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DO MILLIONAIRES ADJUST THE REALIZATIONS OF THEIR LONG-TERM CAPITAL GAINS WHEN TAXES CHANGE?

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Policymakers have suggested a number of proposals to impose surtaxes on high-income taxpayers. Several of the proposals have focused on increasing taxes on long-term capital gains on those with an income above some threshold. However, many taxpayers can avoid a surtax by timing the realizations of their capital gains to keep their incomes below the threshold. In this brief we investigate how taxpayers respond if their income is consistently too high to avoid the surtax by using that tactic.

INTRODUCTION

Over the last 10 years, concern over Medicare and Social Security funding and the ability of the general funds to pay for other federal spending has increased (Mermin et al. 2023; Steuerle and Smith 2023). Some policymakers propose to increase taxes on those with high incomes, in particular taxes on capital gains. For example, the net investment income tax (NIIT), passed as part of the Affordable Care Act, applies a tax on capital incomes for those with modified adjusted gross incomes of at least $200,000 for single taxpayers and $250,000 for married taxpayers. The initial proposal for the NIIT passed with the Affordable Care Act originally set the threshold at $1 million with revenue intended to fund Medicare, but the floor was lowered before passage and to comply with Senate procedural rules. As passed, the act directs the revenues to the general fund (Kofsky and Schmutz 2019). Since then, policymakers have made numerous proposals to increase taxes on the long-term capital gains of those with at least $1 million in income.

In related research, we showed that more than 95 percent of taxpayers would have at least some ability to avoid those taxes by shifting the timing of capital gains realizations (McClelland and Smith 2023). However, a large share of gains could not escape the increase because the remaining 5 percent of taxpayers are heavily concentrated at the top of the income distribution and their taxable incomes, excluding capital gains, are continuously above the higher surtax threshold.

In this research we estimate the potential change in realizations by those with at least $1 million in taxable income, excluding long-term capital gains realizations. These taxpayers cannot avoid the tax by spreading their gains out over several years and therefore can only reduce their exposure to the tax increase by reducing their realizations.

We anticipate that taxpayers with incomes this high can adjust their capital gains in response to changes in tax rates, both current and anticipated. For example, they can afford sophisticated financial advisors who understand the tax treatment of capital gains and anticipate future changes in rates. In Dowd, McClelland, and Muthichaeron (2015), the elasticity of long-term capital gains with respect to tax rates over all taxpayers was estimated to be -0.7. We therefore anticipate that the elasticity of millionaires will be greater in absolute value.

To estimate the elasticity, we apply the method of Dowd, Mcclelland, and Muthichaeron (2015) to a longitudinal dataset of millionaires derived from individual tax data. We use state variation in tax rates over time to identify how realizations respond to tax rates. Also, we focus on personally held gains and exclude gains from trusts, mutual fund distributions, and other sources over which the taxpayer may have less control. Unlike Dowd, McClelland, and Muthichaeron (2015), we use a more recent panel with data from 2012 to 2020, and, because we have essentially the entire study population, we do not have sampling weights. Further, because we set federal and state tax rates to those of a taxpayer with $1 million of taxable income, we do not need to adjust for tax rates that are endogenous with respect to income.

LITERATURE REVIEW

Dowd, McClelland, and Muthichaeron (2015) provide a brief review of the literature on capital gains and taxation. Here we reprise that review and review analyses conducted since the study. Feldstein, Slemrod, and Yitzhaki (1980) used a cross-section of tax data from 1973 to analyze the behavior of stockholders in response to tax cuts, finding that realizations increased so much that the tax cuts "paid for themselves". Auten and Cordes (1991) critiqued the use of cross-sections and pointed out that time-series analyses found less dramatic effects.

For many years, the study by Burman and Randolph (1994) was taken to be the definitive statement on the topic. Using a panel of individual tax data from 1979 through 1983, they separated the elasticity of capital gains into a "permanent" component and a "transitory" component. The permanent component was estimated over a three-year time frame and the transitory component was estimated using responses to contemporaneous changes in taxes. Their result was nearly the reverse of Feldstein, Slemrod, and Yitzhaki (1980), finding a permanent effect of only -0.18. However, they found a much larger transitory component of -6.42. Unfortunately, their estimate of the permanent effect was so imprecise that the estimate was insignificantly different from zero. Several years later Auerbach and Siegel (2000), used the model of Burman and Randolph (1994) on a longer panel of individual tax data (1986 through 1993). They sought to improve the estimation of permanent elasticity by removing potential endogeneity of the tax rates. Using the Burman and Randolph method for estimating the permanent elasticity, they found that it was only -0.34. But with their modification, it jumped to -1.72. The transitory elasticity, on the other hand, exceeded -4.3 in both cases.

Dowd, McClelland, and Muthichaeron (2015) also applied the Burman and Randoph method to a panel of individual tax data from 1999 through 2008. This was a stratified random sample that oversamples high-income taxpayers. Although it includes low-income taxpayers as well, high-income taxpayers realize most of the long-term capital gains. They calculated permanent elasticity as in Auerbach and Siegel (2000), which resulted in a permanent elasticity of -0.7 and a transitory elasticity was -1.7. Although they relied on state-level variation in tax rates for identifying the model, that period also included two major changes in federal tax law: the Economic Growth Tax Relief Reconciliation Act of 2001, and the Jobs and Growth Tax Relief Reconciliation Act of 2003. They found that most of the effect came through changes in the amount of realized gains rather than from the frequency with which gains are realized.

Dowd and McClelland (2019) used data from 2012 to estimate the average amount of capital gains from assets held less than a year and those held more than a year. The gains from assets held less than a year are taxed like ordinary income. The gains from assets held for more than a year receive the preferential rate that is currently capped at 23.8 percent. They found that when taxed as ordinary income, taxpayers realized on average gains of just over $600. At the lower, preferential rate, average gains were nearly $1,200. Combining the two, along with the applicable tax rates implies a “persistent” elasticity of -0.8.

Agersnap and Zidar (2021) use aggregate state-level data over the 1980 to 2016 period. Further, they calculate permanent effects over ten years rather than three years. They found elasticities between -0.3 and -0.5, although these values were not statistically different from the -0.7 found in Dowd, McClelland, and Muthichaeron (2015). They also found that a substantial share of the effect was due to migration by owners of capital in response to changes in state tax rates.

Lavecchia and Tazhitdinova (2021) used Canadian data to examine a permanent cancellation of a lifetime exemption of a certain level of capital gains from taxation. They found, like Dowd, McClelland, and Muthichaeron (2015), that the decision to realize gains was at most weakly affected by the tax change. Surprisingly, they found a positive permanent effect on the amount of gains realized. They attribute this to a potentially large downward wealth effect caused by the loss of the lifetime exemption.

DATA

This brief uses anonymized data derived from individual tax records including 1040 forms and schedules and information returns such as W-2s. Here, we use taxable income and information on capital gains from form 1040 and more detailed information on long-term capital gains from Schedule D for all returns with taxable income, excluding capital gains greater than or equal to $1 million in 2018 price-adjusted dollars in every tax year from 2012 to 2021. We included 52,562 tax units in the analysis, with a total of 472,957 observations.[1]

As is common in this research, we use capital gains from the sale of personally held assets, such as stocks. We determined tax rates by adding the applicable state and federal tax rates for those with $1 million in taxable income. We combined federal and state income taxes at $1 million of wage income, recalculated combined taxes with $1 million in wage income plus $1,000 of long-term capital gains, and divided the difference by 1,000 based on a synthetic panel of hypothetical tax units using National Bureau of Economic Research’s TAXSIM model.[2] Hypothetical wage and long-term capital gains are in 2018 price-adjusted dollars. More information is available in appendix A.

THE TAXATION OF CAPITAL GAINS

Capital gains are not taxed as they accrue, but when they are realized. This makes the timing of their taxation more flexible than other sources of income, such as salaries. Gains are the difference between the sale price and purchase price, after adjustments such as depreciation and commissions. At death, the basis is reset to the market value of the asset and the asset passes tax-free to the decedent’s heirs.

Gains from the sale of assets held more than a year are taxed at lower rates than for those held less than a year, which are taxed at the same rate as ordinary income. When determining overall taxable income, long-term losses are subtracted from long-term gains, and short-term losses are subtracted from short-term gains. Any net-short term losses can then be subtracted from long-term gains. Net losses of up to $3,000 can be used to offset ordinary income, and additional losses can be carried forward to offset future gains. Special rules apply to several types of assets, most notably owner-occupied homes. There is an exclusion of $250,000 for the sale of most homes by taxpayers ($500,000 for those married taxpayers filing jointly) and losses cannot be claimed. States typically tax capital gains as ordinary income, regardless of how long they are held.

[1] We omitted data for tax year 2021 (52,562 person-year observations) because we do not have tax rates for the future tax year. We also omitted 101 person-year observations for units with no reported US state.

[2] TAXSIM version 35 model and documentation are available at https://www.nber.org/research/data/taxsim.

Since 1987, tax rates on long-term capital gains have been lower than the rates for ordinary income. For example, in 2017 a single taxpayer with taxable income between $37,950 and $91,900 faced a marginal tax rate of 25 percent on their ordinary income, but 15 percent on their long-term capital gains.

In 2013, the tax rate on long-term capital gains was raised from 15 percent to 20 percent plus a 3.8 percent NIIT on capital incomes for taxpayers with modified adjusted gross incomes of at least $200,000 for single taxpayers and $250,000 for married taxpayers filing jointly. The maximum tax rate therefore increased by 8.8 percentage points in 2013.

The Tax Cuts and Jobs Act of 2017 (TCJA) created separate brackets for ordinary income and long-term capital gains and lowered the top tax rate on ordinary income to 37 percent. Although the TCJA did not change the statutory tax rate on long-term capital gains, it did raise the effective rate for taxpayers in states with income taxes.[3]

Before the TCJA, taxpayers could deduct all of their state income tax from their taxable income from their federal form. For taxpayers living in states that taxed capital gains, this deduction meant that realizing more gains increased their state tax deduction, which lowered the effective federal tax rate on capital gains. Importantly, taxable income was taxed at a top rate of 39.6 percent, while capital gains were taxed at a rate of 23.8 percent. For a state such as California, with a tax rate of 13.3 percent for incomes over $1,000,000, this meant that an additional $10 of capital gains would result in an additional $2.38 in capital gains taxes, but a reduction of taxes on ordinary income of $0.53 (0.396 x $1.33). The net increase in federal taxes from an additional $10 of capital gains would be $1.85, which means that the effective tax rate would be 18.5 percent. But under the TCJA, the so-called SALT cap limited the deduction of state and local taxes to $10,000. A taxpayer with at least $10,000 in state and local taxes cannot further reduce their taxable income from an additional $10 in capital gains and therefore the effective tax rate increased from 18.5 percent to 23.8 percent.

EMPIRICAL MODEL

We estimate elasticities using Burman and Randolph's two stage model that was also used by Dowd, McClelland, and Muthichaeron (2015). The two stages comprise a first-stage criterion equation in which taxpayers decide to realize a gain or not, and a second-stage level equation in which taxpayers realizing gains decide how much to realize. Our estimated two-stage model is:

(1) $$I_t = \alpha_1\tau_{it-1} + \alpha_2\tau_{it} + \alpha_3\tau_{it+1} + X_{1it}\alpha_4 + \epsilon_{1it}$$

(2) $$lng_{it} = \beta_1\tau_{t-1} + \beta_2\tau_{it} + \beta_3\tau_{it+1} + X_{2it}\beta_4 + \delta\lambda_{it} + \epsilon_{2it}\ ;\ I_{it} = 1,$$

where I_{it} is an indicator representing the decision to realize long-run capital gains, λ_{it} is the inverse Mills ratio, X_{1it} is a vector of control variables, X_{2it} is a strict subset of X_{1it}. The inverse Mills ratio, which is calculated using variables from the first stage, compensates for a potential sample selection bias that may exist in the second stage.

The set of controls in the first equation contains a dummy variable equal to 1 if there are losses in the prior year in excess of $3,000, and hence can be carried over to reduce taxes in the current year. The variables common to both sets include the dummy variables for the number of dependents, a married dummy, taxpayer age brackets, sex of the head of household, region, and year dummies (to account for macroeconomic shocks common to all taxpayers). We include the lagged values of business losses and rent losses. We impute unrealized gains using the method of Dowd, McClelland, and Muthichaeron (2015), and we include a variable representing the share of unrealized gains held as stock. Because we did not have access to Sales of Capital Asset data, we did not include the variables for financial sophistication used by Dowd, McClelland, and Muthichaeron (2015).

[3] Currently Alaska, Florida, Nevada, South Dakota, Tennessee, Texas, and Wyoming do not tax personal income. New Hampshire taxes interest and dividends, and Washington taxes business income.

Dowd, McClelland, and Muthichaeron (2015) imputed permanent income by regressing the natural log of the average of real positive income over all years on several demographic characteristics. The coefficients were then applied to lagged values of the regressors. Here, we impute permanent income by estimating a fixed-effects regression model of log of real positive income as a function of age, age squared, marital status dummies, and number of dependent dummies with the tax unit identifier as our panel variable. This regression is estimated for tax years 2012 to 2021. Permanent income is the predicted income for each tax unit. Transitory income is calculated as the difference between annual current income and permanent income.

The means of the variables we used are in table 1. For more information see appendix A.

Identification of the response to changes in tax rates comes from variation in state-level tax rates for those with $1 million of taxable income. Between 2012 and 2021, there were 54 changes in the top statutory tax rates of states. For example, in 2016, Hawaii lowered their top tax rate from 11 percent to 8.25 percent, and in 2018 raised it back to 11 percent. Because these are all constant above a specific income level, these tax rates are exogenous with respect to income and do not depend on individual capital gains realizations. That lack of endogeneity is a unique feature of our analysis, and as a result, we do not use instrumental variables techniques designed to address endogeneity concerns.

However, although state-level tax rates are not determined by the capital gains of individuals, they may be influenced by overall capital gains in a state. For example, a state with a very high level of capital gains realizations by high-income taxpayers may have high tax rates on that income. California, for example, has the highest combined state and federal tax rate on capital gains (36.06 percent in 2021) and among the largest amount of average gains. If a long-run positive relationship between overall gains and state tax rates exists, then an estimate of the negative relationship between individual gains and state tax rates could be biased toward zero. In a regression context, the state has a separate intercept above the other states. A simple resolution to this problem is to either exclude such a state or add a dummy variable for taxpayers who lives in one.

Table 1
Summary Statistics

	Mean
Marginal tax rate	
Prior year marginal tax rate	26.10
Current year marginal tax rate	27.26
Future year marginal tax rate	28.41
Capital gains	
Long-term capital gains (L)	5.81
Realizing a gain (D)	0.54
Age	
Ages 30 to 39 (D)	0.05
Ages 40 to 49 (D)	0.24
Ages 50 to 59 (D)	0.37
Ages 60 to 69 (D)	0.23
Ages 70 and older (D)	0.11
Number of dependents	
1 dependent (D)	0.37
2 dependents (D)	0.13
3 dependents (D)	0.22
4 dependents (D)	0.13
5 dependents (D)	0.04
6 dependents (D)	0.01
7 dependents (D)	0.00
8 dependents (D)	*
9+ dependents (D)	*
Other demographic information	
Male (D)	0.94
Married (D)	0.90
Region	
Midwest (D)	0.15
Northeast (D)	0.33
West (D)	0.21
Losses	
Have a carryover loss greater than $3,000 (D)	0.20
Have a net short-term loss (D)	0.49
Having net losses from sale of a business asset (D)	0.13
Have net pass-through losses (D)	0.09
Lagged business losses (L)	6.85
Have lagged business losses (D)	0.67
Lagged rent losses (L)	0.95
Have lagged rent loss (D)	0.11
Measures of wealth or income	
Log of impute wealth (thousands) (L)	15.17
Permanent income (L)	15.21
Ratio of stocks to gains (L)	-5.72
Transitory income (L)	-0.01
Number of observations	**472,957**

Source: Authors' analysis of data from IRS data.
Note: * indicates values less than 0.001. (D) indicates dummy variables. (L) indicates logged variables.

The permanent elasticity for each taxpayer is calculated as

(3) $$\eta_{pit} = \bar{\tau}_{it}(\beta_1 + \beta_2 + \beta_3 + \lambda_{it}(\alpha_1 + \alpha_2 + \alpha_3)),$$

where $\bar{\tau}_{it}$ is the average of the tax rates in equation (3) and the inverse Mills ratio λ_{it} is evaluated at the predicted value of I_t evaluated at the mean plus the covariance of the error terms in equations (1) and (2). The sum of the coefficients in each stage represents the effect of permanent change in tax rates. The total elasticity is calculated as a gains-weighted average of the individual elasticities. This weighting emphasizes the response of capital gains rather than of taxpayers. Thus, the response of a small number of taxpayers who realize a large amount of gains receives greater weight than a larger number of taxpayers who collectively realize very little in gains.

RESULTS

The results from our initial model are shown in appendix B. Because this represents the population, there is no sampling variation and therefore no test of statistical significance is possible. In other words, we are not drawing inferences about the population from a sample because we are observing the population.

The estimated permanent elasticity is only -0.37, which is substantially closer to zero than the -0.72 elasticity found in Dowd, McClelland, and Muthichaeron (2015) and statistically significantly different. It is also quite different from the -0.80 in Dowd and McClelland (2019). The results with the higher elasticities both used samples from across the income distribution while ours focused on those with at least $1 million in taxable income. This suggests that millionaires are fundamentally less responsive to small tax changes than taxpayers with lower incomes. This could happen if millionaires have already shielded the most tax-responsive assets from taxation or are planning to hold them until death. The remaining assets would then be less responsive.

We tested the sensitivity of our initial result to various assumptions (Table 2). We first tested the importance of assuming that $1 million in 2018 dollars put every taxpayer in the maximum tax bracket. In 2012, New York state set the top bracket to $1 million, indexed for inflation. By 2018, the top bracket started at $1,077,500. Several other states also had top brackets set to $1 million. As a consequence, the tax rates for some taxpayers near the $1 million threshold were not the top tax rates in their state. We reestimated the model with a threshold set to $1,164,227 in 2018 dollars, which is high enough so that all taxpayers in the sample have the top marginal tax rate in their state. The resulting elasticity estimate is nearly the same as in the initial result.

As an additional test, we exclude these states from the analysis. The resulting elasticity measure is nearly the same as in Dowd, McClelland, and Muthichaeron (2015). By the process of exclusion, we discovered that the inclusion or exclusion of California played an important role in the magnitude of the elasticity. As shown in table 2, simply excluding California resulted in an elasticity of -0.6.

We then explored several possible reasons for this result. First, in a ballot initiative in November of 2012, California increased the top tax rate from 10.3 percent to 13.3 percent. This change was retroactive to January 1, 2012. The national 8.8 percentage point increase in 2013 meant that California taxpayers were subject to an increase of 11.8 percentage points in a very short period of time. It is possible that some taxpayers in that state did not have sufficient time to change their realizations of capital gains in time, in particular because of the retroactive nature of the state tax increase. These taxpayers would then be less responsive to tax changes, but only in this very limited context. To test how these increases affected our results, we re-estimated the elasticity on a dataset that omits 2012 and 2013 but included California. The resulting elasticity of -0.34 showed that those years were not responsible for the elasticity in our initial result.

TABLE 2

Sensitivity Analyses

	Elasticity	Sample size
Initial result	-0.37	472,957
Raise threshold to $1,164,227	-0.39	361,166
Exclude CA, CT, DC, NY, and NJ	-0.68	287,330
Exclude only CA	-0.60	405,256
Exclude 2012 and 2013	-0.34	367,934
Exclude 2017 – 2020	-0.44	262,709
Add dummy variable for CA	-0.58	472,957
Exclude CA, MN, and NJ	-0.71	374,978

Source: Authors' analysis of data from IRS data.

If the increase in effective tax rates caused by the TCJA went unrecognized, taxpayers would appear to be unresponsive to the tax increase. To test this as a possible source of the low elasticity in the initial result, we omitted the years 2017 through 2020. The elasticity rose in absolute value to -0.44, a relatively small change. This showed that the TCJA also was not responsible for the low elasticity.

As described earlier, California has the highest tax rate in 2021 and also among the highest average gains, which could lead to a positive relationship between gains realized in that state and tax rates. We test this by adding a dummy variable for California, and the resulting elasticity is nearly identical to that found by omitting California entirely. It appears that a large part of reason for the lower elasticity is large gains and tax rates in that state. To test whether or not other high-tax states equally affect the calculated elasticity, we excluded the three states with the highest tax rates (California, Minnesota and New Jersey). The resulting elasticity was -0.71.

We therefore removed California from our main model and use -0.6 as the estimated permanent elasticity. The regression results are listed in Appendix C. We then tested the sensitivity of the results to address additional concerns (Table 3). First, Agersnap and Zidar (2021) found, as in our initial result, low elasticities but they also found that nearly one third of the effect came from taxpayers migrating within the first two years of a tax change. On the other hand, Young and colleagues (2016) found a negligible amount of migration by millionaires in response to changed tax rates. By excluding movers, we found a small decrease in absolute value , from -0.60 to -0.57, which is roughly consistent with the results of Young and colleagues.

TABLE 3

Sensitivity Analyses

	Elasticity	Sample size
Main Result (Exclude only CA)	-0.60	405,256
Exclude movers	-0.57	342,369
Omit inverse Mills ratio and dummy variable for loss carryover in first stage	-0.67	405,256
Use Dowd, McClelland, and Muthichaeron (2015) measure of permanent income	-0.60	405,256
Lower threshold to $551,473	-0.73	1,225,708

Source: Authors' analysis of IRS data.

As mentioned above, the two-stage model we use accounts for potential sample selection bias. To test the degree to which there is such a bias, we omit the dummy variable for losses in the prior year in excess of $3,000 in the first stage and the inverse Mills ratio in the second stage. The calculated elasticity is slightly larger in absolute value (from -0.60 to -0.67), suggesting that there is little sample selection bias.

To determine the effect of our estimate of permanent income, we re-estimated the model using the Dowd, McClelland, and Muthichaeron (2015) estimate. The elasticity of -0.60 is identical to the main result, demonstrating that the exact calculation of permanent income plays little role in the elasticity.

Finally, if high-income taxpayers really are less responsive to capital gains tax rates, lowering the threshold should increase the absolute value of the elasticity. To evaluate this idea, we lowered the income threshold for inclusion in the sample to $551,473 in 2018 dollars. This was sufficiently high that the top rate applies in all states whose top rates start at less than $1 million.[4] In this case the elasticity was calculated as -0.73, suggesting that high-income taxpayers may be somewhat less responsive to a capital gains tax increase than those taxpayers with lower incomes.

[4] That is, all states with income taxes except California, Connecticut, the District of Columbia, New York, and New Jersey.

DISCUSSION

Initially we anticipated that estimated elasticities would exceed -0.7 in absolute value. We found, however, the opposite. It appeared that high-income taxpayers were less responsive to tax rates on long-term capital gains, not more responsive. If taxpayers with at least $1 million have a substantially lower elasticity than taxpayers with lower income, raising the tax rates on their capital gains would generate more revenue than indicated by an elasticity of -0.7. This would reduce the need to use other methods for taxing those gains, such as mark-to-market taxation and taxing unrealized gains at death, that have been suggested as a method for preventing high-income taxpayers from avoiding such a tax increase. On the other hand, if the lower elasticity in our results reflects the decision by high-income taxpayers to hold capital assets until death, those methods may still generate a considerable amount of revenue.

But a careful analysis shows that millionaire taxpayers respond in a very similar fashion to all taxpayers, as found in Dowd, McClelland, and Muthichaeron (2015). Omitting California from the data or even allowing for it to have a different intercept moves the elasticity back to near the Dowd, McClelland, and Muthichaeron (2015) level.

These results must be interpreted with some caution. Our model was estimated over a somewhat narrow range of variation in tax rates. The largest annual tax change for 2012 to 2021 was a 10.94 percentage point increase in 2013, while many of the state-level changes were less than 5 percentage points. Raising the rate to that of ordinary income would involve a 17 to 19.6 percentage point increase.[5] It is possible that taxpayers would respond more strongly to a change of that magnitude than they do to smaller changes. This same critique applies to the results in Burman and Randolph (1994), Auerbach and Siegel (2000), Agersnap and Zidar (2021) and any other research that relies on historic changes in state-level tax rates for identification.

Another source of caution stems from the use of capital gains from personally held assets. Dowd, McClelland, and Muthichaeron (2015) estimates elasticities on several additional types of gains. Some estimated elasticities, such as those on capital gains distributions from mutual funds, are very inelastic, while others, such as gains from partnerships and S-corporations have higher elasticities than those of personally held assets. Counting all types of capital gains less carryover, they estimated an elasticity of -0.9.

With these cautions in mind, while the responses to large tax rate changes over a long period of time may be higher than our -0.6 or the -0.7 indicated in Dowd, McClelland, and Muthichaeron (2015), recent proposals have included a tax on unrealized gains at death. That would discourage taxpayers from indefinitely holding unrealized gains. To the extent that high elasticities reflect taxpayer's decision to hold unrealized gains until death, those proposals might raise more revenue than these elasticities suggest.

[5] The current maximum tax rate is 37 percent. After the expiration of the Tax Cuts and Jobs Act in 2025, the rate will revert to 39.6.

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APPENDIX A: DATA

Our dataset comes from data collected from form 1040, schedules, and information returns such as W-2s. We use income data from form 1040, itemized deduction information from schedule A, capital gains data from schedule D, business loss data from schedule E, and birth and death years from Social Security data for all returns with adjusted gross income (AGI) greater than or equal to $1 million in 2018 inflation-adjusted dollars in any tax year from 1998 to 2021. Our sample includes 2,395,527 unique tax filers. This is a 100 percent sample of eligible filers.

We validated the reported income amounts by comparing the annual number of filers with selected income sources and amounts of income by source for filers with at least $1 million in AGI with published Internal Revenue Service data by AGI (Table 1.4: Individual Income Tax, All Returns: Sources of Income, Adjustments, and Tax Items, by Size of Adjusted Gross Income for 2001 to 2020 and Table 1.4A: Returns with Income or Loss from Sales of Capital Assets Reported on Form 1040, Schedule D: Selected Items, by Size of Adjusted Gross Income for tax years 2012 to 2020). This validation confirmed the accuracy of our data extract.

Our dataset does not contain the amount of capital loss carryover. We create both short-term and long-term capital loss carryover using taxpayer's prior year tax return. The capital loss carryover is the loss reported on schedule D line 16 that is more negative than the $3,000 loss limit ($1,500 for married filing separately). We use the calculations described in the schedule D capital loss carryover worksheet to construct short-term loss carryover (schedule D line 6) and long-term loss carryover (schedule D line 14).

We make adjustments to reported capital gains as follows:

- Some filers with capital gains are not required to file Schedule D. They report capital gains directly on form 1040. In these cases, we assign the capital gains reported on directly on form 1040 to long-term capital gains distributions (schedule D line 13).
- The instructions on schedule D line 21 say to enter the smaller of the amount of the loss on schedule D line 16 or $3,000 ($1,500 if married filing separately). Beginning in 2004, the instructions for line 21 added the statement: "Note. When figuring which amount is smaller, treat both amounts as positive numbers." In a number of cases, filers entered ($3,000) on line 21 instead of the correct smaller loss reported on schedule D line 16. This error was more prevalent in tax years before the instructions added the additional note. For filers with this type of reporting error (less than 0.1 percent of our sample), we corrected the amount reported on form 1040.
- After correcting the above issues, some filers (less than 0.1 percent of our sample) still have values reported on schedule D line 21 do not match the amount reported on form 1040. In these cases, we adjust the capital gains distribution amount (schedule D line 13) so that the values from schedule D are consistent with the amount reported on form 1040. We updated the amounts for schedule D line 15 (net long-term capital gain or loss), schedule D line 16 (combined short-term and long-term gains or loss), and schedule D line 21 (amount reported to form 1040) to include the changes we allocated to schedule D line 13.

Our analysis focuses on capital gains that closely reflect the gains from active trading. This active trading amount is the sum of gains (losses) reported on Form 1099-B and transactions reported on Forms 8949 (schedule D lines 8a, 8b, 9, and 10). We have data for actively traded gains for tax years 2012 to 2021.

We construct a longitudinal panel of tax filers based on the masked tax identification number and tax year. We assume that any missing year in the panel before death represents a tax year the filer was not required to file, and we set the tax variables to zero. We convert all income variables to 2018 price-adjusted dollars.

For each tax filer, we estimated wealth using Survey of Consumer Finance (SCF) data for the available years 2001 through 2019. We create two wealth variables, total unrealized capital gains and unrealized capital gains from stocks, bonds, and mutual funds and regress their natural logs of on variables and tax variables that are in both the SCF and our data panel. We then apply the estimated coefficients to the tax variables to impute the log of wealth. The wealth estimates are a function of the following variables:

- Age
- Age squared
- Single and female (dummy variable)
- Married (dummy variable)
- Wages (dummy variable)
- Wages (log)
- Taxable interest (dummy variable)
- Taxable interest (log)
- Tax-exempt interest (dummy variable)
- Tax-exempt interest (log)
- Dividend income (dummy variable)
- Dividend income (log)
- Alimony (dummy variable)
- Alimony (log)
- Schedule E income (dummy variable)
- Schedule E income (log)
- Schedule C or F income (dummy variable)
- Schedule C or F income (log)
- Itemizer (dummy variable)
- Home mortgage int deduction (dummy variable)
- Year (dummy variable)
- dependents (dummy variables 1–9+)
- Married filing jointly (dummy variable)
- Pension, annuities, SS income (dummy variable)
- Pension, annuities, SS income (log)

We constructed a measure of permanent income based on a fixed effects regression with dependent variable equal to the natural logarithm of the sum of positive tax unit income from the following sources:

- Wage and salary
- Taxable interest income
- Tax exempt interest
- Dividends
- State income tax refund
- Alimony received
- Schedule C income
- Schedule D income
- Supplemental gains
- Pension and annuity income
- Schedule E income
- Schedule F income

- Unemployment compensation
- Gross Social Security
- Other taxable income.

Transitory income is calculated as the difference between permanent income and current income.

We generated three separate analysis samples from our panel data:

- Filers with adjusted gross income above $1 million (2018 price-adjusted dollars) in every year from 2012 to 2021 (73,970 filers, 739,700 person-year observations)
- Filers with taxable income above $1 million (2018 price-adjusted dollars) in every year from 2012 to 2021 (52,562 filers, 525,6200 person-year observations)
- Filers with taxable income above $551,473 (2018 price-adjusted dollars) in every year from 2012 to 2021 (119,704 filers, 1,197,040 person-year observations).

TABLE A1

Estimated Coefficients from our Initial Model

Dependent variable: Personal Long-Term Capital Gains Realizations (L)

	Level equation	Criterion equation
Prior year marginal tax rate	-0.01	0.01
Current year marginal tax rate	0.00	-0.01
Future year marginal tax rate	-0.02	0.00
Inverse mills ratio	-1.63	*
Permanent income (L)	0.79	0.00
Transitory income (L)	0.73	0.03
Log of impute wealth (thousands) (L)	0.20	0.14
Ratio of stocks to wealth (L)	0.09	0.13
Lagged business losses (L)	0.03	-0.01
Have lagged business losses (D)	-0.28	0.20
Lagged rent losses (L)	0.00	-0.01
Have lagged rent loss (D)	0.06	0.09
Male (D)	0.09	-0.05
1 dependent (D)	-1.05	-1.25
2 dependents (D)	-1.24	-1.43
3 dependents (D)	-1.25	-1.39
4 dependents (D)	-1.31	-1.53
5 dependents (D)	-1.34	-1.60
6 dependents (D)	-1.37	-1.75
7 dependents (D)	-1.12	-1.21
8 dependents (D)	-0.76	-1.15
9+ dependents (D)	-0.92	-1.50
Married (D)	0.14	0.22
Ages 30 to 39 (D)	0.35	0.32
Ages 40 to 49 (D)	0.33	0.25
Ages 50 to 59 (D)	0.33	0.22
Ages 60 to 69 (D)	0.32	0.24
Ages 70 and older (D)	0.37	0.33

(cont.)

Having net losses from sale of a business asset (D)	0.11	0.51
Have net pass-through losses (D)	0.00	-0.02
Have lagged rent loss (D)	0.00	0.19
Have a carryover loss greater than $3,000 (D)	*	-0.14
Intercept	-0.96	-0.49
Number of observations	254,262	472,957
Permanent elasticity	-0.37	

Source: Authors' analysis of data from IRS data.
Notes: Dollar amounts are in 2018 price-adjusted dollars.
* indicates variables not included in the regressions. Level equation is based on ordinary least squares regression to predict the log value of realized long-term capital gains, among tax units with long-term gains. Criterion equation is based on a probit regression to predict the probability of having long-term capital gains. Dummy variables for year and region were included in the analysis but are not listed here.
(D) indicates dummy variables. (L) indicates logged variables. Dummy variables for regions and years are included in the model but are omitted from the table.

TABLE A2

Estimated Coefficients from Our Main Model

Dependent variable: Personal Long-Term Capital Gains Realizations (L)

	Level equation	Criterion equation
Prior year marginal tax rate	0.00	0.01
Current year marginal tax rate	-0.02	-0.01
Future year marginal tax rate	-0.01	0.00
Inverse mills ratio	-1.52	*
Permanent income (L)	0.77	0.02
Transitory income (L)	0.71	0.02
Log of impute wealth (thousands) (L)	0.23	0.15
Ratio of stocks to wealth (L)	0.11	0.13
Lagged business losses (L)	0.03	-0.01
Have lagged business losses (D)	-0.25	0.19
Lagged rent losses (L)	0.00	0.00
Have lagged rent loss (D)	0.05	0.08
Male (D)	0.10	-0.06
1 dependent (D)	-1.22	-1.24
2 dependents (D)	-1.45	-1.42
3 dependents (D)	-1.45	-1.38
4 dependents (D)	-1.53	-1.51
5 dependents (D)	-1.54	-1.58
6 dependents (D)	-1.60	-1.72
7 dependents (D)	-1.32	-1.18
8 dependents (D)	-0.94	-1.11
9+ dependents (D)	-1.09	-1.47
Married (D)	0.17	0.22
Ages 30 to 39 (D)	0.20	0.30
Ages 40 to 49 (D)	0.20	0.22
Ages 50 to 59 (D)	0.21	0.19
Ages 60 to 69 (D)	0.21	0.20
Ages 70 and older (D)	0.26	0.29

(cont.)

Having net losses from sale of a business asset (D)	0.14	0.49
Have net pass-through losses (D)	0.00	-0.02
Have lagged rent loss (D)	0.03	0.18
Have a carryover loss greater than $3,000 (D)	*	-0.13
Intercept	-0.69	-0.78
Number of observations	218,323	405,256
Permanent elasticity	-0.60	

Source: Authors' analysis of data from IRS data
Note: Dollar amounts are in 2018 price-adjusted dollars.
* indicates variables not included in the regressions. Level equation is based on ordinary least squares regression to predict the log value of realized long-term capital gains, among tax units with long-term gains. Criterion equation is based on a probit regression to predict the probability of having long-term capital gains. Dummy variables for year and region were included in the analysis but are not listed here.
(D) indicates dummy variables. (L) indicates logged variables. Dummy variables for regions and years are included in the model but are omitted from the table.

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