiply by 12.0 to get the standard 10-year projection using standard growth assumptions). The unit is always the family tax unit not the individual adult (estate multiplier individual based estimates are converted into family based estimates). For the percentiles thresholds (top 1%, top .1%, top .01%), percentiles are defined relative to the total number of family tax units in the economy (175m in 2019). The top 1% represents the top 1.75m families, etc. The statistics are reported assuming no tax evasion (over and beyond the raw source, estates estimates are lower primarily because of tax avoidance/evasion). Capitalized incomes and SCF statistics are for year 2016 extrapolated to 2019 (assuming no change in distribution). Estates are the average from years 2009-2012, corrected for differential mortality (from Chetty et al. 2016), converted to tax units, and extrapolated to 2019. The bottom rows show by how much the tax base would shrink if taxpayers can hide a fraction of their wealth (10% or 50%). We assume that tax evasion comes half and half from intensive and extensive margins. We assume that the percentile thresholds would be adjusted to always capture the same fraction of the population. In contrast, the nominal thresholds (\$10m and \$50m) are not adjusted, explaining why the revenue loss is larger. The last row shows the implied estate tax evasion rate that would fully explain the gap between the tax base from the capitalized incomes estimates at the top and the tax base from the estate multiplier estimates at the bottom.

Table 3: Reported income relative to true income for Top Wealth Holders

	Estates above \$100m (linked to income tax)	SCF top .001% wealth holders	SCF top .01% wealth holders	Forbes Top 400 (combined with IRS Top 400)
	(1)	(2)	(3)	(4)
Year	2007	2016	2016	2014
Wealth (\$millions)	313	951	365	5,725
Reported income (\$millions)	9.4	30.5	11.6	159
Reported income/wealth	3.0%	3.2%	3.2%	2.8%
Average macro return on wealth	5.9%	6.4%	6.4%	6.8%
Fraction true income reported	51%	50%	50%	41%
Sample size	116	86	465	400

Notes: This table reports statistics on how much income top wealth holders report on their individual tax returns relative to their true economic income using various sources of publicly available data (across columns). The first source in col. (1) is linked estate tax and income tax data from Bourne et al. (2018). The sample are all estates above \$100 million for 2007 decedents. The second source in cols. (2) and (3) is the 2016 Survey of Consumer Finances (authors' computations). The sample are top .001% wealth holders in col. (2) and top .01% in col. (3) (SCF household unit). The third source in col. (4) combines the Forbes Top 400 (with the IRS Top 400 highest income earners). The table lists the year wealth was measured, the average wealth, average reported income on the individual tax return, the ratio of reported income to wealth. The next row reports total capital income to total household wealth economy wide (macro rate of return on wealth). The next row reports the fraction of true income reported on individual tax returns (assuming conservatively that the rich get the same rate of return as the macro-average). The last row reports sample size. In col (1), average wealth is estimated as 3.14 times the \$100m threshold (based on estate tax statistics for 2007 decedents). The reported income of the Forbes 400 is estimated as 50% of the reported income of the IRS Top 400 (as SCF top .001% wealth holders have reported income of 50% of the SCF top .001% income earners in 2016).

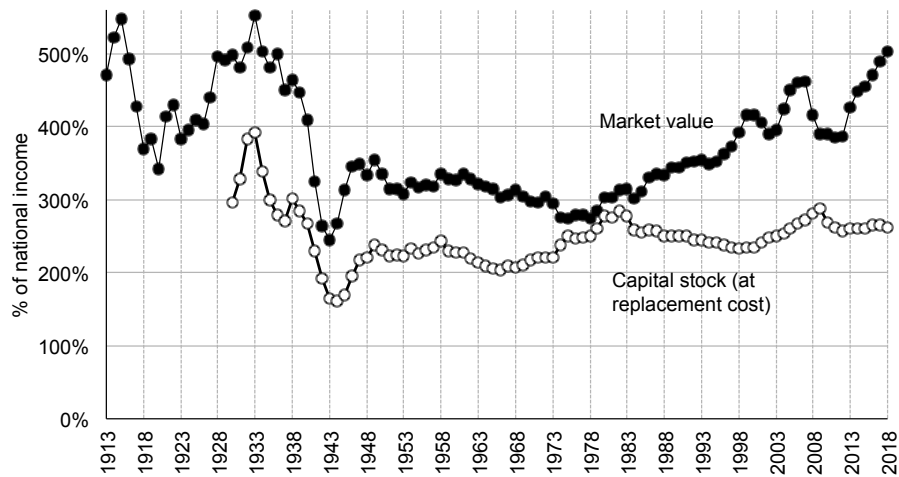
Table 4: Effect of Long-Term Wealth Taxation on Top 15 Wealth Holders in 2018

Top Wealth Holder	Source	Current 2018 wealth (\$ billions)	With Warren wealth tax since 1982 (3% above \$1b)	With Sanders wealth tax since 1982 (5% above \$1b graduated to 8% above \$10b)	With radical wealth tax since 1982 (10% above \$1b)
1. Jeff Bezos	Amazon (founder)	160.0	86.8	43.0	24.1
2. Bill Gates	Microsoft (founder)	97.0	36.4	9.9	4.3
3. Warren Buffett	Berkshire Hathaway	88.3	29.6	8.2	3.2
4. Mark Zuckerberg	Facebook (founder)	61.0	44.2	28.6	21.3
5. Larry Ellison	Oracle (founder)	58.4	23.5	8.5	4.0
6. Larry Page	Google (founder)	53.8	35.3	19.5	13.3
7. David Koch	Koch industries	53.5	18.9	8.0	3.6
8. Charles Koch	Koch industries	53.5	18.9	8.0	3.6
9. Sergey Brin	Google (founder)	52.4	34.4	19.0	13.0
10. Michael Bloomberg	Bloomberg LP (founder)	51.8	24.2	11.3	5.8
11. Jim Walton	Walmart (heir)	45.2	15.1	5.0	2.0
12. Rob Walton	Walmart (heir)	44.9	15.0	5.0	2.0
13. Alice Walton	Walmart (heir)	44.9	15.0	4.9	2.0
14. Steve Ballmer	Microsoft (CEO)	42.3	18.2	7.5	3.5
15. Sheldon Adelson	Las Vegas Sands (founder)	35.5	18.4	9.3	5.6
Total (top 15)		943	434	196	111.3

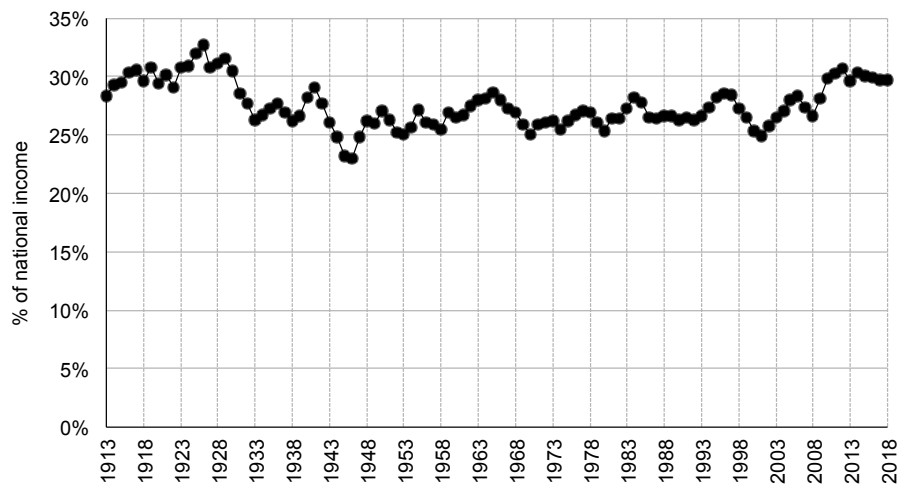
Notes: The table lists the name, source of wealth, and wealth in 2018 of the top 15 richest Americans (Forbes magazine estimates). The last three columns show what their wealth would have been if a wealth tax had been in place since 1982. The first column considers the Warren wealth tax that has a 2% marginal tax rate above \$50 million and a 3% marginal tax rate above \$1 billion. The second column considers the Sanders wealth tax that has a 1% marginal tax rate above \$32 million, 2% above \$50m, 3% above \$250m, 4% above \$500m, 5% above \$1 billion, 6% above \$2.5b, 7% above \$5b, 8% above \$10b. The last column considers a radical wealth tax with a 2% tax rate above \$50m and a 10% marginal tax rate above \$1b. The tax thresholds apply in 2018 and are indexed to the average wealth per family economy wide in prior years. The wealth tax has a much larger cumulative effect on inherited and mature wealth than on new wealth.

Figure 1: US Aggregate Household Wealth and Capital Income

(a) Household wealth (percent of national income)

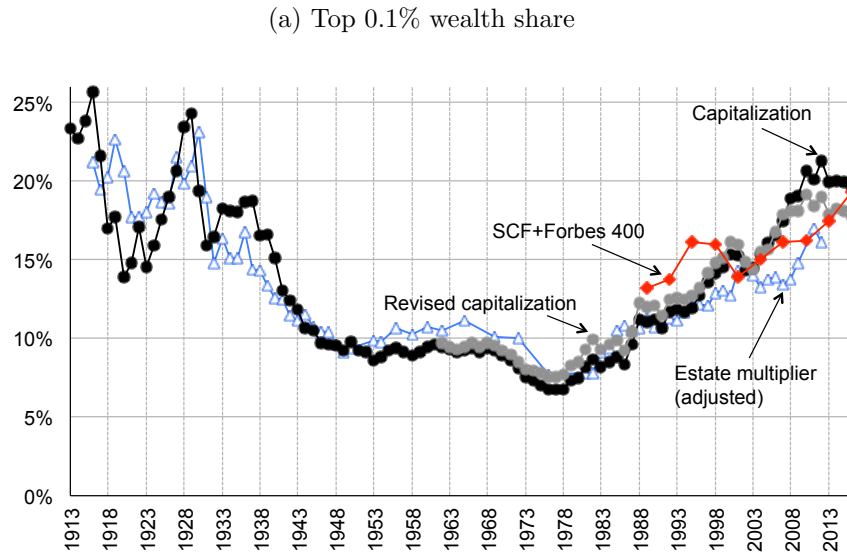


(b) Capital income (percent of national income)

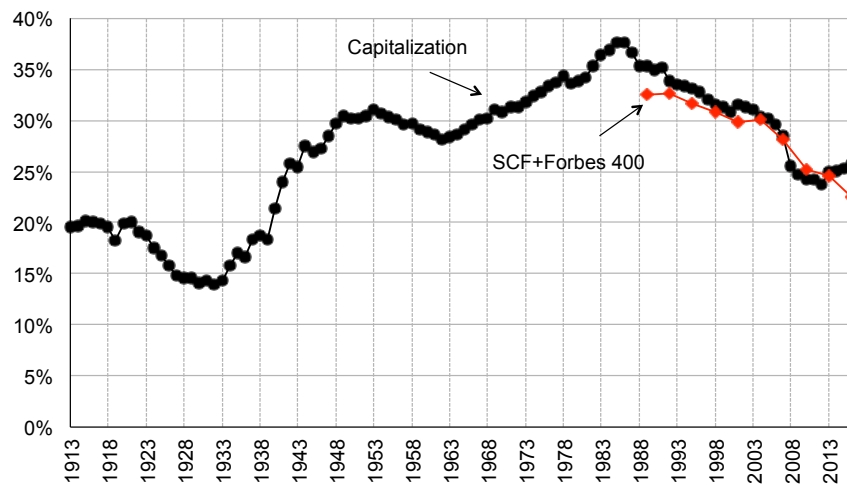


Sources: Piketty, Saez, and Zucman (2018), updated to 2018. The top panel depicts total household wealth (assets minus liabilities) at market prices as a fraction of national income since 1913. It also depicts the replacement cost of capital value of the US capital stock (all residential structures, but not land, and capital assets valued at replacement cost; capital assets include the value of intangible assets such as patents and copyrights). The bottom panel depicts the share of capital income in national income (the remaining share being labor income).

Figure 2: US Wealth Inequality and Its Evolution

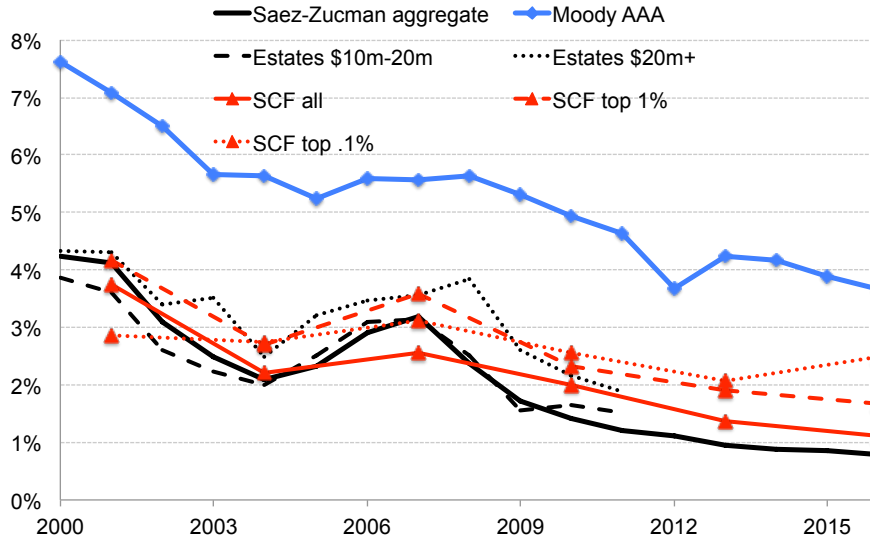


(b) Bottom 90% wealth share



Notes: The top panel depicts various estimates of the share of wealth held by the top 0.1% of family tax units in the United States: (1) survey data combining the SCF and the Forbes 400 rich list; (2) the capitalization method of Saez and Zucman (2016) updated to 2016 and improved upon in Piketty, Saez, and Zucman (2018); (3) the capitalization method with adjustments to capitalizing interest income and valuing pass-through businesses; (4) the estate multiplier method from Kopczuk and Saez (2004) updated in Saez and Zucman (2016), smoothed out after 2000, adjusted for more accurate mortality differentials by wealth from Chetty et al. (2016), and converted into tax units (instead of individual adults). See Figure 4 below for a step-by-step decomposition of these adjustments. The bottom panel depicts estimates of the share of wealth held by the bottom 90% of families (households for the SCF). (No estate multiplier estimates are available for this measure.) To improve comparability, the SCF estimates exclude consumer durables and add back the wealth of the Forbes 400, which are excluded by design from the SCF.

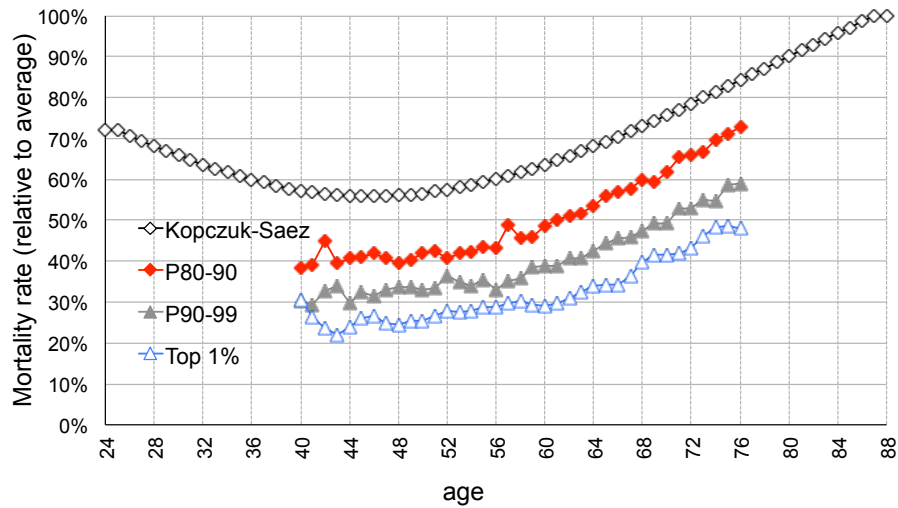
Figure 3: Interest Rate by Wealth Class, 2000-2016



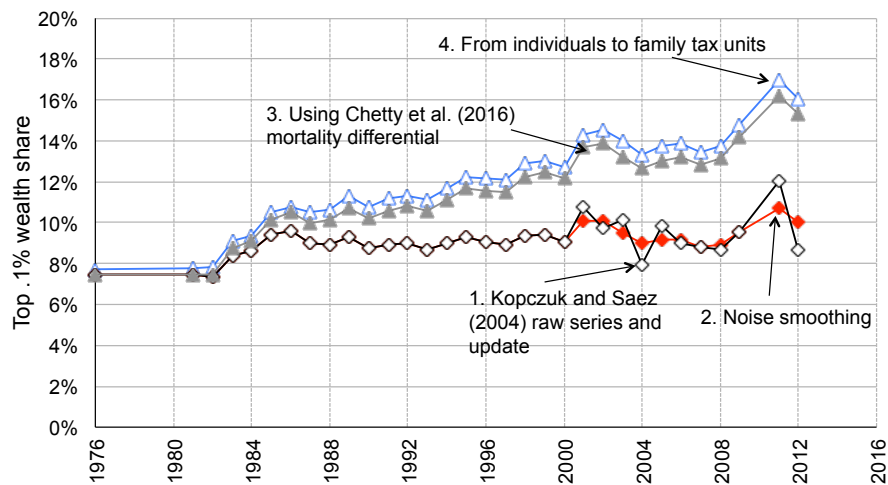
Notes: The figure displays how the interest rate on fixed claimed assets (savings and checking accounts, taxable bonds) varies over time and by wealth class using linked income and wealth data sources: linked estate and income tax data and the Survey of Consumer Finances (SCF). The figure displays the aggregate rate of return economy wide used in the baseline Saez and Zucman (2016) series. The figure depicts the interest rate using estate tax returns matched to prior year income tax returns for non-married filers from internal tax data for large estates over \$20 million and between \$10 and \$20 millions (numbers reproduced from Saez and Zucman (2016, Figure Vb)). The figure also depicts the interest rate observed in the SCF in aggregate and for top 1% and top .1% wealth holders. Overall, while somewhat noisy, the SCF data confirms the estate-income tax data that the interest rate for the wealthy tracks pretty closely the aggregate interest but is slightly higher. When interest rates are very low in recent years, this small difference however translates into a significant difference in capitalization factors. Therefore, we revise the capitalization method to incorporate these empirical findings as we did in earlier sensitivity analysis already presented in Saez and Zucman (2016) and double the interest rate for the top .1% (relative to average). Finally, the figure depicts the Moody AAA rate of return used by Smith et al. (2019) revised capitalization method. The AAA rate is much higher (by about 3 points) than the empirical interest rate earned by the wealth from estate-income and SCF data throughout the period implying that the AAA rate is not. In recent years with low interest rates, using this AAA rate for capitalizing interest greatly underestimates fixed claim assets at the top and hence leads to estimate top wealth shares.

Figure 4: Correcting Estate Multiplier Estimates

(a) Male mortality rate differentials by income percentiles in 2012-4

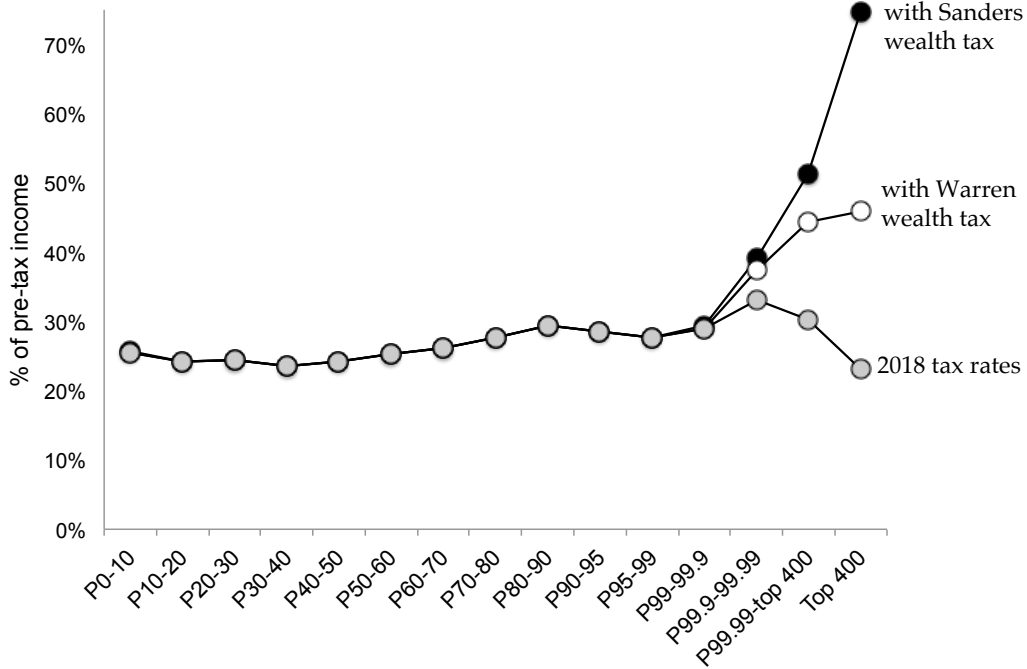


(b) Correcting estate multiplier estimates



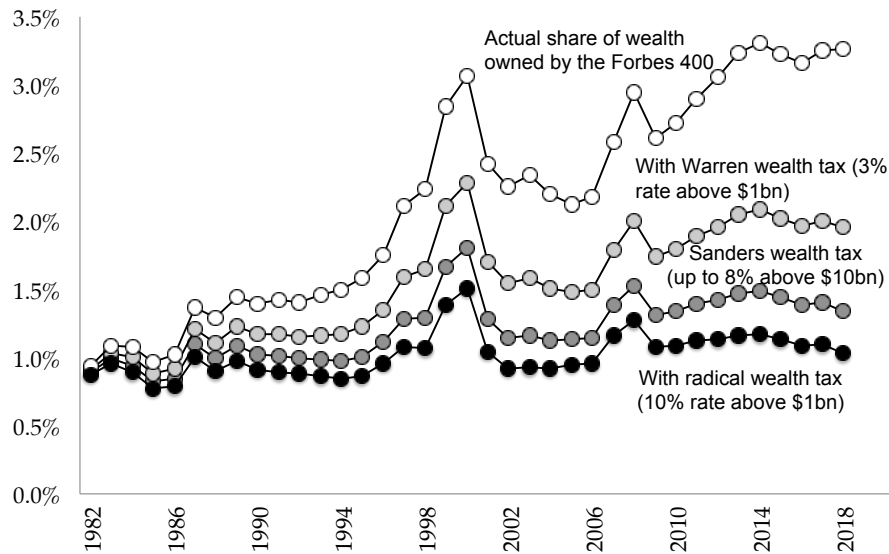
Notes: The figure shows how to correct estate multiplier estimates. The top panel depicts the mortality rates of upper income groups relative to average by age (for males) in 2012-4 based on the recent work by Chetty et al. (2016). Income is measured 2 years earlier or at age 61, whichever is less. The panel also depicts the mortality rate advantage for top wealth holders assumed by Kopczuk-Saez estate multiplier series (from an estimate of the college graduate mortality differential in the 1980s created by Brown, Liebman, and Pollet 2002). There is a strong mortality gradient within the top 20% and the Kopczuk-Saez assumption greatly overestimates mortality at the top in 2012-4. The bottom panel shows a step-by-step correction of estate multipliers in 4 steps: (1) we start from the raw estimates from Kopczuk and Saez (2004), updated to 2012 in Saez and Zucman (2016); (2) we smooth the series after 2000 to reduce noise; (3) we use the mortality differential from the top 1% from Chetty et al. (2016) in 2012 and the Kopczuk-Saez differential in 1980 (with a linear phased-in adjustment for years between 1980 to 2012); and (4) we convert the individual adult estimates coming from estates into tax unit family based estimates (using the same ratios of individual adult vs. tax unit from the Piketty, Saez, and Zucman (2018) top wealth share series).

Figure 5: The Effects of Wealth Taxation on Overall Tax Progressivity



Notes: The figure depicts the average tax rate by income groups in 2018. All federal, state, and local taxes are included. Taxes are expressed as a fraction of pre-tax income. P0-10 denotes the bottom 10% of adults, P10-20 the next 10%, etc. Source is Saez and Zucman (2019) updated from Piketty, Saez, and Zucman (2018). Taking all taxes together, the US tax system looks like a giant flat tax with similar tax rates across income groups but with lower tax rates at the very top. The figure depicts how adding the wealth taxes proposed by Elizabeth Warren and Bernie Sanders would affect the progressivity of the overall tax system. The Warren wealth tax has a 2% marginal tax rate above \$50 million and a 3% marginal tax rate above \$1 billion; The Sanders wealth tax has a 1% marginal tax rate above \$32 million, 2% above \$50m, 3% above \$250m, 4% above \$500m, 5% above \$1 billion, 6% above \$2.5b, 7% above \$5b, 8% above \$10b.

Figure 6: The Effects of Wealth Taxation on Top Wealth Holders



Sources: The figure depicts the share of total wealth owned by the top 400 richest Americans since 1982 from Forbes magazine (the top 400 are included in 2018; in prior years, the number of richest individuals included is indexed to the total number of families in the economy, so as to capture the same fraction of families in all years). The figure also depicts what their wealth share would have been if the Warren, Sanders, or a radical wealth tax had been in place since 1982. The Warren wealth tax has a 2% marginal tax rate above \$50 million and a 3% marginal tax rate above \$1 billion. The Sanders wealth tax has a 1% marginal tax rate above \$32 million, 2% above \$50m, 3% above \$250m, 4% above \$500m, 5% above \$1 billion, 6% above \$2.5b, 7% above \$5b, 8% above \$10b. The radical wealth tax has a 2% tax rate above \$50m and a 10% marginal tax rate above \$1b (as discussed in Saez and Zucman, 2019). The bracket thresholds apply in 2018 and are indexed to the average wealth per family economy-wide in prior years. The wealth share of the top 400 has increased from 0.9% in 1982 to 3.3% in 2018. With the Warren wealth tax in place since 1982, their wealth share would have been 2.0% in 2018. With the Sanders wealth tax in place since 1982, their wealth share would have been 1.3% in 2018. With a radical wealth tax, it would have been about 1.0% in 2018, as in the early 1980s.