

Taxing Our Wealth*

Florian Scheuer
University of Zurich

Joel Slemrod
University of Michigan

November 2020

Abstract

This paper evaluates proposals for an annual wealth tax. While a dozen OECD countries levied wealth taxes in the recent past, now only three retain them, with only Switzerland raising a comparable fraction of revenue as recent proposals for a US wealth tax. Studies of these taxes sometimes, but not always, find a substantial behavioral response, including of saving, portfolio change, avoidance, and evasion, and the impact depends crucially on design features, especially the broadness of the base and enforcement provisions. Because the US proposals are very different from any previous wealth tax, experience in other countries offers only broad lessons, but we can gain insights from closely related taxes, such as the property and the estate tax, and from optimal tax analysis of the role of wealth taxation.

*Florian Scheuer is the UBS Professor of Economics of Institutions, University of Zurich, Zurich, Switzerland. Joel Slemrod is the Paul W. McCracken Collegiate Professor of Business Economics and Public Policy, Stephen M. Ross School of Business, and Professor of Economics, University of Michigan, Ann Arbor, Michigan. Their email addresses are florian.scheuer@uzh.ch and jslemrod@umich.edu. We are grateful to Alan Auerbach, Marius Brühlhart, Leonard Burman, Reto Föllmi, Gordon Hanson, Janet Holtzblatt, Bas Jacobs, Louis Kaplow, Beth Kaufmann, Paul Kindsgrab, Matthias Krapf, Greg Leiserson, Isabel Martinez, Enrico Moretti, Raphael Parchet, Sarah Perret, Dina Pomeranz, Anasuya Raj, Casey Rothschild, Kurt Schmidheiny, Kent Smetters, Timothy Taylor, Uwe Thümmel, Daniel Waldenström, Iván Werning, Heidi Williams and Gabriel Zucman for valuable comments and to Paul R. Organ and Gabriele Patete for exceptional research assistance. Florian Scheuer acknowledges support through ERC grant No. 757721.

1 Introduction

A primary reason for imposing a wealth tax is to shift the tax burden toward the most affluent households. This goal is evident in the choice of wealth as a base for the tax, given that wealth is considerably more unequally distributed than the most common tax bases, income and consumption. In 2016, for example, the top 1% of households ranked by net worth held 40% of US wealth, while the top 1% ranked by income earned 24% of income (Wolff 2017). In addition, wealth taxes typically have high wealth thresholds before any tax is due, and may also include a graduated structure of tax rates that apply above the thresholds. Heightened consideration of a wealth tax is almost certainly tied to the increase in inequality over the past four decades: although the details of this increase are disputable, in our view the conclusion that it has increased non-trivially is not (for discussion, see the Symposium on Rising Inequality of Income and Wealth in the Fall 2020 issue of this journal). The wealth tax has had some prominent academic adherents: for example, Kaldor (1956) called for a wealth tax for developing countries, Allais (1977) proposed to replace most direct taxes with a 2% wealth tax in France, and Piketty (2014) called for a global progressive wealth tax.

Even some of those who are concerned about rising economic inequality raise questions about whether a wealth tax is the appropriate policy response. Measuring some forms of wealth on an annual basis is very difficult: for example, how does one value pension accounts, life insurance, trusts, or closely-held family corporations? Heterogeneous measurability of assets could cause horizontal inequity and a flight to more easily under-valued assets, and consequent understatement of net wealth. Recent experience is not encouraging: while a dozen high-income European countries levied wealth taxes in the recent past, now only three retain them, which suggests that the other nine countries determined that any benefits associated with such taxes do not justify their costs. In addition, there are a range of other policy options to tackle inequality.

In this essay, we begin with a basic conceptual discussion of the base and tax rates for a wealth tax. We then provide an overview of the recent wealth taxes in European countries. The United States has never levied an annual wealth tax, but during the 2019-20 contest for the Democratic presidential nomination, wealth tax proposals were put forward by Senators Bernard Sanders and Elizabeth Warren. As we will see, none of the European wealth taxes either applied rates anywhere near the 6 or 8% top rates in these proposals nor established such a broad base, and only Switzerland raises a level of government revenue comparable to these proposals. However, the US does have experience with some taxes that have aspects similar to a wealth tax. As we discuss, the property tax is an annual tax on ownership of immovable property; the estate tax is a wealth tax imposed at time of death; and the capital gains tax is imposed on some increases in the value of some assets, albeit in a haphazard

way.

We then turn to what we know about the behavioral effects of a wealth tax, including effects on real behavior, on financial choices aimed at reducing the burden of a wealth tax, on outright tax evasion, and on administrative and compliance costs. Studies of the European wealth taxes often, but not always, find a substantial behavioral response, although the nature of the response varies. We emphasize that any lessons drawn from the European experience must be applied to the recent US proposals with substantial caution, because their design features—rate schedule, broadness of the base, and enforcement provisions—are very different from any previous wealth tax.¹

Finally, we look to optimal tax theory—*should* we as a society decide to tax our wealth and, if yes, how so? We point out that the former conventional wisdom—that an optimal tax system would feature no taxes on capital—has been overturned. Instead, we review a series of arguments that justify some form of progressive taxation of wealth accumulation both in the short and long run. We also discuss under which conditions such taxes should take the form of a wealth tax versus alternative policies that have similar objectives. We conclude with an overview of some political economy arguments for taxes on wealth accumulation that go beyond the usual redistributive objectives.

2 What is a Wealth Tax?

2.1 The Base of a Wealth Tax

In principle, the base of a wealth tax is net worth—the value of assets minus debts. Like all taxes, in practice, the base to which tax rates are applied could be narrowed by exemptions, deductions, or preferential treatment (for example, discounted valuation) of certain components of net wealth.

Determining the base for a wealth tax raises some thorny practical issues. For example, the market value of a closely-held, family-run business, or of personal property perhaps received via inheritance, is difficult to estimate at high frequency. The value of many assets, including firms, consists of a projected flow of future income, which makes valuation highly sensitive to the applied discount rate. Another issue is that wealth and wealth tax liability is not always matched by disposable income in a given year, and so requiring the tax to be remitted annually may raise liquidity problems.

Past and current wealth taxes contain many base-narrowing features. For example, all wealth taxes exempt wealth below a certain threshold, which varies considerably across

¹We do not address whether a wealth tax would be constitutional in the United States, a subject of some controversy. For the two views, compare Johnson and Dellinger (2018) and Jensen (2019).

countries. Some wealth taxes do not apply to wealth held in a pension or life insurance account. Some have exemptions or reduced tax rates for the wealth in one's primary residence; more generally, wealth tax rules often differ across real estate and financial assets. There are reduced or deferred wealth taxes for certain business assets—for example, to prevent a situation where a family-owned firm would need to be liquidated to satisfy a wealth tax liability. Wealth tax bases often leave out trusts established to pass wealth to later generations. Finally, wealth taxes have not been applied to implicit wealth in the form of an individual's human capital, although this is sometimes hard to disentangle from the value of business partnerships (such as law firms or doctors' practices).

2.2 The Rate of a Wealth Tax

It is a useful starting point to think of a wealth tax as a tax on the “normal” rate of return to capital. A wealth tax at a rate of t_w is equivalent to a tax rate of t_w/r on capital income where r is the interest rate. For an asset whose rate of return is 8%, a 4% wealth tax corresponds to an annual 50% tax rate on capital income and an 8% wealth tax (the top rate in Sanders' proposal) is equivalent to a 100% tax rate on capital income. Thus, the income-tax-equivalent of a given wealth tax rate is smaller, the higher is the rate of return.

Despite this equivalence, a wealth tax differs from a capital income tax in an important way. For a given amount of wealth, the tax liability of a wealth tax does not depend on the amount of capital income the wealth actually generates, while in contrast a capital income tax liability is related to that flow. For example, if all of one's wealth were held in a zero-interest demand deposit, a capital income tax would generate no tax liability, while a wealth tax would. If wealth declines in a given year — that is, the return for that year is negative — the wealth tax still applies.

Because a wealth tax affects the rate of return to saving, it changes the relative price of consumption across time. For instance, in a world where $r = .07$, an 8% wealth tax turns a 7% rate of return before tax into a negative 1% return after tax.² Whereas at a 7% return one dollar becomes \$7.61 ($= (1 + .07)^{30}$) after 30 years, with a negative 1% return after tax, one dollar becomes \$0.74 ($= (1 - 0.01)^{30}$), ten times less. Tax rates that might sound low in the income or sales tax context are actually much higher when compounded over time.

²The real average growth rate of the total wealth held by those on the Forbes 400 list of the wealthiest Americans has been 7.3% per year between 1982 and 2018.

3 Wealth Taxes: Existing and Proposed

3.1 European Wealth Taxes

In 1990, twelve European countries levied an annual tax on net wealth. By 2018, only four—France, Norway, Spain, and Switzerland—levied such a tax, with Switzerland raising more than three times as much revenue as a fraction of total revenues (3.9%) as any of the other three countries (OECD 2018). In 2018, France replaced its annual wealth tax with a tax only on immovable property. Italy levies an annual tax on financial assets in the form of a stamp duty on bank and securities accounts, and the Netherlands has a hybrid system with similarities to an annual wealth tax, imputing an asset-type-specific rate of return to assets and assessing a 30% tax on those imputed returns.³

Table 1 provides some summary statistics about wealth taxes in high-income European countries, and then in the bottom two rows compares them to the proposals made by Senators Sanders and Warren in 2019.

For the European wealth taxes, the average top rate was about 1%. Finland, Sweden and Switzerland had top rates around 4% in the past, and the highest current rate is in the Spanish region Extremadura at 3.75%. But the Spanish system, certain Swiss cantons, and, in the past, some other countries feature a cap on the sum of wealth and income taxes as a fraction of taxable income. Such a cap limits the liquidity problem of a high ratio of income plus wealth tax liability to disposable income—and has the effect of imposing a zero marginal tax on wealth for those at the cap. The cap also provides an additional incentive to reduce reported taxable income.

Many of the wealth taxes described in Table 1 feature exemptions or preferential treatment of some forms of assets, notably one's main residence, life insurance proceeds, pension wealth, and business assets. The exemption thresholds of these countries' wealth taxes average about EUR 500,000 for married couples.

At first blush, it does not bode well for wealth taxes that, of the dozen European countries that have had them in the last three decades, only a quarter of them still do.⁴ Why did the other three-quarters abandon them? A 2018 OECD report lists a number of concerns: efficiency costs, risk of capital flight, failure to meet redistributive goals, and high administrative costs. In Germany, the Federal Constitutional Court deemed the wealth tax

³Several non-European countries have had wealth taxes, including Argentina, Bangladesh (more recently a net-worth-triggered income tax surcharge or net wealth tax, whichever is higher), Colombia, India (repealed in 2015), Indonesia (abolished in 1985), Pakistan (removed in 2003 and reinstated in 2013), and Sri Lanka (1959-1993).

⁴The Florida intangibles tax offers a cautionary tale closer to home. It could be avoided by putting intangibles in trust in December and distributing them out of trust in January, to the point that it became commonly known as a voluntary tax; it was repealed in 2007.

Country/Plan	Years of enforcement	Revenue as % of GDP	Top marginal rate		Exemption level		# of marginal rates	Cap on liability?	Treatment of:				Estate/ inheritance /gift tax?
			Most recent	Ever	Single	Married			Main residence	Life Insurance	Pension	Business assets	
	[1]	[2]	[3a]	[3b]	[4a]	[4b]	[5]	[6]	[7a]	[7b]	[7c]	[7d]	[8]
Austria	1954-1994	0.14%	1.00%	1.00%	None	None	1	N	T	T	T	T	N
Denmark	1903-1997	0.06%	0.70%	2.20%	€ 320,657	€ 641,314	1	Y	T	E	E	T	Y
Finland	1919-2006	0.08%	0.80%	4.00%	€ 250,000	€ 500,000	1	Y	TP	E	E	T	Y
France	1982-1986, 1989-2017	0.22%	1.50%	1.80%	€ 1,300,000	€ 1,300,000	5	Y	TP	T	E	E	Y
Germany	1952-1997	0.11%	1.00%	2.50%	€ 61,355	€ 122,710	1	N	T	T	E	TP	Y
Iceland	1096-2006, 2010-2015	0.48%	2.00%	2.00%	€ 473,248	€ 630,997	2	N	T	E	E	TP	Y
Ireland	1975-1978	0.10%	1.00%	1.00%	€ 88,882	€ 126,974	1	Y	E	T	E	TP	Y
Luxembourg	1934-2006	0.55%	0.50%	0.50%	€ 2,500	€ 5,000	1	N	T	T	E	TP	Y
Netherlands	1965-2001	0.18%	0.70%	0.80%	€ 90,756	€ 113,445	1	Y	TP	E	E	TP	Y
Norway	1892-present	0.45%	0.85%	1.10%	€ 157,833	€ 315,666	1	N	TP	E	E	TP	N
Spain	1977-2008, 2011-present	0.18%	0%-3.75%	3.75%	€ 400,000-700,000	€ 800,000-1,400,000	8	Y	TP	T	E	E	Y
Sweden	1947-1991; 1991-2007	0.19%	1.50%	4.00%	€ 166,214	€ 221,619	1	Y	T	T	E	E	N
Switzerland	(1840-1970)-present	1.08%	0.1%-1.1%	3.72%*	€ 25,380-116,250	€ 51,150-232,500	1-1000	Y*	TP	T	E	TP	Y
Sanders	n/a	1.56%	8.00%	n/a	\$16,000,000	\$32,000,000	8	N	T	T	T	T	Y
Warren	n/a	1.34%	6.00%	n/a	\$50,000,000	\$50,000,000	2	N	T	T	T	T	Y

Notes and sources:

Countries with currently active wealth taxes are shaded in gray. For inactive countries, the table reports information as of the most recent active year. The Sanders and Warren plans are as shown on campaign websites as of April 20, 2020. Data for Iceland come from OECD 2018, Herd and Thorgeirsson 2001, Krenek and Schratzenstaller 2018, and conversations with Thorolfur Matthiasson.

[1]: OECD 2018, p. 76, Table 4.1. France abolished its wealth tax in 2017 and replaced it with a tax based on real estate; in 1096 (not a typo) Icelanders began paying a 1% tax on wealth (in fact, a tithe based on a 10% tax applied to an assumed 10% return on assets); Sweden made a major change in 1991; Switzerland's cantons introduced the tax gradually, with full adoption by 1970.

[2]: OECD Global Revenue Statistics Database, line 4210 (individual recurrent taxes on net wealth). For active countries the value is for 2018. For inactive countries, the value is for the most recent full active year. For Ireland, McDonnell 2013, p. 24; for Iceland and Luxembourg, Krenek and Schratzenstaller 2018, pp. 23-24.

[3]: OECD 2018, p. 88, Figure 4.2 and various historical sources. The Spanish central government top rate is 2.5%; some regions levy higher rates (e.g., Extremadura's top rate is 3.75%) while others levy lower rates (e.g., Madrid's 100% credit results in an effective rate of 0%). Rates differ across Swiss cantons. *The average top marginal rate in 1942 across all cantonal capitals was 3.72% (Eidgenössische Steuerverwaltung 1969), which is higher than the cantonal plus municipal rates that we are able to confirm in any other year.

[4]: OECD 2018, p. 81, Table 4.2. Austria had no specific threshold but implicitly wealth below € 11,000 was untaxed. Denmark's exemption levels were provided in Krone by Katrine Jakobsen and converted to Euro at the 12/31/1996 exchange rate. Krenek and Schratzenstaller 2018, p. 23 notes Luxembourg's € 2,500 exemption per person. Taxpayers are taxed individually in Finland and Spain. The Spanish central government statutory individual exemption is € 700,000; some regions have lower exemptions, including Aragon at € 400,000 and Catalonia at € 500,000. Exemptions differ across Swiss cantons.

[5]: OECD 2018, pp. 87-88. The Swiss canton of Basel-Country has a schedule with rates increasing for each CHF1,000 of reported wealth, up to 1M.

[6]: OECD 2018, pp. 88-89. *In some cantons, but not all.

[7]: OECD 2018, p. 84, Table 4.3. For Denmark, Jakobsen et al. 2019. T = fully taxed, E = full exemption, TP = tax preference.

[8]: OECD 2018, p. 24, Table 1.1. Austria abolished its inheritance and gift taxes in 2008, though there is a 2.0-3.5% tax on the transfer of assets with the lower rates for transfers between close relatives.

Table 1: European wealth taxes and the Sanders and Warren proposals.

unconstitutional in 1995 on the grounds that the tax’s discrimination of property and financial assets was an infringement against the fiscal principle of tax equality (Drometer et al. 2018). In Sweden, it was argued that the special treatment of business equity made the wealth tax regressive—taxing middle-class wealth (housing, financial assets) and exempting the wealthiest individuals’ assets (large, closely-held firms)—and it was blamed for spurring tax avoidance and evasion, including capital flight to tax havens (Waldenström, 2018).

3.2 The Swiss Example

Of the three European countries that still levy a wealth tax, Switzerland raises by far the most revenue as a share of overall tax revenue, amounting to 1.1% of GDP in 2018, which is comparable to the revenue projected for the recent US proposals. Hence, the Swiss example is of particular interest for the wealth tax debate in the United States.

The wealth tax in Switzerland has a long history and in fact predates the modern income tax. The Swiss tax system is generally structured in three layers: the federal, cantonal and municipal level. There is no federal wealth tax, but all cantons must levy a comprehensive wealth tax, over which they have significant freedom in designing. Eight cantons impose flat rates (above some exemption level) and the other 18 feature graduated rate schedules. Each municipality then chooses a multiplier that is applied proportionally to the cantonal tax rate schedule. Hence, an individual’s overall tax liability depends on both the canton and municipality of residence. This highly decentralized system induces local tax competition and migration.

In 2018, the combined cantonal and municipal marginal wealth tax rates in the top bracket ranged between 0.1% (canton of Nidwalden) and 1.1% (canton of Geneva). In 16 of the 26 canton capitals, the annual top wealth tax rate was below 0.5%. There is also some variation in the tax-exempted amounts, ranging in 2018 from about \$55,000 in the canton of Jura to \$250,000 in the canton of Schwyz (for married couples). Hence, even though it raises similar overall revenue as the estimates for the U.S. proposals, the Swiss wealth tax is targeted at a larger share of the population and is substantially less progressive.

The base of the Swiss wealth tax is broad: in principle, all assets, including those held abroad, are taxable. Only foreign real estate, common household assets, and pension wealth are exempt. The tax liability is based on net wealth, so taxpayers can deduct mortgages and other debt. The annual reporting requirements for assets and liabilities allow the cantonal tax authorities to track the year-to-year evolution of wealth and cross-check it against reported income (the so-called “wealth development test”), so the wealth tax serves a supporting role for income tax enforcement.

Several aspects of the broader Swiss tax system provide context for the greater role of

the wealth tax there. First, there is no capital gains tax on movable assets (for example, shares of stock in a company) unless the owner professionally trades securities.⁵ Second, almost all cantons have abolished taxes on gifts and bequests from parents to children. The Swiss wealth tax therefore serves as a backstop to at least partly substitute for a capital gains tax and an estate tax, which are common in other countries. Third, due to the institution of bank secrecy within Switzerland, third-party reporting of financial assets is precluded, which constrains enforcement. Fourth, while there are some guidelines for the valuation of privately-held business assets based on a weighted average of capitalized earnings in recent years and net asset holdings (Hongler and Mauchle 2020), it remains subject to considerable discretion on the part of cantonal tax authorities, which may contribute to an equilibrium where the wealthy are treated rather leniently.⁶

The Swiss wealth tax enjoys broad political support, as evidenced by the fact that it keeps being reaffirmed by citizens in Switzerland's direct democracy, where most tax policy decisions must be put directly to voters. But its design and the role it plays in the overall tax system are quite different from what is currently discussed in the United States. In particular, it is not geared towards a major redistribution of wealth, and indeed wealth concentration in Switzerland remains high in international comparison (Föllmi and Martinez, 2017).

3.3 Comparisons with Recent US Wealth Tax Proposals

During the 2019-20 Democratic presidential nomination campaign, two prominent candidates, Bernie Sanders and Elizabeth Warren, proposed that the United States enact an annual wealth tax. The Sanders proposal featured graduated rates starting at 1% on net worth above \$32 million for a married couple, rising to a marginal tax rate of 8% on net worth above \$10 billion, while Warren proposed a 2% rate on net worth in excess of \$50 million and a 6% rate above \$1 billion. The candidates claimed these levies would raise \$3.75 trillion and \$4.35 trillion over 10 years, or approximately 1.34% and 1.56% of GDP and 7.9% and 9.1% of federal revenues.⁷

As Table 1 details, these US proposals differ quite substantially from the wealth taxes across Europe—past and present—in a number of ways. First, the top marginal rates of both the Sanders and Warren proposals are far higher than any top rate of the European

⁵As for real estate, there is a special capital gains tax at the cantonal level as well as a property tax at the municipal level.

⁶Some cantons offer foreigners who live but do not work in Switzerland an exemption from regular taxation, subjecting them instead to a flat-rate tax based on their living expenses, which has allowed some very rich households to enjoy low tax burdens. The minimum tax rules under this alternative tax regime have been tightened recently, and it currently affects fewer than 5000 individuals (Federal Department of Finance 2019).

⁷Emmanuel Saez and Gabriel Zucman advised Senator Warren regarding her proposal, produced the revenue estimates, and have written a detailed explanation and defense of it (Saez and Zucman, 2019a).

wealth taxes. Second, neither the Sanders nor Warren proposal has a cap on annual tax payments as a share of income. Third, both the Sanders and Warren wealth tax proposals have what is by European standards an exceptionally high exemption level. Under Warren's plan, 75,000 households would be subject to the tax, while Sanders' plan would apply to 180,000 households. The very top rates would affect an even smaller group: Warren's top rate kicks in at \$1 billion, applying to about 600 people as of October 2019 (according to Forbes), while Sanders' top rate begins at \$10 billion, applying to only about 50 people.⁸ Fourth, both Sanders and Warren proposed unprecedentedly broad bases, including for example assets held in trust, and (in Warren's case) including retirement assets and assets held by minor children. Fifth, the revenue to be raised from these wealth taxes as a share of GDP is a third to a half above the Swiss level, which in turn is substantially higher than the revenue raised in the other countries. Finally, the US wealth tax proposals would be federal, rather than decentralized as in Spain or Switzerland.

Supporters of these proposals for a US wealth tax often discount the relevance of European experience with, and especially the wide abandonment of, wealth taxes on the grounds that the details of the US plans, especially the high exemption level, rate schedule, broadness of the base, and enforcement provisions, are very different than these other systems. This is true, but it is a double-edged sword, as these unprecedented design features also make it difficult to learn from experience and to predict its consequences with much confidence.

4 What Other Taxes Does a Wealth Tax Resemble?

Although the United States has never had an annual wealth tax, it has long experience with several other related taxes.

4.1 Property Taxes

Local governments in the United States rely heavily on an annual tax on one form of wealth, often called "immovable" property, in the form of property taxes. Property taxes account for nearly half of own-source local government revenues.

The rate of tax levied on immovable property varies widely. Harris and Moore (2013) report that, for the period 2007-2011, the mean property tax burden as a share of house prices was 1.15%.

For a number of reasons, a property tax is not identical to an equivalent-rate wealth tax. First, US property taxes do not allow for a deduction for debt. Second, the Tiebout

⁸The extreme targeting of top wealth levels has led some readers of an earlier draft to suggest that a more appropriate title is "Taxing Their Wealth."

(1956) theory of property taxes emphasizes that households can choose among many different communities with varying levels of local public goods. In this setting, the property tax, unlike a wealth tax, becomes a non-distorting price for local services, and has much different implications than a broader wealth tax not tied to public services. Third, immovable property is only one component of wealth, and because the relative size of this component varies dramatically across levels of household net worth, a property tax is not well-targeted at the very wealthy. Using the 2016 Survey of Consumer Finances, Wolff (2017) estimates that, while principal residences (the major but not only component of the property tax base) account for 62% of the gross assets of individuals in the middle three quintiles of net worth, they comprise only 8% of gross assets for the top 1%. Fourth, most local property taxes in the United States feature a fixed rate, occasionally with an exempt level of property value. Of course, other rate structures are possible. For example, the “council tax” in the United Kingdom features a graduated rate structure based on the property value. Many US states do levy a surcharge on the highest-value homes or have a progressive bracket structure through their real estate transfer tax system, sometimes referred to as “mansion taxes.”

4.2 Estate and Inheritance Taxes

The US federal government has levied a tax on a base close to net worth since it enacted an estate tax in 1916, and added a gift tax in 1924. This tax requires a valuation of taxable wealth at death, coinciding with the probate process, which attempts to locate and determine the net worth of the deceased. The US estate tax has a sizeable exemption level, which as of 2020 is \$11.58 million for singles and \$23.16 million for married couples, and features a flat rate of 40% over the exemption. The revenue it generates has eroded over time, recently because of legislated increases in the exemption level; in fiscal year 2019 it raised \$16.7 billion, or slightly less than 0.5% of federal revenues—less than one-tenth of what the Sanders and Warren proposals projected to collect—from about 0.06% of decedents.

In principle, the estate tax is designed to target the superrich, but in practice many features of the law allow them to significantly reduce their exposure. Notably, the effective estate tax rate is reduced by extensive undervaluation of wealth transfers via, for example, family limited partnerships, which are holding companies owned by two or more family members created to retain a family’s business interests, real estate, publicly-traded and privately-held securities. Due to the lack of control and lack of marketability that limited partners possess, these interests can be transferred to future generations at a discount to market value.

What is known about the consequences of an estate tax? Kopczuk (2013) surveys the evidence and concludes that the literature suggests an elasticity of *reported* estates—which

includes changes in real wealth accumulation, avoidance, and evasion—with respect to the net-of-tax rate between 0.1 and 0.2. Eller et al. (2001) analyze estate tax evasion based on data from a stratified random sample of federal estate tax returns as filed and audit assessments, and they estimate the estate tax underreporting gap due to noncompliance to be 13%, but this figure may substantially understate the true magnitude of the gap, in part because it does not account for any noncompliance not detected during the IRS examination process.

4.3 Capital Gains Taxes

Any analysis of how the wealthy are taxed must confront how capital gains are taxed. For the superrich, realized capital gains represent a very high fraction of reported income. For example, IRS data shows that in tax year 2014 realized capital gains represented 60% of total adjusted gross income (AGI) for the 400 highest-AGI Americans. In tax year 2016, those with adjusted gross income over \$10 million reported net capital gains corresponding to 46% of their adjusted gross income, whereas it is a negligible fraction for those earning less than \$200,000 (Scheuer and Slemrod 2020).

A capital gains tax is of course not a wealth tax, because it applies to gains rather than to the total value of the financial asset. Under current US law, capital gains are taxed at a lower rate than other income and are taxed upon realization (usually sale) rather than accrual, which generates a so-called deferral (or interest) advantage. Most importantly, capital gains unrealized at death completely escape income taxation. Instead, there is a “step-up” provision under which the value of an asset at the time of death becomes the tax basis for the inheritor, so that if sold the taxable capital gain is calculated as if that was the purchase price. Even though some of the income that gives rise to the appreciation of assets (such as corporate stock) is subject to taxation at the corporate level, corporate tax rates have come down over time. Taken together with the extreme concentration of capital gains at the top, these provisions have led to concerns that the overall progressivity of the income tax is eroding.

There have been a number of proposals to alter the capital gains tax in ways that would restore tax progressivity without resorting to an annual wealth tax. As one example, President-elect Joe Biden released a plan to tax capital gains and dividends at the same rate as ordinary income for taxpayers with incomes exceeding \$1 million and also to tax unrealized capital gains at death. Combined with other proposed changes in the income tax code, Biden’s tax plan would raise the top marginal tax rate for capital gains from 20% to 39.6%.

While Biden’s plan would eliminate two of the preferential tax provisions for capital gains, it would retain the current system of taxation based on realization rather than accrual other than at death, thereby preserving the advantage of being able to defer taxes within a lifetime. In view of this, calls for the taxation of accrued capital gains have been made.

For example, Batchelder and Kamin (2019) offer a menu of “incremental” revenue options, including an accrual-based capital gains tax consisting of an annual mark-to-market tax on publicly-traded assets plus a retrospective accrual tax for illiquid assets. Under a retrospective scheme, the capital gains tax is assessed upon realization, but the statutory tax rate rises as the holding period lengthens, effectively charging interest on past gains when realization occurs. This eliminates the need to value assets that are not actually being sold while minimizing liquidity problems and the incentive to defer such realization (Auerbach 1991).

5 Consequences of a Wealth Tax

Imposing a wealth tax will tend to reduce the amount of taxed wealth, due to some combination of changes in wealth accumulation, shifts in financial choices, and outright evasion. Here, we consider these various consequences, along with some discussion of the administrative and compliance costs of levying such a tax. We focus mostly on evidence from the European wealth taxes, but also consider some evidence from related taxes like the estate tax.

5.1 Evidence on the Overall Response to Wealth Taxes

Empirical studies of the behavioral response to wealth taxes are much sparser than for income taxes, largely because wealth taxes themselves are much rarer than income taxes. Moreover, because the tax bases and relevant enforcement details vary widely, applying the evidence on the effect of one country’s tax to another is problematic. Indeed, some potentially critical enforcement instruments, such as cross-country information exchange agreements that are designed to constrain tax evasion using foreign accounts, post-date essentially all of the studies.

We begin with four studies that find taxable wealth to be highly responsive to its tax rate. Brülhart et al. (2019) take advantage of variations in the Swiss wealth tax rate across cantons and over time and find that a 1 percentage-point decrease in wealth taxes increases reported taxable wealth after six years by at least 43% (and by 96% for the subset of large reforms). Comparing administrative tax records from two cantons suggests that about one-fourth of the effect comes from taxpayer mobility and another one-fifth from house price capitalization. They argue that savings responses cannot explain more than a small fraction of the remainder, suggesting sizable evasion responses in this setting with no third-party reporting of financial wealth.

Jakobsen et al. (2020) examine changes in the Danish wealth tax that was cut back beginning in 1989 and abolished in 1997, taking advantage of two design aspects of this tax: a

doubling of the exemption threshold for married couples and a cap on the ratio of income, payroll, and wealth taxes as a fraction of income that renders the marginal wealth tax equal to zero for those at the cap. For the very wealthy, they conclude that reducing the wealth tax rate by 1 percentage point would raise taxable wealth by 21% after 8 years. Because the estimated effect grows over time, they argue that it could not be all a one-time avoidance effect. Instead, half of the long-run effect is mechanical since a higher wealth tax reduces wealth even when behavior is unchanged.

Also sizeable are the estimated elasticities of Durán-Cabré et al. (2019) based on an analysis of the surprise re-introduction of a wealth tax in Catalonia in 2011. They find no evidence of it reducing wealth accumulation, but find that the tax triggered substantial tax avoidance via taxpayers changing their asset composition toward exempt assets (mainly company shares) and induced taxpayers to reduce taxable income to take advantage of an income-related cap on the sum of income and wealth tax liability. They find that a 1 percentage point reduction in the average wealth tax rate would lead to an increase in taxable wealth of 32% over four years. Agrawal et al. (2020) look more closely at the migration response, focusing on the fact that all Spanish regions levied positive wealth tax rates except for Madrid. They conclude that, by five years after the reform, the number of wealthy individuals residing in Madrid for tax purposes increased by 10% relative to other regions, but conclude that misreporting rather than physical location change is likely the main factor. As in Brülhart et al. (2019), this applies to sub-national variation in wealth tax rates, where migration (or reported migration) is likely to be large relative to cross-national migration.

Zoutman (2018) studies a major reform to wealth and capital income taxation in the Netherlands that occurred in 2001. Comparing households that were similar in wealth and income, but treated differently by the reform, he concludes that a 1 percentage point decrease in the wealth tax rate leads to a long-run increase in accumulated wealth of 14%.

Finally, Seim (2017) finds considerably smaller effects. Exploiting bunching around a kink in the Swedish wealth tax rate schedule where the rate changes from 0% to 1.5%, he estimates that a reduction in the wealth tax rate by 1 percentage point increases reported wealth by 0.10 to 0.27%. He concludes that the elasticity mainly represents reporting responses, and finds no evidence of households changing their saving or portfolio composition.⁹

In sum, recent studies of the European experience suggest that the behavioral response to wealth taxation can be substantial, but that the anatomy of the response—real versus avoid-

⁹In a recent study of Colombia, Londoño-Velez and Avila-Mahecha (2019) find evidence of bunching responses of reported wealth below notches in the tax rate structure and estimate that, in the short run, a 1 percentage point wealth tax cut increases reported wealth by 2%. They conclude that these responses reflect predominantly avoidance and evasion, such as misreporting wealth items subject to less third-party reporting. They also find that wealthy taxpayers increased compliance in response to incentives for the disclosure of previously hidden wealth, as well as in response to an exogenous increase in the risk of detection and punishment due to the publication of the “Panama Papers.”

ance versus evasion—varies a lot, in large part because of differences in the broadness of the tax base. Advani and Tarrant (2020) offer a comprehensive review of these empirical studies and attempt to explain the varying results based on design features, contextual factors, and methodological differences.

There is an important interaction among these behavioral reactions. As Slemrod (2001) details in a more general context, the tax disincentive to real behavior depends on how the marginal cost of avoidance and evasion interacts with the real decision. In the extreme, a tax that can be costlessly evaded will provide no disincentives for real behavior. This insight suggests that when estimating the effects of a wealth tax, it is essential to understand how design differences might affect the costs of evading the tax. Indeed, supporters of the prominent US wealth tax proposals have suggested several reasons why it might be harder to evade than the European experience would indicate: for example, the United States is a much larger country, its tax system is citizenship-based rather than residence-based, the proposals involve much higher exemption thresholds, they are accompanied by plans to enhance tax enforcement, and their implementation would post-date the adoption of the Foreign Account Tax Compliance Act (FATCA) in 2010. We take up some of these issues below.

5.2 Real Behavioral Responses

A wealth tax reduces the after-tax return to saving. The most important potential real behavioral response is in terms of reduced saving and capital accumulation. This effect is qualitatively the same as under other taxes on capital accumulation, such as a capital income tax (see e.g. Bernheim 2002 for an overview). As seen above, though, one difference is that a wealth tax can translate into higher capital income tax rates than are commonly imposed (potentially exceeding 100%), which presumably leads to larger effects.

Taxes that appear to be levied on the wealthy may instead be borne by others via tax-induced changes in pre-tax prices. For example, if a wealth tax reduces capital accumulation, in the long run it may reduce average wage rates. Such an argument figured prominently in the debate preceding the Tax Cuts and Jobs Act of 2017, when supporters argued that the proposed cut in the rate of corporate income tax would, via increased business investment and eventually a larger capital stock, increase average annual wages by as much as \$9,000; this suggests an avenue through which taxing “their” wealth ends up affecting “our” wealth. This conclusion is highly controversial, however (for an overview of the arguments made at this time, see Slemrod 2018 in this journal).

A wealth tax could also affect work effort, but there is no consensus on the relevant labor supply elasticity. Notably, a substantial fraction of the very wealthy are (themselves or

descendants of) principals in a rather successful business venture: of the wealthiest Americans on the 2018 Forbes 400 list, 69% were “self-made” founders of their business (Scheuer and Slemrod 2020). As a result, the relevant margin is probably not hours of work in the narrow sense. Instead, the key effects may be on the incentives for entry into entrepreneurship (Cullen and Gordon 2007, Scheuer 2014) and on the ownership and control structure of business enterprises.

Due to the highly progressive nature of the wealth tax, it could, for example, discourage entrepreneurial risk taking. Hall and Woodward (2020) document that entrepreneurial risk is highly skewed, with most venture-capital backed startup companies faring poorly and a few performing exceptionally well. Due to incentive problems, this risk cannot be diversified, which limits the attractiveness of entrepreneurship under reasonable risk aversion, so further reducing entry might seem like a bad idea. However, because a risk-averse individual will have relatively low marginal utility in case of very good outcomes, the effect on ex ante decisions of a wealth tax that applies only in those low-probability states of the world could be modest.

Another concern is that a wealth tax might force entrepreneurs to continually reduce their ownership in a company whose valuation increases over time in order to pay the tax liability. Even if such founders are not primarily motivated by monetary incentives, but instead are mostly interested in being able to realize their ideas, such an anticipated dilution of control rights could have discouraging effects ex ante.

Might a US wealth tax induce some people to move out of the country? Because the US taxes on the basis of citizenship rather than residence, moving does not relieve an American citizen of any tax obligations—instead, citizenship renunciation is required. There are some prominent examples: Facebook co-founder Eduardo Saverin dropped his US citizenship in favor of Singapore just prior to the Facebook IPO in 2012. But overall, US citizenship renunciation by the wealthy has been very small. Between 2005 and 2017, more than 30,000 individuals dropped their US citizenship, of whom fewer than 100 reported net worth greater than \$100 million (Organ, 2020). Overall, however, about one-third of those dropping citizenship were millionaires, compared with only about 5-6% in the US population. An increase in renunciations in the 2010s was probably due to increased enforcement of tax evasion using offshore accounts, prompting renunciation by dual citizens already resident abroad. However, there is no historical precedent to help gauge the renunciation response to a wealth tax at rates far above existing levels.¹⁰

¹⁰Senator Warren proposed a 40% exit tax on the net worth above \$50 million of any US citizen who renounces their citizenship, while Senator Sanders proposed a 40% exit tax on the net value of all assets under \$1 billion, and a 60% exit tax for those with wealth exceeding \$1 billion. If enforced, these measures would probably greatly limit any potential exit responses.

5.3 Avoidance

One way to reduce wealth tax liability is to substitute to assets that face lower tax rates, or to hold assets for which the value is harder to monitor and thus easier to successfully understate. Spain offers a stark example: when it exempted some forms of closely-held businesses from its wealth tax base, the share of the exempted stock as a share of all closely-held businesses increased from 15 to 77% (Alvaredo and Saez 2009).

In a US context, a wealth tax might lead some high net-worth individuals to shift into assets that are harder to value, such as keeping businesses private rather than going public. Startup firms might forego equity infusions to avoid new valuation rounds, which could constrain their expansion, or they could start issuing non-standard, less transparent types of stocks. Hemel (2019) offers the example of companies deciding not to offer their shares on public equity markets, even if a public offering would be the most efficient means of raising capital, because a more transparent valuation will lead to a larger wealth tax liability for its shareholders. Much wealth of the Forbes 400, for example, is currently held in publicly-traded stock, but this feature cannot be taken as unresponsive to a potential wealth tax. This is an example of a potentially substantial and distorting behavioral response of which there is no trace in existing data; how likely it is to occur, and what enforcement responses might constrain it, is very hard to know for sure. Such shifting into less visible assets would also have repercussions for our measures of wealth inequality: it might look like a wealth tax reduces concentration when in reality it partly shifts top wealth into forms that are less susceptible to accurate measurement.¹¹

5.4 Evasion

Government auditors typically lack the resources to trace sophisticated means of wealth tax evasion—say, methods that work through layers of financial intermediaries. High-profile leaks from these intermediaries, such as the 2007 leak from HSBC Bank in Switzerland and the 2015 “Panama Papers” from the firm Mossack Fonseca, have allowed researchers to gain insights into these forms of tax evasion. Alstadsæter et al. (2019) link the account names from the HSBC leak with individual tax data for Norway, Sweden, and Denmark and find that 95% of these foreign account-holders did not report the existence of the account to the tax agency. They show that evasion rates rise sharply across the income distribution, and conclude that the top 0.01% in the income distribution evade about 25% of the income and wealth taxes they owe. Guyton et al. (2020) combine random audit data with data on offshore bank accounts and show that tax evasion for US taxpayers through offshore financial

¹¹Another avenue of wealth tax avoidance is inter-vivos gifts. Research suggests that these gifts are tax-sensitive (see, for example, Bernheim et al., 2004, and Joulfaian and McGarry, 2004).

institutions is highly concentrated at the very top of the income distribution, and that random audits virtually never detect this form of evasion.

Despite this new evidence, we do not yet know the extent to which a wealth tax at much higher rates would be susceptible to evasion, although some of the studies of European wealth taxes suggest substantial evasion. Its extent will certainly depend on the enforcement environment, which is evolving. The Foreign Account Tax Compliance Act (FATCA) of 2010 set up third-party reporting requirements based on existing tax information exchange agreements. Through threat of a punitive withholding tax for non-complying foreign financial institutions, FATCA provides US tax subjects with strong incentives to report to the IRS the value and income generated by their foreign accounts.¹² Both the Sanders and Warren plans would expand enforcement further, proposing significant increases in the IRS enforcement budget and a minimum audit rate for taxpayers subject to the wealth tax.

How effective such expanded enforcement would be in restraining evasion has been controversial. Saez and Zucman (2019a) claim that evasion would shrink the wealth tax base by just 15%. Kopczuk (2019) expressed skepticism, noting that the most effective tax enforcement relies on market transactions reported by third parties, which would be absent for much wealth. This is not purely an enforcement problem because, as mentioned, the valuation of many assets is objectively hard. Clever ideas have been put forward to address this problem; for example, Allais (1977) proposed that wealth owners self-report the value of their assets but then the government (or any other private bidder) could acquire these assets at a surcharge of 40% (respectively, 50%). Such schemes come with their own difficulties, though, especially with opaque assets, not to mention the political concerns about the government owning a large share of businesses in the economy.

One difference between the wealth tax and the estate tax is that the former requires reporting at a much higher frequency. While this potentially raises compliance costs, the upside is that any evasion strategy must engineer an entire path of reports that is plausible on a yearly basis, notably relative to yearly income, rather than just one end-of-life snapshot. This may make it harder to systematically conceal wealth than in the case of the estate tax, which allows for decades of planning without generating much data for tax authorities.

5.5 Administrative and Compliance Costs

A wealth tax imposes costs of collection, including the compliance costs borne by taxpayers and third parties and the administrative costs borne by the government. Leiserson (2019) ex-

¹² The international version of FATCA, known as the Automatic Exchange of Financial Account Information in Tax Matters (the AEOI Standard), began in September 2017 and, by 2019, 94 countries had exchanged information. Johannesen et al. (2020) provide evidence on the impact of pre-FATCA enforcement policies aimed at foreign accounts held by U.S. taxpayers.

trapolates from experience with the US estate tax to estimate the ratio of private compliance costs to revenues from a 2% wealth tax at 19%, which is approximately double the conventional wisdom about the US income tax; he estimates government administrative costs to be just 0.6% of revenue. Troup et al. (2020) estimate the compliance cost to be 1% to 1.5% of total wealth in the first year based on the legal costs of the probate process in the UK, which, depending on the tax rate, would mean costs roughly equivalent to tax revenue. However, the compliance costs would fall in subsequent years due to repetition effects. Moreover, due to the fixed-cost nature of valuation and reporting efforts, the compliance cost relative to revenue declines if a higher wealth tax rate is applied.

6 Are Wealth Taxes Part of an Optimal Tax System?

We now turn to the normative question whether wealth accumulation *should* be taxed and, if so, the extent to which a wealth tax should be a preferred mechanism for doing so. A growing literature in public economics has started to incorporate more realistic labor markets into models of optimal tax policy, accounting for phenomena such as rent-seeking, skill-biased technological change, and superstar effects, to name just a few advances (for an overview, see Scheuer and Slemrod 2020). This line of work has focused on the optimal design of labor income taxes in static models that capture recent trends in occupational sorting and wage inequality. Because a growing concentration of earnings can affect, through savings, the degree of wealth inequality down the road, this raises the question whether these trends also affect the optimal taxation of capital or wealth.

6.1 The Atkinson-Stiglitz Benchmark

Suppose first that *all* wealth inequality is driven by inequality in labor incomes. In this case, the Atkinson-Stiglitz (1976) theorem provides a classic benchmark. It states that, if a non-linear labor income tax is available, any distortion of savings is Pareto-inefficient whenever preferences satisfy two conditions: i) they are separable between consumption and labor; and ii) all individuals have the same utility over consumption across time. In other words, if individuals only differ in their labor productivities, and the recent rise in wealth inequality is the result of changes in labor markets, such as top earners being able to leverage their skills on a larger scale (Scheuer and Werning 2017), then the policy response should be to adjust the progressivity of labor income taxes. The taxation of capital income or wealth on top of that is not justified.

This theorem is a conceptually useful baseline, but the underlying assumptions are not realistic. First, Saez (2002) has suggested a positive correlation between labor productivities

and savings propensities. This violates the Atkinson-Stiglitz condition (ii), because individuals will differ in their discount rates in a way that is related to earnings abilities. Similarly, when individuals differ in their rates of return on their wealth, this lends support to the additional taxation of capital (Gerritsen et al. 2020). Second, disentangling labor and capital income can be challenging in practice, so capital income taxes may be needed to minimize revenue-losing tax-base shifting from labor to capital income (Christiansen and Tuomala 2008). Third, when agents face uncertainty and are risk averse, taxing capital income can improve incentives for labor supply (Golosov et al., 2006). Fourth, current policymakers do not face a blank slate, but instead face a situation with pre-existing wealth inequality. Individuals already differ in the wealth they own, either because they have inherited it from previous generations or because they themselves have saved in the past.

6.2 A One-Time Tax on Existing Wealth

In principle, pre-existing wealth inequality could be alleviated in a lump-sum fashion through a one-time, unanticipated wealth tax. Indeed, historically, various countries have used one-time wealth taxes to deal with revenue shortfalls, such as war-time spending shocks. In 1999, Donald J. Trump, then a candidate for the Reform Party presidential nomination, proposed a 14.25% one-time “net worth tax” on individuals and trusts worth more than \$10 million in order to eliminate the US national debt. More recently, calls have been made for a time-limited, progressive wealth levy to stem the fiscal burden arising from the coronavirus pandemic (for example, Landais et al. 2020).

From an optimal tax perspective, such policies are attractive because they avoid behavioral distortions by only touching wealth that has already been accumulated.¹³ But this appealing feature critically hinges on the ability of policymakers to implement such on short notice and on their commitment not to make such taxes permanent or to reintroduce them periodically when similar times come about in the future, which would lead to reputational damage. In the past, originally one-off war taxes have often turned into long-lasting tax policies.

6.3 Taxing Future Wealth Accumulation

If an unexpected, distortion-free redistribution of existing wealth is not feasible, one policy option is to adjust the labor income tax going forward. If initial wealth and earnings abilities are positively correlated, a more progressive labor income tax could be used to target both

¹³Taxes on existing wealth can be replicated, in principle, by consumption taxes coupled with subsidies on labor income. Moreover, even though taxing pre-existing wealth has no incentive effects, it has redistributive effects across age cohorts because those who are older tend to have more wealth.

determinants of inequality, at least indirectly. The alternative is to introduce a tax on future wealth accumulation, which will of course distort the savings incentives of individuals. We now present a parsimonious model to show that a tax on wealth accumulation will be part of the optimal tax mix, even if preferences satisfy conditions (i) and (ii), and that the optimal schedules of the wealth and labor income tax are closely linked.¹⁴

Suppose individuals have a fixed labor productivity $\theta \sim F(\theta)$. They live for two periods $t = 0, 1$: They work, consume and save in the first period and consume out of their (after-tax) savings in the second (which can be interpreted as retirement). Their preferences are

$$u(c_0) - h(y_0/\theta) + \beta u(c_1),$$

where c_t is consumption in period t , y_0 is the labor income earned in period 0, and β is a common discount factor. Importantly, these preferences satisfy the Atkinson-Stiglitz assumptions: (i) the disutility of labor h is separable from the utility of consumption, and (ii) the subutility of consumption $u(c_0) + \beta u(c_1)$ is common across individuals.¹⁵

There is a linear savings technology with gross rate of return R (again common across individuals). Individual θ is born with wealth $k_0(\theta)$ in period 0. Notice that the initial wealth inequality is perfectly correlated with labor productivity θ . This is assumed to conceptually weaken the scope of a wealth tax: If the correlation were imperfect, so that there could be individuals with the same labor income but very different initial wealth levels, we would be in a situation with two-dimensional heterogeneity and a labor income tax alone would be insufficient to achieve redistribution across these two dimensions. Here, this well-known argument for a wealth tax does not apply.

Because we assume that no direct tax on initial wealth is possible, the remaining policy instruments are a tax on first-period labor income $T_y(y_0)$ and a tax on second-period wealth $T_k(Rk_1)$, which is equivalent to a tax on capital income in this model. Individuals' budget constraints are

$$c_0 = y_0 - T_y(y_0) + k_0 - k_1 \tag{1}$$

$$c_1 = Rk_1 - T_k(Rk_1). \tag{2}$$

If $k_0(\theta)$ was common across all θ , the Atkinson-Stiglitz theorem would imply that, at any Pareto optimum, $T_k(Rk_1) = 0$: We should only use the labor income tax $T_y(y_0)$ to achieve redistribution. Here we ask what happens when $k_0(\theta)$ varies across individuals: Is the labor

¹⁴Cremer et al. (2001) observe that the Atkinson-Stiglitz uniform commodity taxation result breaks down when individuals have heterogeneous endowments and offer simulations of the optimal tax system in a four-type model.

¹⁵With heterogeneity in individuals' savings propensities, governed by β , in addition to heterogeneity in labor skills θ , it is well known that the Atkinson-Stiglitz theorem does not apply and there is a case for savings taxes. We rule this out to stack the cards against a wealth tax.

tax T_y still sufficient to deal with both initial wealth inequality and labor income inequality, or should we (also) use the tax on future wealth accumulation T_k despite its distortionary effects? Proposition 1 shows that the latter is optimal.

Proposition 1. *In any Pareto optimum, the optimal marginal wealth tax schedule satisfies*

$$T'_k(Rk_1(\theta)) = \frac{T'_y(y_0(\theta))}{1 - T'_y(y_0(\theta))} \left[\frac{\sigma(\theta)}{\alpha(\theta)\eta(\theta)} \left(1 + \frac{1}{\varepsilon(\theta)} \right) - 1 \right]^{-1} \quad (3)$$

where σ denotes the intertemporal elasticity of substitution, ε the Frisch elasticity of labor supply, $\alpha = k_0/c_0$ measures the share of period-0 consumption financed out of initial wealth, and $\eta(\theta) \equiv k'_0(\theta)\theta/k_0(\theta)$ the elasticity of initial wealth with respect to labor productivity.

To gain intuition for the formula, consider first the case with no initial wealth inequality, so $\eta = 0$. Hence, we return to the Atkinson-Stiglitz benchmark with $T'_k(Rk_1) = 0$ and all desired redistribution is achieved through the labor income tax. The same is true when the intertemporal substitution elasticity σ is infinite (the saving distortions induced by a wealth tax explode) or when the Frisch elasticity ε is zero (inelastic labor supply implies that the labor tax is lump-sum, so there is no need for an additional wealth tax).

Second, more generally, formula (3) links the shapes of the wealth and labor income tax schedules at any optimum (as both are driven by the redistributive motives of the government). But the term in square brackets introduces a wedge between the two. For instance, suppose σ and ε are fixed parameters.¹⁶ Then any variation in this term is determined by how $\alpha\eta$ varies across the distribution. If $\alpha\eta$, which summarizes the importance of initial wealth relative to labor income inequality, is increasing towards the top, the wealth tax should be more progressive than the labor income tax, and vice versa.¹⁷

The parameters in formula (3) can all be connected to empirical statistics; notably, η can be backed out from the joint distribution of wealth and income. For example, suppose the marginal tax rates on wealth and labor income converge to the constants t_k and t_y at the top, respectively, and the same holds for the intertemporal substitution elasticity σ , the Frisch elasticity ε and the importance of initial wealth as captured by the statistic α . Then we have the following corollary of Proposition 1:

Corollary 1. *In any Pareto optimum, the top marginal wealth tax rate is*

$$t_k = \frac{t_y}{1 - t_y} \left[\frac{\sigma\rho_k + \varepsilon\rho_y}{\varepsilon\alpha\rho_y} - 1 \right]^{-1}$$

¹⁶This would be the case when $u(c)$ exhibits constant relative risk aversion and the disutility of labor is iso-elastic.

¹⁷It can also be shown that $T'_k(Rk_1) > 0$ under standard redistributive motives.

where t_y is the top marginal income tax rate and ρ_k and ρ_y are the Pareto tail coefficients of the wealth and labor income distribution, respectively.

It is straightforward to calibrate this formula. For instance, suppose $\sigma = 1$, so $u(c) = \log(c)$. Because $\alpha \leq 1 + \beta$, we can use the formula to obtain an upper bound to the marginal wealth tax rate. Empirical estimates suggest $\rho_k \approx 1.4$ and $\rho_y \approx 1.6$. Moreover, suppose $\varepsilon = .3$ and $t_y = 50\%$. Interpreting the period length in this two-period model as roughly 30 years and assuming a yearly interest rate of 3%, we have $\beta = .97^{30} = .4$. This implies

$$t_k \leq \frac{.5}{1 - .5} \left[\frac{1 \times 1.4 + .3 \times 1.6}{.3 \times 1.4 \times 1.6} - 1 \right]^{-1} = 56\%$$

over the 30-year horizon, or an annual wealth tax of at most

$$t_k^{annual} \leq 1 - (1 - .56)^{1/30} = 2.7\%.$$

In sum, unless there is already a fully equalized wealth distribution, it is generally optimal to introduce progressive taxes on future wealth accumulation on top of labor income taxes, despite their distortive effects, at least for some amount of time. In the long run, of course, the effect of initial wealth on overall inequality will diminish. Indeed, the influential Chamley-Judd result argued that zero capital taxation is optimal in the long run; Judd (1985) argued that this result holds even in the face of extreme wealth inequality, while Chamley (1986) instead considered long-run capital taxation in a representative agent framework. However, Straub and Werning (2020) have recently demonstrated that Judd's result is invalid whenever the intertemporal elasticity of substitution is at most one—which seems the empirically relevant level—and the long-run tax on capital should in fact be positive and significant. For higher elasticities, it converges to zero, but possibly at a very slow rate—for decades, or even centuries.¹⁸

6.4 Wealth versus Capital Income Taxes

We conclude that the modern theory of optimal taxation lends support to taxing wealth accumulation. However, the existing literature does not pin down the appropriate tax instruments to use for this purpose. As discussed in Section 2, in standard models, the wealth tax is equivalent to a tax on capital income. Given that most countries already have progressive capital income taxes, for instance, what might justify levying a wealth tax instead, or in

¹⁸Chamley's (1986) model imposes an upper bound on capital taxes, and Straub and Werning (2020) provide conditions under which this bound is binding forever at the optimum, also implying positive long-run capital taxes. Saez and Stantcheva (2018) show that when wealth enters utility directly, in addition to the consumption it finances, the optimal long-run capital tax is also positive.

addition?

When individuals differ in the rates of return r on their wealth, there is a tradeoff between wealth taxes and capital income taxes that depends on the source of these differences. Because the capital-income-tax equivalent of a given wealth tax rate t_w is given by t_w/r , Allais (1977) pointed out that a wealth tax favors wealth holders with high rates of return relative to a capital income tax. Hence, relative to a capital income tax a wealth tax encourages the reallocation of capital from “idle” wealth holders to productive entrepreneurs. In a quantitative model, Guvenen et al. (2018) find significant efficiency gains from this effect of compared to a uniform capital income tax.

There is, however, an opposing effect. If heterogeneous returns reflect heterogeneous windfall gains, rents, or excess profits (perhaps due to market power or inside information), rather than actual productivity differences, then taxing away such gains has well-known efficiency benefits (Rothschild and Scheuer 2016). But a wealth tax gets this exactly reversed—it taxes the normal rate of return and leaves the excess returns untouched. For example, if all investors have a real rate of return of 3%, but some earn additional excess profits on their investments, then a 3% wealth tax would not target any of those rents, whereas a capital income tax would.

A related issue is that much of what shows up as return to capital on the tax reports of the superrich (for example, in the form of realized capital gains) is arguably compensation to labor from the work that went into building a successful company or picking high-performing assets. In Scheuer and Slemrod (2020), we argue that the ability to convert this kind of labor income into preferentially-taxed capital gains is a key margin of behavioral response to taxes at the top, which we refer to as the “plasticity” of the tax base. A wealth tax only taxes some normal return, whereas a capital income tax hits the full extent of such shifted labor compensation.

Some progress has been made in measuring the extent and nature of return heterogeneity (for example, Fagereng et al., 2020). However, a comprehensive decomposition into actual productivity differences versus differential rents or shifted labor compensation has not yet been accomplished.

7 Political Economy

The case for a wealth tax often reaches beyond specifically economic questions of tax incidence and redistribution and is based on a concern that rising inequality of income and wealth may lead to adverse political outcomes. As one example, excessive inequality might allow the rich to capture the political system and tilt it in their favor. From a somewhat different angle, Farhi et al. (2012), Piketty (2014), and Scheuer and Woltitzky (2016) have

emphasized concerns going back to Karl Marx, who predicted that an increase in the concentration of wealth would lead to a revolution and to radical redistribution. We briefly consider both perspectives and the extent to which they can justify a wealth tax.

7.1 Wealth and Political Power

Even in a “one-person, one-vote” democracy, the superrich can affect politics more than others through campaign contributions, ownership of media outlets, or lobbying activities. Gilens (2014) and Bartels (2016) collect evidence that political decisions often are more sensitive to the preferences of the rich than those of the median voter. Accordingly, proponents of a progressive wealth tax have argued that reducing the wealth of the superrich is a desirable objective in itself, beyond the revenue it could raise to effect redistribution. Indeed, Saez and Zucman (2019b) propose setting wealth tax rates above the revenue-maximizing rate, expressing a willingness to reduce the wealth of the superrich in the interest of preventing an “oligarchic drift” that would otherwise undermine democracy. Of course, there is some tension between enacting a wealth tax to fund redistribution initiatives (such as “Medicare for All” in the recent US proposals) and enacting a wealth tax with the goal to collect less than the revenue-maximizing amount.

Even if concerns about an extreme concentration of wealth and political power are warranted, the jury is still out on the extent to which a wealth tax is the appropriate tool to address the problem. Other instruments may be better targeted at ensuring a more equal political representation, such as regulating campaign contributions and public financing of political campaigns. Some European countries offer examples of democracies where money plays a smaller role in politics than in the United States, and Brechenmacher (2018) concludes that wealthy elites exerting disproportionate political influence is a distinctly US phenomenon. One particular concern with the wealth tax is that it might encourage the wealthy to become more politically active, in an attempt to reduce their wealth tax liability through, for example, political donations.

7.2 Politically Sustainable Tax Policy

One can argue that the primary role of a wealth tax is to make tax policy and the resulting inequality more stable so that it can resist the threat of political upheaval. Such threats were important drivers of tax and welfare state policies in 19th and 20th century Europe, when the socialist movement gained momentum (Esping-Andersen 1990), and they are palpable today in many South American countries. If political instability is an urgent problem, annual wealth taxes are able to compress the wealth distribution relatively quickly compared to, say,

taxes on bequests or capital income.

One approach to modelling this question is to focus on tax policies that will maintain the support of a majority of citizens over time. Scheuer and Wolitzky (2016) show that the optimal sustainable tax policy involves a positive marginal tax on the wealth accumulation of the rich, while subsidizing that of the middle class. Ex post, there is always a temptation to impose wealth taxes, because at this point, wealth accumulation is sunk. However, if the future is likely to bring near-confiscatory wealth taxes, then individuals anticipating this outcome would save very little in the first place, leading eventually to a poor outcome for everyone. Hence, ex ante it is better to tax the savings of the rich at least to some degree and create a middle class that accumulates enough wealth to successfully oppose more extreme redistribution in the future.

Of course, if the issue is reducing the impetus for political disruption based on tensions related to income inequality, the wealth tax needs to be compared to a range of other political alternatives: for example, a combination of a progressive increase in income tax rates, more tax audits, expanding the estate tax, reforms to capital gains taxation, refocusing government spending on those with lower income levels, or an expansion of social insurance programs.

8 Conclusion

In recent years, many European countries decided that a wealth tax did not belong in their armory of tax instruments. Although the US has never had such a tax, perceptions of unacceptably high income and wealth inequality have recently galvanized support for one, and two prominent senators have produced detailed proposals. These proposals differ quite substantially from the experience of their European counterparts. Thus, the evidence about the consequences of wealth taxation in Europe is in any event of limited usefulness. On the one hand, the broader base along with promised expanded enforcement will limit the revenue leakage and distortion from avoidance and evasion, while exacerbating real behavioral responses. On the other hand, the higher top rates and targeting of the superrich will concentrate the revenue pressure on those taxpayers with the best means and strongest incentives to avoid the tax. Hence, when evaluating these US wealth tax proposals, one can at best hold one's breath and extrapolate broadly from the European wealth tax experience and the US experience with similar taxes, and gain insight from optimal tax reasoning about whether to tax capital via an annual wealth tax. Given rising economic inequality in the United States, proposals for taxes on wealth accumulation in some form are likely to remain an ongoing subject of debate.

References

- Advani, A. and H. Tarrant (2020), "Behavioural Responses to a Wealth Tax," Wealth Tax Commission Evidence Paper 5.
- Agrawal, D., D. Foremny and C. Martínez-Toledano (2020), "Paraísos Fiscales, Wealth Taxation, and Mobility," Mimeo.
- Allais, M. (1977), "L'Impôt sur le Capital et la Réforme Monétaire," Editions Hermann, Paris.
- Alstadsæter, A., N. Johannesen, and G. Zucman (2019), "Tax Evasion and Inequality," *American Economic Review* 109, 2073–2103.
- Alvaredo, F. and E. Saez (2009), "Income and Wealth Concentration in Spain from a Historical and Fiscal Perspective." *Journal of the European Economic Association* 7, 1140-1167.
- Atkinson, A. and J. Stiglitz (1976), "The Design of Tax Structure: Direct versus Indirect Taxation." *Journal of Public Economics* 6, 55-75.
- Auerbach, A. (1991), "Retrospective Capital Gains Taxation," *American Economic Review* 81, 167-178.
- Bartels, L. (2016), *Unequal Democracy, Political Economy of the New Gilded Age*, Princeton University Press.
- Batchelder, L. and D. Kamin (2019), "Taxing the Rich: Issues and Options," Mimeo.
- Bernheim, D. (2002), "Taxation and Saving," *Handbook of Public Economics* 3, 1173-1249.
- Bernheim, B. D., R. Lemke, and J. K. Scholz (2004), "Do Estate and Gift Taxes Affect the Timing of Private Transfers?" *Journal of Public Economics* 88, 2617-2634.
- Brechenmacher, S., (2018), "Comparing Democratic Distress in the United States and Europe," Carnegie Endowment for International Peace.
- Brülhart, M., J. Gruber, M. Krapf, and K. Schmidheiny (2019), "Behavioral Responses to Wealth Taxes: Evidence from Switzerland," NBER Working Paper 22376.
- Chamley, C. (1986), "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives," *Econometrica* 54, 607-622.
- Christiansen, V. and Tuomala, M. (2008), "On Taxing Capital Income with Income Shifting," *International Tax and Public Finance* 15, 527–545.
- Cullen, J. and R. Gordon (2007), "Taxes and Entrepreneurial Risk-Taking," *Journal of Public Economics* 91, 1479-1505.
- Drometer, M., M. Frank, M. Hofbauer Pérez, C. Rhode, S. Schworm, and T. Stitteneder (2018), "Wealth and Inheritance Taxation: An Overview and Country Comparison," *Ifo DICE Report* 16.
- Duran-Cabrè, J., A. Esteller-Moré, and M. Mas-Montserrat (2019), "Behavioural Responses to the (Re-)Introduction of Wealth Taxes. Evidence From Spain," IEB Working Paper.

- Du Rietz, G, and M. Henrekson (2014), "Swedish Wealth Taxation, 1911-2007." IFIN Working Paper No. 1000.
- Eidgenössische Steuerverwaltung (1969), "Steuerbelastung in der Schweiz," Heft 456.
- Eller, M., B. Erard, and C.-C. Ho, (2001), "Noncompliance with the Federal Estate Tax," *Rethinking Estate and Gift Taxation*, 375-410.
- Esping-Andersen, G. (1990), *The Three Worlds of Welfare Capitalism*, Princeton University Press.
- Fagereng, A., L. Guiso, D. Malacrino, and L. Pistaferri (2020), "Heterogeneity and Persistence in Returns to Wealth," *Econometrica* 88, 115-170.
- Farhi, E., C. Sleet, I. Werning, and S. Yeltekin (2012), "Non-linear Capital Taxation Without Commitment," *Review of Economic Studies* 79, 1469-1493.
- Federal Department of Finance (2019), "Besteuerung nach Aufwand," https://www.efd.admin.ch/efd/de/home/themen/steuern/steuern-national/besteuerung-nach-dem-aufwand/fb-besteuerung_nach_aufwand.html
- Föllmi R. and I. Martinez (2017), "Volatile Top Income Shares in Switzerland? Reassessing the Evolution Between 1981 and 2010," *Review of Economics and Statistics* 99, 793-809.
- Gerritsen, A., B. Jacobs, A. Rusu and K. Spiritus (2020), "Optimal Taxation of Capital Income with Heterogeneous Rates of Return," Working Paper, Erasmus University Rotterdam.
- Gilens, M. (2014), *Affluence and Influence, Economic Inequality and Political Power in America*, Princeton University Press.
- Golosov, M., A. Tsyvinski and I. Werning (2006), "New Dynamic Public Finance: A User's Guide," *NBER Macroeconomics Annual*, MIT Press.
- Guvenen, F., G. Kambourov, B. Kuruscu, S. Ocampo, and D. Chen (2018), "Use It or Lose It: Efficiency Gains from Wealth Taxation," Working Paper, University of Minnesota.
- Guyton, J., P. Langetieg, D. Reck, M. Risch, and G. Zucman (2020), "Tax Evasion by the Wealthy: Measurement and Implications," in *Measuring and Understanding the Distribution and Intra/Inter-Generational Mobility of Income and Wealth*, R. Chetty, J. Friedman, J. Gornick, B. Johnson, and A. Kennickell, editors.
- Hall, R. and S. Woodward (2010), "The Burden of the Nondiversifiable Risk of Entrepreneurship," *American Economic Review* 100, 1163-94.
- Harris, B.H. and B.D. Moore (2013), "Residential Property Taxes in the United States," Urban-Brookings Tax Policy Center Working Paper.
- Hemel, D. (2019), "Taxing Wealth in an Uncertain World," *National Tax Journal* 72, 755-776.
- Herd, R. and T. Thorgeirsson (2001), "Increasing Simplicity, Neutrality and Sustainability: A Basis for Tax Reform in Iceland," OECD Economics Department Working Paper No. 292.

Hongler P. and F. Mauchle (2020), "Is Switzerland a Role Model for Wealth Taxes?" *Tax Notes International* 97, 645-653.

Jakobsen, K., K. Jakobsen, H. Kleven, and G. Zucman (2020), "Wealth Taxation and Wealth Accumulation: Theory and Evidence From Denmark," *Quarterly Journal of Economics*, 135(1), 329-388.

Jensen, E. (2019), "Is a Tax on Wealth Constitutional?" *Journal of Taxation of Investments*, Spring 36(3), 79-86.

Johannesen, N., P. Langetieg, D. Reck, M. Risch and J. Slemrod (2020), "Taxing Hidden Wealth: The Consequences of U.S. Enforcement Initiatives on Evasive Foreign Accounts," forthcoming, *American Economic Journal: Economic Policy*.

Johnsen, D., and W. Dellinger (2018), "The Constitutionality of a National Wealth Tax," *Indiana Law Journal* 93.

Joulfaian, D., and K. McGarry (2004), "Estate and Gift Tax Incentives and Inter-vivos Giving," *National Tax Journal* 57, 429-444.

Judd, K. (1985), "Redistributive Taxation in a Simple Perfect Foresight Model," *Journal of Public Economics* 28, 59-83.

Kaldor, N. (1956), *Indian Tax Reform*, Ministry of Finance, Government of India.

Kessler, D. and P. Pestiau (1991), "The Taxation of Wealth in the EEC: Facts and Trends," *Canadian Public Policy* 17, 309-321.

Kopczuk, W. (2013), "Taxation of Intergenerational Transfers and Wealth," in A. Auerbach, R. Chetty, M. Feldstein, and E. Saez, eds., *Handbook of Public Economics*, Vol. 5, Elsevier.

Kopczuk, W. (2019), "Comment on 'Progressive Wealth Taxation' by Saez and Zucman," *Brookings Papers on Economic Activity* Fall 2019, 512-526.

Krenek, A. and M. Schratzenstaller (2018), "A European Net Wealth Tax," WIFO Working Paper No. 561.

Landais, C., E. Saez and G. Zucman (2020), "A Progressive European Wealth Tax to Fund the European COVID Response," <https://voxeu.org/article/progressive-european-wealth-tax-fund-european-covid-response>

Lehner, M. (2000), "The European Experience with Wealth a Tax: Comparative Discussion," *Tax Law Review* 53, 615-692.

Leiserson, G. (2019), "Taxing Wealth," Mimeo, Washington Center for Equitable Growth.

Londoño-Velez, J. and J. Ávila-Mahecha (2019), "Can Wealth Taxation Work in Developing Countries? Quasi-Experimental Evidence from Colombia," Mimeo.

McDonnell, T. (2013), "Wealth Tax: Options for its Implementation in Ireland," NERI Working Paper.

OECD (2018), *The Role and Design of Net Wealth Taxes in the OECD*.

Organ, P. (2020), "Expatriation and the U.S. Tax System," Mimeo, University of Michigan.

- Piketty, T. (2014), *Capital in the Twenty-first Century*, Harvard University Press.
- Rothschild, C. and F. Scheuer (2016), "Optimal Taxation with Rent-Seeking," *Review of Economic Studies* 83, 1225-1262.
- Saez, E. (2002), "The Desirability of Commodity Taxation Under Non-Linear Income Taxation and Heterogeneous Tastes," *Journal of Public Economics*, 83, 217-230.
- Saez, E. and S. Stantcheva (2018), "A Simpler Theory of Optimal Capital Taxation" *Journal of Public Economics* 162, 120-142.
- Saez, E. and G. Zucman (2019a), "Progressive Wealth Taxation," *Brookings Papers on Economic Activity* Fall 2019, 437-511.
- Saez, E. and G. Zucman (2019b), *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*, Orell Fuessli.
- Sandford, C. and O. Morrissey (1985), "The Irish Wealth Tax: A Case Study in Economics and Politics," The Economic and Social Research Institute Paper 123.
- Scheuer, F. (2014), "Entrepreneurial Taxation with Endogenous Entry," *American Economic Journal: Economic Policy* 6, 126-163.
- Scheuer, F. and J. Slemrod (2020), "Taxation and the Superrich," *Annual Review of Economics* 12, 189-211.
- Scheuer, F. and I. Werning (2017), "The Taxation of Superstars," *Quarterly Journal of Economics* 132, 211-270.
- Scheuer, F. and A. Wolitzky (2016), "Capital Taxation under Political Constraints," *American Economic Review* 106, 2304–2328.
- Seim, D. (2017), "Behavioral Responses to Wealth Taxes: Evidence from Sweden," *American Economic Journal: Economic Policy* 9, 395–421.
- Silfverberg, C. (2009), "The Swedish Net Wealth Tax: Main Features and Problems," *Scandinavian Studies in Law* 44, 367-374.
- Slemrod, J. (2001), "A General Model of the Behavioral Response to Taxation," *International Tax and Public Finance* 8, 119-128.
- Slemrod, J. (2018), "Is This Tax Reform, or Just Confusion?" *Journal of Economic Perspectives*, 32(4), 73-96.
- Straub, L., and I. Werning (2020), "Positive Long-Run Capital Taxation: Chamley-Judd Revisited," *American Economic Review* 110, 86-119.
- Tiebout, C. M. (1956), "A Pure Theory of Local Expenditures," *Journal of Political Economy* 64, 416-424.
- Troup, E., J. Barnett and K. Bullock, "The Administration of a Wealth Tax," Wealth Tax Commission Evidence Paper 11.
- Waldenström, D. (2018), "Inheritance and Wealth Taxation in Sweden," *Ifo DICE report* 16.

Wolff, E. (2017), *A Century of Wealth in America*, Harvard University Press.

Zoutman, F. (2018), "The Elasticity of Taxable Wealth: Evidence from the Netherlands," Working Paper, Norwegian School of Economics.

A Appendix

A.1 Proof of Proposition 1

Because initial wealth k_0 cannot be directly targeted, this amounts to the assumption that both θ and k_0 are unobservable to the government. In other words, lump-sum instruments based on labor productivities or initial wealth are unavailable. This means that the government cannot directly control $c_0(\theta)$: instead, it can only determine $\hat{c}_0(\theta) \equiv c_0(\theta) - k_0(\theta)$. Intuitively, the government can give individuals a transfer in $t = 0$ of the amount \hat{c}_0 , but their actual consumption will then be given by $c_0 = \hat{c}_0 + k_0$, which is unobservable.

By the revelation principle, any allocation $(\hat{c}_0(\theta), c_1(\theta), y_0(\theta))$ that is attainable through some tax system must therefore satisfy the incentive compatibility constraints

$$u(\hat{c}_0(\theta) + k_0(\theta)) - h(y_0(\theta)/\theta) + \beta u(c_1(\theta)) \geq u(\hat{c}_0(\theta') + k_0(\theta)) - h(y_0(\theta')/\theta) + \beta u(c_1(\theta')) \quad (4)$$

for all θ, θ' . The aggregate resource constraint is

$$\int \hat{c}_0(\theta) dF(\theta) + \frac{1}{R} \int c_1(\theta) dF(\theta) \leq \int y_0(\theta) dF(\theta). \quad (5)$$

The government maximizes

$$\int g(\theta) [u(\hat{c}_0(\theta) + k_0(\theta)) - h(y_0(\theta)/\theta) + \beta u(c_1(\theta))] dF(\theta)$$

using some Pareto weights $g(\theta)$.

Define

$$V(\theta) \equiv u(\hat{c}_0(\theta) + k_0(\theta)) - h(y_0(\theta)/\theta) + \beta u(c_1(\theta)).$$

The necessary envelope condition corresponding to (4) is

$$V'(\theta) = u'(\hat{c}_0(\theta) + k_0(\theta))k_0'(\theta) + h' \left(\frac{y_0(\theta)}{\theta} \right) \frac{y_0(\theta)}{\theta^2}. \quad (6)$$

It is useful to formulate the planning problem in terms of $(V(\theta), c_1(\theta), y_0(\theta))$ using

$$\hat{c}_0(\theta) = \Phi [V(\theta) + h(y_0(\theta)/\theta) - \beta u(c_1(\theta))] - k_0(\theta)$$

where $\Phi(u)$ denotes the inverse function of $u(c)$. This allows us to write the Pareto problem as follows:

$$\max_{(V(\theta), c_1(\theta), y_0(\theta))} \int g(\theta) V(\theta) dF(\theta)$$

s.t.

$$V'(\theta) = u' \left[\Phi \left(V(\theta) + h \left(\frac{y_0(\theta)}{\theta} \right) - \beta u(c_1(\theta)) \right) \right] k'_0(\theta) + h' \left(\frac{y_0(\theta)}{\theta} \right) \frac{y_0(\theta)}{\theta^2}$$

and

$$\int \Phi \left[V(\theta) + h \left(\frac{y_0(\theta)}{\theta} \right) - \beta u(c_1(\theta)) \right] dF(\theta) + \frac{1}{R} \int c_1(\theta) dF(\theta) \leq \int y_0(\theta) dF(\theta) + \int k_0(\theta) dF(\theta).$$

After integration by parts (and dropping boundary terms), the corresponding Lagrangian becomes

$$\begin{aligned} \mathcal{L} = & \int g(\theta) V(\theta) dF(\theta) - \int \mu'(\theta) V(\theta) d\theta \\ & - \int \mu(\theta) \left\{ u' \left[\Phi \left(V(\theta) + h \left(\frac{y_0(\theta)}{\theta} \right) - \beta u(c_1(\theta)) \right) \right] k'_0(\theta) + h' \left(\frac{y_0(\theta)}{\theta} \right) \frac{y_0(\theta)}{\theta^2} \right\} d\theta \\ & + \lambda \left\{ \int y_0(\theta) dF(\theta) + \int k_0(\theta) dF(\theta) \right\} \\ & - \lambda \left\{ \int \Phi \left[V(\theta) + h \left(\frac{y_0(\theta)}{\theta} \right) - \beta u(c_1(\theta)) \right] dF(\theta) + \frac{1}{R} \int c_1(\theta) dF(\theta) \right\} \end{aligned} \quad (7)$$

where $\mu(\theta)$ and λ denote the multipliers on the incentive and resource constraints, respectively. The first-order condition for $c_1(\theta)$ is

$$\mu(\theta) \frac{u''(c_0(\theta))}{u'(c_0(\theta))} \beta u'(c_1(\theta)) k'_0(\theta) - \lambda f(\theta) \left[\frac{1}{R} - \beta \frac{u'(c_1(\theta))}{u'(c_0(\theta))} \right] = 0$$

where we used $\Phi'(u) = 1/u'(c)$. Define the savings wedge as

$$T'_k(Rk_1) \equiv 1 - \frac{u'(c_0)}{\beta R u'(c_1)}.$$

Substituting this yields

$$T'_k(Rk_1(\theta)) = -\frac{\mu(\theta)}{\lambda f(\theta)} u''(c_0(\theta)) k'_0(\theta). \quad (8)$$

This already reveals that there is a savings wedge at the optimum whenever $k'_0(\theta) \neq 0$ and $\mu(\theta) \neq 0$.

The first-order condition for $y_0(\theta)$ is (dropping arguments to simplify notation)

$$-\mu \left[\frac{u''(c_0)}{u'(c_0)} h' \left(\frac{y_0}{\theta} \right) \frac{1}{\theta} k'_0(\theta) + h'' \left(\frac{y_0}{\theta} \right) \frac{y_0}{\theta^3} + h' \left(\frac{y_0}{\theta} \right) \frac{1}{\theta^2} \right] + \lambda f \left[1 - \frac{h'(y_0/\theta)}{\theta u'(c_0)} \right] = 0.$$

Rearranging,

$$\mu = \frac{\lambda f \left[1 - \frac{h'(y_0/\theta)}{\theta u'(c_0)} \right]}{\frac{h'(y_0/\theta)}{\theta u'(c_0)} \left[u''(c_0) k'_0(\theta) + \frac{u'(c_0)}{\theta} \left(\frac{h''(y_0/\theta) y_0}{h'(y_0/\theta)} + 1 \right) \right]}.$$

Define the labor wedge as

$$T'_y(y_0) \equiv 1 - \frac{h'(y_0/\theta)}{\theta u'(c_0)}.$$

Moreover, the Frisch elasticity is

$$\varepsilon \equiv \frac{dy_0}{d(1 - T'_y)} \Big|_{u'(c_0)} = \frac{1 - T'_y}{y_0} = \frac{h'(y_0/\theta)\theta}{h''(y_0/\theta) y_0}.$$

Substituting both yields

$$\mu = \frac{\lambda f T'_y(y_0)}{(1 - T'_y(y_0)) \left[u''(c_0) k'_0(\theta) + \frac{u'(c_0)}{\theta} \left(\frac{1}{\varepsilon} + 1 \right) \right]}.$$

Finally, substituting this in (8) delivers

$$T'_k(Rk_1(\theta)) = - \frac{T'_y(y_0)}{1 - T'_y(y_0)} \frac{1}{1 + \frac{u'(c_0)}{\theta u''(c_0) k'_0(\theta)} \left(\frac{1}{\varepsilon} + 1 \right)}.$$

The intertemporal elasticity of substitution is

$$\sigma = - \frac{u'(c)}{c u''(c)},$$

so we can write this as

$$T'_k(Rk_1(\theta)) = \frac{T'_y(y_0)}{1 - T'_y(y_0)} \frac{1}{\frac{\sigma c_0}{\theta k'_0(\theta)} \left(\frac{1}{\varepsilon} + 1 \right) - 1}.$$

Together with the definition of $\alpha(\theta) = k_0(\theta)/c_0(\theta)$ and $\eta(\theta) \equiv k'_0(\theta)\theta/k_0(\theta)$, this delivers the result in (3).

A.2 Proof of Corollary 1

The individuals' Euler equation is

$$u'(c_0) = \beta R(1 - t_k)u'((1 - t_k)R((1 - t_y)y_0 + k_0 - c_0)).$$

With a constant intertemporal elasticity of substitution σ , this can be written as

$$c_0 = \gamma((1 - t_y)y_0 + k_0 - c_0)$$

with

$$\gamma = \beta^{-\sigma} R^{1-\sigma} (1 - t_k)^{1-\sigma}.$$

Rearranging yields

$$\frac{1 + \gamma}{\gamma} = (1 - t_y) \frac{y_0}{c_0} + \frac{k_0}{c_0}$$

and hence $\alpha \leq 1 + 1/\gamma$.

With a constant Frisch elasticity ε , the first-order condition for y_0 is

$$y_0 = (1 - t_y)^\varepsilon \theta^{1+\varepsilon} c_0^{-\frac{\varepsilon}{\sigma}}.$$

If $\alpha(\theta) \rightarrow \alpha > 0$ and $\eta(\theta) \rightarrow \eta$ as θ grows large, then for high-earners

$$y_0(\theta) \rightarrow \kappa_y \theta^{1+\varepsilon(1-\eta/\sigma)}$$

for some constant κ_y . Second-period wealth is

$$Rk_1(\theta) = R((1 - t_y)y_0(\theta) + k_0(\theta) - c_0(\theta)),$$

which under the same conditions becomes

$$Rk_1(\theta) \rightarrow \tilde{\kappa}_y \theta^{1+\varepsilon(1-\eta/\sigma)} + \kappa_k \theta^\eta$$

for some constants $\tilde{\kappa}_y$ and κ_k . Because the Pareto tail coefficient of the empirical income distribution ρ_y is typically higher than that of the empirical wealth distribution ρ_k (because wealth is more unequally distributed than income) and in this model both are driven by the same underlying skill parameter θ , this implies that the Pareto tail coefficient of the distribution of θ must satisfy both

$$\rho_\theta = \left(1 + \varepsilon \left(1 - \frac{\eta}{\sigma}\right)\right) \rho_y \quad \text{and} \quad \rho_\theta = \eta \rho_k,$$

which can be used to solve for η :

$$\eta = \frac{\sigma(1 + \varepsilon)\rho_y}{\sigma\rho_k + \varepsilon\rho_y}.$$

Substituting this in (3) delivers the sufficient-statistics formula in Corollary 1.