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USING THE ALTERNATIVE MINIMUM TAX TO ESTIMATE THE ELASTICITY OF TAXABLE INCOME FOR HIGHER-INCOME TAXPAYERS

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Using the Alternative Minimum Tax to Estimate the Elasticity of Taxable Income for Higher-Income Taxpayers

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Abstract

This paper exploits large kinks generated by the intersection of the regular income tax and the alternative minimum tax (AMT) schedules to provide fresh estimates of the elasticity of taxable income with respect to the net-of-tax rate. Such cross-schedule interactions can confound the location of analyzable kinks if either of the two schedules are considered independently of each other. Further, the magnitude of the kink resulting from this interaction is greater than for kinks found separately on the two tax schedules, potentially generating more substantial behavioral responses. I use publicly available Statistics of Income (SOI) individual tax return data from 1993-2011 to exploit bunching around the "intersection kink" point and generate estimates of the elasticity of reported income for higher-income individuals in the United States. Estimated elasticity of taxable income around the intersection kink is 0.08, an order of magnitude higher than earlier estimates using only the regular tax schedule, and eight times as high as in other countries such as Denmark. Preferred estimates are higher at 0.15.

Introduction

Income taxes play a key role in maintaining the social compact between a country's government and its citizens. Such taxes fund the provision of public goods; can be Pigouvian in nature, in that they are imposed to deter undesirable behavior, or behavior that generates negative economic externalities; or they can be used to reduce inequality via redistribution of income. To achieve these objectives, the government sets required income tax rates. However, if taxpayers' behavior changes in such a way that taxable income – which is the income tax base – also shifts with changes in the tax rate, then changes in governmental revenue generated by a change in tax rates will be different with and without such behavioral changes.

The elasticity of taxable income with respect to the net-of-tax rate measures the percentage change in taxable income with respect to a 1 percent change in the net-of-tax rate, defined as $1 - \tau$, where τ is the top marginal tax rate faced by a taxpayer. Note that due to a higher value of taxable income at high income levels, a given percentage change in taxable income will generate larger revenue changes as compared to the same percentage change at lower income levels. The elasticity of taxable income with respect to the net-of-tax rate is, therefore, an important policy parameter, particularly for higher income individuals. This paper aims to improve the estimation of this parameter for higher-income individuals.

A change in the top marginal tax rate that a taxpayer faces can induce a range of behavioral changes. Firstly, a change in the tax rate that impacts after-tax income at the margin can generate real responses, as taxpayers adjust their labor supply. Further, an increase in the top marginal tax rate that a taxpayer faces can cause taxpayers to shift income across different streams or pursue more aggressive tax avoidance strategies to minimize their tax bills. Higher tax rates can also incentivize taxpayers to simply evade taxes by under-declaring their income. The attraction of the elasticity of taxable income lies in its ability to capture these behavior changes and to distil them into a single parameter which has immense relevance to policy, and particularly, revenue generation.

Higher-income taxpayers pay the largest share of income taxes. Therefore, accurately estimating their behavioral response is critical to revenue and welfare analyses. Over the past two decades, the income tax share of the top quintile of income earners has persisted around 85 percent. Further, the diversity of income streams of higher-income taxpayers provides them with the ability to shift income from higher- to lower-taxed streams. Having high income levels, these taxpayers can also leverage the services of savvier financial advisers to minimize their taxable incomes, and therefore, their overall tax bill. While more recent literature has systematically considered the elasticity for the very top percentile, the only significant paper in the United States that assesses the responsiveness of the tax base for higher-income individuals facing the top marginal tax rate is Saez (2010).

Previous estimates of the overall micro elasticity of taxable income with respect to the overall net-of-tax rate have ranged from 0.0 to 0.3. Gruber and Saez (2002) provide a detailed overview of these estimates. Many of these estimates were obtained using difference-in-differences estimators which face endogeneity concerns, since effective marginal tax rates and taxable income are likely to be jointly determined. More recent work has used bunching estimators which utilize distributional changes around marginal tax kinks and the estimate elasticity of taxable income non-parametrically to mitigate such endogeneity. The most prominent was developed and utilized by Saez (2010), which considered federal income taxes in the United States, and found estimates of 0.1-0.3 for lower income levels, and 0.006 for taxpayers facing the highest income tax kink. Compare this to Chetty et al. (2011) which used a similar bunching technique and estimated the elasticity to be 0.01 at the top kink of the income tax schedule in Denmark.

Bunching estimators have also attracted attention for the strong assumptions they make about underlying elasticities (Blomquist and Newey, 2017; Bertanha et al., 2016). Therefore, in this paper, I will estimate and compare elasticities via two methods: the traditional bunching estimator, and a method using sub-distributions as control groups (Coles et al., 2019)

I hypothesize that the low elasticity estimates obtained for higher income taxpayers in the United States using the traditional bunching estimator is a result of excluding the impact of another salient federal income tax instrument, which interacts with the regular tax schedule at higher income levels and confounds such an analysis. This instrument is the Alternative Minimum Tax (AMT). In this paper, I incorporate the interaction of the AMT with the regular income tax schedule for higher-income taxpayers, which leads to taxpayers facing a new, effective tax schedule. Using this effective schedule, I assess bunching around the top effective kink and estimate the elasticity of taxable income with respect to the net-of-tax rate.

The purpose of the AMT is to ensure that higher-income individuals do not take too many deductions, so that they pay their "fair share" of taxes. The AMT partially or fully disallows many deductions allowed under the regular income tax schedule. These include personal exemptions; standard deductions; and certain itemized deductions such as state and local income tax deductions, interest on private-activity municipal bonds, the bargain element of incentive stock options, foreign tax credits, and home equity loan interest deductions. However, it treats charitable contributions and mortgage interest payment deductions for primary housing in a manner similar to the regular income tax schedule. I estimate that for example in tax year 2000, approximately 20 percent of taxpayers with regular taxable income > $100,000 faced the new effective tax schedule. For taxpayers with regular taxable income > $200,000, this rate jumps to 42 percent. Not all taxpayers facing the effective schedule pay the AMT, since at higher income levels, the regular tax schedule dominates the AMT schedule.

I use publicly available Internal Revenue Service (IRS) Statistics of Income (SOI) division individual income tax return annual samples from 1993-2011. Using this data, I locate these "intersection kinks" for each taxpayer in the sample. I then standardize these kinks by finding the distance of each taxpayer from their respective intersection kinks and re-estimate the elasticity of taxable income with respect to the net-of-tax rate.

I find an elasticity estimate of 0.08 at the effective kink, which is an order of magnitude higher than Saez (2010) for higher-income taxpayers in the US, and eight times as high as Chetty et al. (2011), implying a higher behavioral response in the US as compared to Denmark. The mean adjusted gross income (AGI) at the effective kink is USD 700,000. Self-employed individuals reveal an elasticity estimate of 0.07, while for wage earners, the estimated elasticity is higher at it stands at 0.11. Previous literature has shown that pure wage earners are less likely or able to change their behavior as compared to self-employed individuals. However, my estimates reveal that this is not true for higher income wage earners, who still have access to multiple channels for manipulating taxable income, such as taking non-monetary compensation at work, shifting income to lower-taxed capital investments, or hiring savvier financial advisers. Further, my preferred, cleanest estimates are for individuals not affected by the maximum capital gains rates, for whom the elasticity estimate is higher at 0.15.

When using the traditional bunching estimator, exploiting the intersection kink on the effective tax schedule to estimate the elasticity of taxable income with respect to the net-of-tax rate is more robust to endogeneity concerns, as compared to doing the same under the regular tax schedule only. This is because the effective, intersection kink, in contrast to kinks on the regular income tax schedule, varies across taxable income. The mechanics of this variation in location is explained in detail in Section 2. This variation mitigates the concern that the location of the kink might be endogenous to taxpayer behavior, strengthening the claim that bunching is a result of the kink, without the two being endogenously determined.

Further, the interaction of the AMT and the regular income tax schedule not only shifts the location of analyzable kink points, but also generates larger effective marginal tax rate changes for higher income taxpayers as compared to what they face on the regular tax schedule. For example, the highest marginal tax rates on the regular income tax schedule in year 2000 go from 31 percent, to 36 percent and then to 39.6 percent, compared to a jump from 28 percent to 39.6 percent at the intersection kink on the effective tax schedule, resulting in a reduction in the net-of-tax rate of 16 percent. A larger change in the net-of-tax rate generates more substantial behavioral responses (Chetty et al., 2011).

This paper also shows that when AMT exemptions are sufficiently large relative to regular income tax exclusions, the "crossover point" from the AMT to the regular tax schedule (zero AMT liability point) corresponds with the interaction kink between the two tax schedules. This also makes the intersection kink on the effective schedule more salient to taxpayers: increasing taxable income and decreasing AMT liability implies decreasing distance to the intersection kink. Taxpayers located in the "sweet spot" of the AMT – where the taxpayer faces the 28 percent AMT marginal tax rate rather than the 39.6 percent regular income tax marginal tax rate (in year , for example 2000) have the incentive to accelerate their incomes to take advantage of the lower marginal tax rate in a given year, as compared to other years when the effective schedule might not apply. One way to benefit from this lower tax rate is, for example, the acceleration of Roth IRA conversions up until the taxpayer's AMT liability is zero, which corresponds to the intersection kink.

I exploit rich variation generated by changes in the AMT regime, such as arbitrary increases in deduction amounts after year 2000 (AMT deduction amounts were not indexed to inflation prior to 2012), in conjunction with changes in the regular income tax regime under the

Bush tax reforms of 2001 and 2003, to study learning effects across taxpayers. I find that behavioral change detected via bunching dissipates with frequent changes in the location of effective kinks, leading to reduced estimates for the elasticity of taxable income with respect to the net-of-tax rate. Estimated elasticity for time period 1993-2002, when the deduction amounts were relatively constant, stands at 0.12; as compared to estimated elasticity of 0.07 from 2003-2011.

Section 1 provides an overview of the Alternative Minimum Tax (AMT). Section 2 delves into existing literature and details my contribution to this literature. Further information on the data used in this paper, together with the explicit methodology for estimating the elasticity of taxable income with respect to the net-of-tax rate is provided in Section 3. I provide results in Section 4 and check their robustness in Section 5. Section 6 concludes the paper.

Section I: The Alternative Minimum Tax (AMT)[1] – An Overview

The AMT was established to ensure that high-income taxpayers do not artificially suppress their tax liabilities due to high utilization of certain exemptions and deductions. The precursor to the Alternative Minimum Tax (AMT) was the Minimum Tax, introduced in 1969. At the time of its inception, the key motivation was to bring 155 highest-income individuals who were paying close to zero tax into the tax net. The minimum tax began with a 10 percent, and later, a 15 percent tax on preferences in excess of USD 30,000. “Preferences” (deductibles) included accelerated depreciation, oil depletion and the capital gains deduction. Net operating losses and retirement income received special treatment.

In 1979, the AMT was introduced with a base that included all the components of Adjusted Gross Income (AGI) and the capital gains deduction in addition to preferences. The new AMT allowed the full amount of regular income tax as a credit. The three tax systems – regular income tax, the minimum tax, and the AMT – worked side-by-side between 1979 and 1981, till the minimum tax was repealed in 1982. Since then, the modern AMT has functioned as the primary policy instrument for ensuring that high-income individuals are forced to contribute more to the tax base[2]. The detailed legislative history of the AMT are provided in Annex A.

The AMT and the regular income tax function in parallel to each other. The AMT has its own tax rate structure and income definition, which treats deductions, credits and exemptions differently. This is discussed in more detail below. Taxpayers must calculate their income tax liability using both the regular income tax form (Form 1040), as well as the AMT form (Form 6251). If taxpayers’ regular income tax liability is greater than their AMT liability, then they do

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[1] While information on the legislative history and structure of the AMT is available from a large number of sources, this section borrows heavily from Feenberg & Poterba (2003)

[2] Feenberg and Poterba 2003

not pay any AMT. However, in case the AMT liability is greater than the regular income tax liability, then individuals pay the difference between the two, in addition to the regular income tax liability. Put another way, taxpayers effectively pay the maximum of the two taxes. People with low levels of income are unaffected by the AMT, due to the fixed and significant portion of the AMT deduction that exists for all types of filers (single, married and filing jointly, married filing separately). For example, the fixed portion of the AMT deduction for single filers in year 2000 was $33,750, while for married filing jointly, the AMT deduction stood at $45,000. Details on these exemptions and their evolution over time are provided in Annex B.

Calculating the AMT: Some Details

The two major steps in calculating taxes on both schedules are: (1) determining taxable income, and (2) applying the tax rate provided in the respective schedule to taxable income to determine income tax. As discussed, the regular tax schedule and the AMT schedule define taxable income differently and apply different tax rates to this taxable income.

Taxpayers can prevent a part of their pre-tax incomes from being taxable by utilizing deductions. Deductions are primarily allowed for two reasons. Firstly, the government provides an allowance for certain cost of living expenditures. Secondly, the government can incentivize certain economic activities with the aid of deductions. For example, taxpayers can take deductions for capital losses, mitigating the negative impact of these capital losses, and encouraging capital investments.

The regular tax and the AMT, while starting from the same pre-tax income, allow a different set of deductions each. As deductions reduce taxable income thereby decreasing tax liability, by design, the AMT schedule allows a much narrower range of deductions as compared to the regular tax schedule. For example, it disallows personal exemptions, standard deductions, and many itemized deductions such as state and local income taxes and property taxes. Besides allowing some other deductions such as mortgage interest payments and charitable contributions, the AMT also allows for a fixed deduction, which for example in year 2000, stood at USD 45,000 for married taxpayers filing jointly. Consequently, the same pre-tax income will result in different taxable incomes under the regular income tax and the AMT schedules. I refer to this final taxable income on the AMT as the Alternative Minimum Taxable Income (AMTI).

To these taxable incomes, the two schedules apply their graduated tax rates. While the AMT statutorily only contains two tax rates of 26 percent and 28 percent, the fixed AMT deduction mentioned above (e.g. USD 45,000 for year 2000) phases out at higher income levels at the rate of 25 cents for every additional dollar of taxable income. This results in the AMT schedule containing four effective tax rates, moving from lower to higher AMTI: 26 percent, 32.5 percent, 35 percent, and then 28 percent, as the fixed deduction is completely phased out. To illustrate the difference between the tax rates on the two schedules, the table below provides tax rates for regular income tax and the AMT for year 2000:

Regular Taxable Income (MFJ)	Tax Rates
$0 - $43,850	15%
$43,850 - $105,950	28%
$105,950 - $161,450	31%
$161,450 - $288,350	36%
$288,350 and above	39.6%

AMT Taxable Income (MFJ)	Tax Rates
$0 - $105,000	26%
$105,000 - $161,000	32%
$161,000 - $285,000	35%
$285,000 and above	28%

Table 1: Tax Rates for the Regular Income Tax and AMT

I provide a detailed, hypothetical example here for clarifying the use of the two schedules. Suppose a married taxpayer is filing jointly in year 2000, with a pre-tax income for the calendar year of USD 300,000. The taxpayer first defines his or her regular taxable income and the AMTI, by removing from pre-tax income the deductions allowed under the two schedules. Let's assume that for regular taxable income, the taxpayer deducts USD 80,000, which is a combination of personal exemptions, and itemized deductions such as state and local taxes, unreimbursed employee expense deduction, investment interest deduction, and tax-exempt interest from private activity bonds. This leaves the taxpayer with USD 220,000 in regular taxable income. Applying regular income tax rates to this taxable income results in a regular tax liability of approximately USD 62,650.

Figure 1 graphically illustrates this setup. The vertical dashed line marks pre-tax income of USD 300,000, while the horizontal dashed line marks the regular income tax liability of USD 62,650. Notice that the tax slabs and the gradients (rates) for each slab depend on the tax brackets and rates defined by the federal government in a particular year. Therefore, all taxpayers face the same shaped curve in a given year. What varies on the pre-tax/income tax graph are individual taxpayer deductions which affect the starting point of the curve, and taxpayer pre-tax incomes (represented by the dashed line), which results in varying tax liabilities.

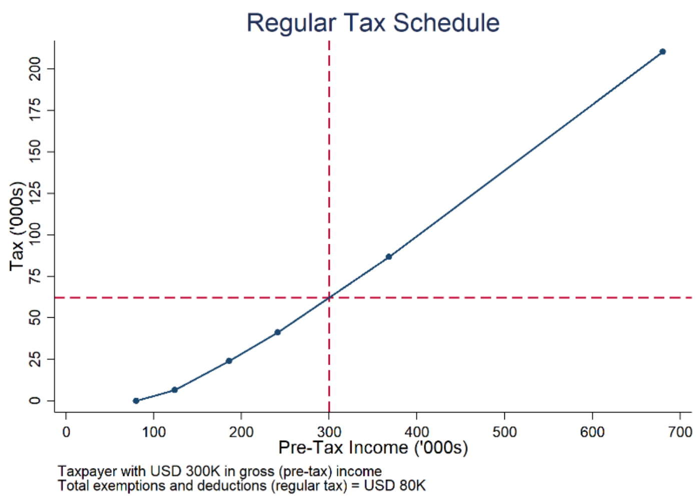

Figure 1: Regular Income Tax Schedule

Similarly, figure 2 graphically illustrates the set up for this taxpayer on the AMT schedule. For the same taxpayer earning pre-tax income of USD 300,000 in year 2000, the AMT disallows all of the above deductions. However, the taxpayer can still avail the fixed AMT deduction for the year, which in 2000 was USD 45,000 for married taxpayers filing jointly. This results in an AMTI of USD 255,000. Applying AMT tax rates to this AMTI generates an AMT liability of USD 78,400 for the taxpayer. The vertical dotted line marks pre-tax income (USD 300,000), while the horizontal dotted line marks the AMT liability (USD 78,400).

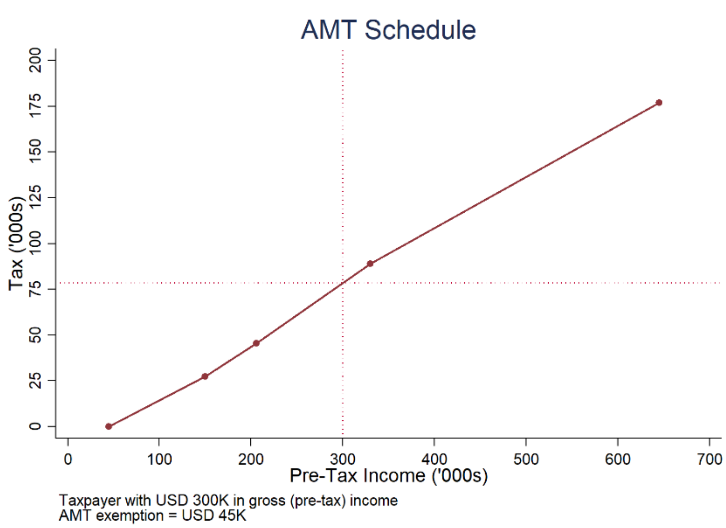

Figure 2: Alternative Minimum Tax (AMT) Schedule

But recall that taxpayers have to pay the higher of the regular income tax and the AMT. Therefore, in effect, the taxpayers face a combined tax schedule, as illustrated in figure 3a. For the taxpayer in our example, the excess tax liability generated by the AMT is the difference between the tax liability generated on the AMT schedule (horizontal dotted line), and the regular income tax liability (horizontal dashed line). Therefore, the effective tax schedule for the taxpayer is the maximum of the two tax schedules, with a new effective kink at the intersection of the regular income tax and the AMT schedules, where the effective marginal tax rate jumps from 28 percent to 39.6 percent in year 2000. This effective schedule is illustrated in figure 3b.

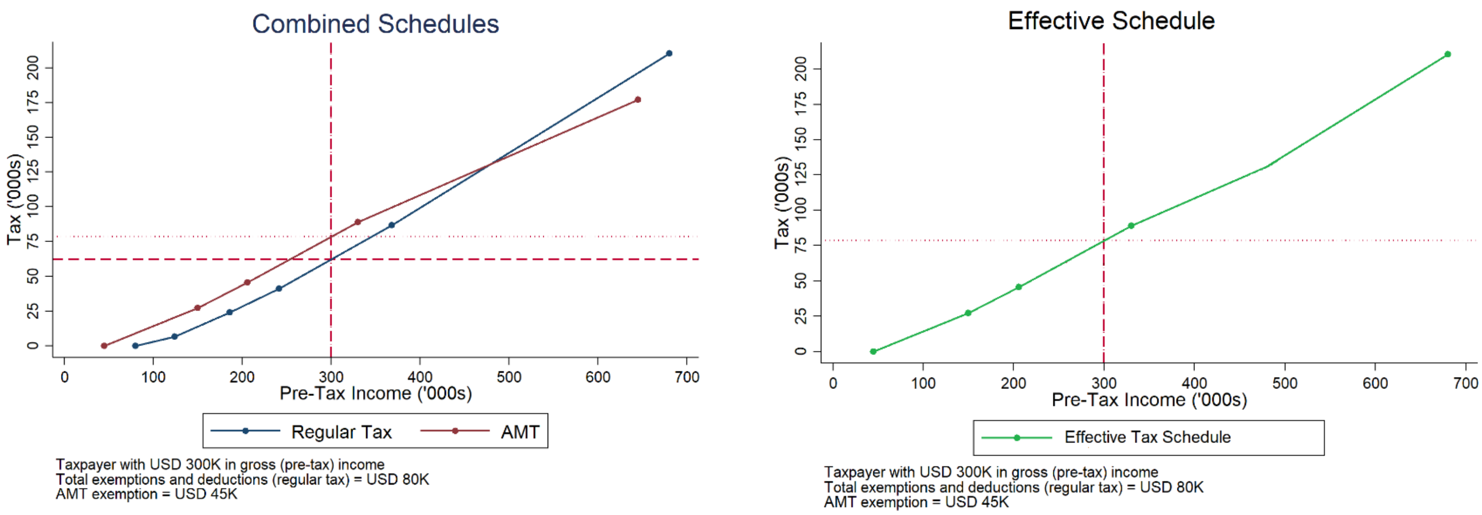

Figure 3a and 3b: An example of the *effective tax schedule* facing a taxpayer with AMT tax sheltering worth $45,000 and regular income tax sheltering of $80,000, given AMT and regular income tax rules in place in tax year 2000, and pre-tax income worth $300,000. For this taxpayer, the red line represents the AMT schedule, the blue line represents the regular income tax schedule. The figure on the right is the effective tax schedule for such a taxpayer: the upper bound of the two tax schedules.

Before exploiting this effective schedule for re-estimating the elasticity of taxable income, section 2 provides a more detailed overview of the literature surrounding this elasticity.

Section II: Literature Review

This paper contributes to an evolving corpus of literature aimed at estimating the elasticity of reported income. Following work by Pencavel (1986) on the impact of tax changes on labor force participation, and Macurdy, Green and Paarsch (1990) on the effect on average number of hours worked, it was recognized that the key policy parameter for studying revenue losses is the elasticity of taxable income with respect to the net-of-tax rate (Feldstein (1995). As shown by Pencavel (1986) and MaCurdy et al. (1990), labor supply is relatively inelastic to changes in the marginal tax rate, perhaps due to search costs, optimization frictions and bargaining power. However, changes in such rates can trigger other behavioral changes, such as increased avoidance via income-shifting, or evasion of taxes.

Past work has generated a wide range of estimates for the elasticity of taxable income. Feldstein (1995) employed a difference-in-differences approach to studying the impact of the tax reform of 1986 on taxable incomes across different parts of the income distribution. Gruber and Saez (2001) attempted to strengthen identification using long panels such as the NBER's Continuous Work History (CWH) File, for the time period 1979-1990. Gruber and Saez developed a dataset with significant variation both in marginal tax rates, as well as reported income to estimate the elasticity of taxable income with respect to marginal tax rates. They found that this elasticity is particularly high for high-income individuals, defined as taxpayers reporting income higher then USD 100,000, for whom the estimate of the elasticity of taxable income is 0.57. For individuals with lower levels of income, they estimated an elasticity of 0.2. Annex D provides a summary of elasticity estimate obtained in studies before year 2000 and shows how there has been wide variation in these estimates.

However, the last decade has seen the utilization of quasi-experimental methods which exploit variation generated by kinks and discontinuities in nonlinear tax schedules to provide fresher estimates of the elasticity of taxable income. A key paper in this regard is Saez (2010), which uses tax return data to analyze bunching at the kink points of the US income tax schedule. Saez finds evidence of bunching around the first kink point of the Earned Income Tax Credit (EITC), which is concentrated primarily among the self-employed, as well as bunching around the first kink of the regular income tax schedule, where taxpayers graduate from an MTR of 0 percent to 15 percent. He uses this bunching to estimate the compensated elasticity of reported income with respect to (one minus) the marginal tax rate – the net-of-tax rage. However, this point in the schedule can plausibly generate bunching mechanically, due to a) there being a bigger mass of taxpayers with no taxable income, b) taxpayers responding to the change in the marginal tax rate, and c) taxpayers responding to a change in outcome from zero to any positive taxable income, rather than responding to a change in the marginal tax rate.

The approach taken by Saez is tested in the Danish context by Kleven et al. (2011, Econometrics), in conjunction with a large-scale field experiment that aims to assess the impact of the probability of detection of evasion on reported income. This study finds significant bunching around large and salient kink points in the nonlinear income tax schedule enforced in Denmark. Further, Kleven et al. extend the bunching approach to the use of pre- and post-intervention bunching to separately identify evasion and avoidance elasticities of reported income.

Using this bunching mechanism and developing a new framework to think about policy impacts where counterfactuals are difficult to find, Chetty, Friedman and Saez (2013, American Economic Review) show bunching on the EITC schedule and divide different geographical areas defined at the zip code level into low- and high-bunching areas. They assume that high bunching implies higher knowledge of a policy and therefore, a higher utilization and receipt of the policy. Therefore, such knowledge can be proxied for treatment, with high-bunching areas serving as the treatment group, and low-bunching areas serving as the comparison group. Using this approach, the authors identify the causal impact of EITC on wage earnings.

Ramnath's 2013 paper (Journal of Public Economics) analyzes bunching around notches generated due to the provision of the Saver's Credit to low- and middle-income households. She finds an estimate for an implied elasticity of adjusted gross income to a change in the effective tax rate of 0.09.

A different kind of nonlinearity in the income tax schedule is exploited in the case of Pakistan by Kleven and Waseem (2014, QJE). Before 2012, Pakistan's income tax schedule had discontinuities instead of kinks in its income tax schedule. Therefore, as taxpayers graduated from one income bracket to the next, they faced a different tax rate on their entire taxable income, not just the portion of income which spilled over into the next tax bracket. This produced notches around these discontinuities, which are exploited to uncover optimization fictions and structural elasticities of reported income in Pakistan.

The following table provides estimates obtained from these bunching studies:

Table 2: Estimates of Elasticity of Taxable Income from Selected Bunching Studies

Author (date) (1)	Data (years) (2)	Sample (4)	Income Definitions (5)	Elasticity estimates (6)
Saez (2010)	US Repeated tax cross-sections (1960-2004)	57,692 for EITC; 268,020 for tax filers	Taxable Income	EITC: 0.25 First tax kink: 0.2 Other kinks: 0
Chetty, Friedman, Olsen, Pistaferri (2011)	Danish Panel (1994-2001)	8.6 million	Taxable Income	Small tax reforms: 0 – 0.004
Kleven et al. (2011)	Danish audit experiment (2007-08)	2405 observations	Taxable income	Self-employed: 0.16 Stock Income: 2.24
Chetty, Friedman and Saez (2013)	US Repeated cross-sections (2000-2005)	54 million		Wage earnings: 0.21 Total earnings: 0.36
Ramnath (2013)	US Repeated cross-sections (2002-2006)	12,564	AGI	AGI: 0.09
Kleven and Waseem (2014)	Pakistan panel (2006-2009)	4 million	Taxable income	Self-employed: 0.025-1.279 Wage earners: 0-0.035 (varies by income level and estimation method)

This paper contributes to existing literature in two ways. First, it uncovers an effective tax schedule that takes precedence over the regular income tax schedule for higher-income taxpayers in the United States and uses this effective schedule to detect behavioral changes via bunching around the effective tax kink. Second, it exploits this uncovered bunching to supplement the fledgling literature on estimated elasticity of taxable income for higher-income taxpayers.

Section III: Data and Methodology

Data

Since 1960, the Statistics of Income (SOI) division of the Internal Revenue Service (IRS) has published annual samples of individual tax returns in the form of Public Use Files (PUF). These micro-datasets are generated using a stratified random sample of tax filers. Weights associated with sampling have varied – high-income filers facing a larger sampling rate, with those at the very top of the income distribution facing an approximately 33 percent rate of sampling. This works well for my paper, since the AMT targets the higher part of the income distribution, where we will see most of the action in any analysis of the AMT[3]. Oversampling provides richer variation in the sample than would be present in the sample with a constant sampling rate. However, findings in this paper can be improved by using data from the universe of tax returns, which can allow for exploiting all available variation at higher-income levels.

The IRS processes the PUF sample to mitigate confidentiality concerns. This involves dropping, blurring, modifying and imputing certain variables. Since this study uses mostly high-income individuals as its target population, it is important to consider the implications of IRS processing on the results presented in this paper. Details are provided in Annex H.

Due to changes in data reporting which generate inaccuracy in the estimation of the AMT liability, I omit years 1998, 2003 and 2007. For the remaining 16 years between 1993-2011, there are a total of 1,232,383 observations covering a population of 915 million individual tax returns. To generate the effective schedule for each taxpayer, I utilize the AMTI and regular taxable income. The AMTI is only available if a taxpayer submits Form 6251. Therefore, I drop all observations where taxpayers did not provide any information on their AMT liability. I also restrict my analysis to single filers and married taxpayers filing jointly, leaving a sample of 643,970 observations. As discussed in the empirical strategy below, the effective kink is only *effective* for taxpayers for whom the total AMT deduction is less than the regular income tax deduction. Therefore, I limit my sample to taxpayers with AMTI > regular taxable income. I also prevent having any taxpayers in my sample for whom there are multiple effective kinks, providing a sample of 226,165 observations.

Similar to earlier studies and to restrict the frame of the analysis to a range within which the effective kink lies, I limit the sample to individuals within USD 400,000 (-$200,000, +$200,000) of the effective kink. This is my analysis sample, with a total of 36,639 observations, representing a total of 1,269,691 (approximately 1.2 million) individual tax returns. The following table provides population counts for each of the years in the sample.

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[3] Saez, Slemrod & Giertz (2012)

Table 3: Population Counts by Year

Year	Population Count	% of Population
1993	60,136	4.7
1994	60,499	4.8
1995	59,750	4.7
1996	64,266	5.1
1997	58,174	4.6
1999	79,411	6.3
2000	96,792	7.6
2001	75,661	6.0
2002	60,502	4.8
2004	55,188	4.3
2005	75,452	5.9
2006	100,013	7.9
2008	112,592	8.9
2009	80,747	6.4
2010	84,966	6.7
2011	145,543	11.5

The population median AGI for these individuals is USD 583,700. With median regular taxable income and AMTI of USD 474,600 and USD 591,700, respectively. The effective, intersection kink for these taxpayers lies on average, at USD 527,692 of effective taxable income.

Empirical Strategy

There are three main elements of the empirical strategy:

1. Locating the intersection kink for each taxpayer and constructing an aggregate distribution of taxable income relative to the intersection kink.
2. Graphically analyzing bunching around the intersection kink and estimating the quantity of excess bunching.
3. Exploiting bunching to estimate the elasticity of taxable income with respect to the net-of-tax rate for comparability.

I Locating the intersection kink and constructing aggregate distribution

In this section, I detail the methodology for finding the intersection kink of each taxpayer along his or her effective taxable income. As discussed, a taxpayer can take deductions under both the regular income tax and the AMT, which shelter part of the income from the respective tax schedules. Let the pre-tax income in a calendar year for a taxpayer be Y. Let the income sheltered under the regular income tax schedule be S_R, which is equal to $Y - D_R$, where D_R represents regular income tax deductions [4]. The AMT also allows for some income sheltering. Denote this by S_{AMT}. The AMT has a fixed deduction for each taxpayer filing category. Denote this by D_{AMT}. Further, the AMT disallows part of the deductions taken under the regular income tax. Therefore, allowed deductions under the AMT are $D_R(1-\alpha)$, where α is the proportion of regular income tax deductions disallowed under the AMT.

$$\text{If } S_R = S_{AMT}, \text{ then } D_R = D_{AMT} + D_R(1-\alpha), \text{ or } \alpha = \frac{D_{AMT}}{D_R}$$

Let T_R be regular taxable income, defined as $T_R = Y - S_R$. Let T_{AMT} be AMTI, defined as $T_{AMT} = Y - S_{AMT}$.

I use the difference between their two taxable incomes, T_R and T_{AMT} to construct their combined schedules.

$$T_{AMT} - T_R = (Y - S_{AMT}) - (Y - S_R) = S_{AMT} - S_R$$

This difference in income sheltering across the two schedules is the distance between the AMT and regular income tax-related zero taxable income points on the pre-tax income graph. Using this, I can find the point of intersection between the two curves by simultaneously solving the two equations representing the top pieces from the two respective schedules. If $S_{AMT} < S_R$, as is the case in figure 4a, then the taxpayer has a unique intersection kink. If $S_{AMT} \geq S_R$, the taxpayer's effective tax schedule can either have two intersection kinks – one at a low level of taxable income and the other at a high level of taxable income, or no intersection kinks, as shown in figures 4b and 4c, respectively.

[4] In fact, overall sheltered income includes "exemptions" and "deductions". For simplicity, I combine both and call them deductions.

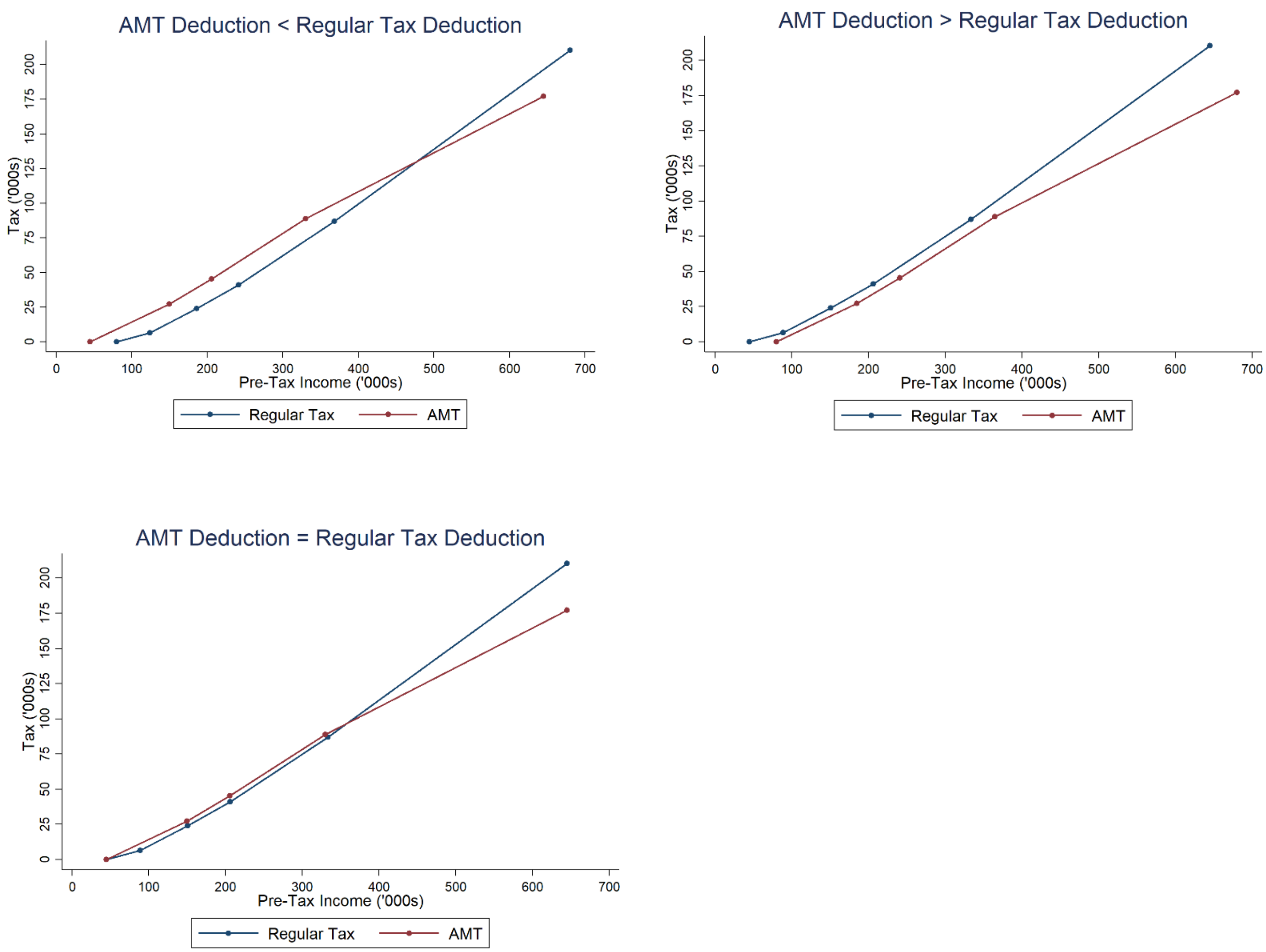

Figure 4a, 4b, and 4c: Effective Schedules Under Varying Deductions

To ensure analysis of a distinct intersection kink, I restrict the sample to taxpayers for whom $S_{AMT} < S_R$. Note that the intersection kink represents a transition from a marginal tax rate of 28 percent to a marginal tax rate of 39.6 percent in year 2000. At this point, the net-of-tax rate decreases by 16 percent.

The two schedules are piecewise linear. Once I restrict the sample to taxpayers for whom there exists a unique intersection kink, I solve the system of equations for the top pieces from each of the two schedules to find the location of the intersection kink across their regular taxable income. As noted, the location of kinks for each taxpayer varies across taxable income, so I proceed to standardize their locations by centering the distribution of taxable income relative to the intersection kink at the zero point, where zero represents the location of the intersection kink.

II Graphically analyze bunching around intersection kink and estimate the quantity of excess bunching

To visualize the distribution of taxable income around the intersection kink, I construct histograms with taxable income bins of varying widths. The choice of binwidth leads to a trade-off between noise and precision: the greater the binwidth, the less noisy and smoother the histogram. The smaller the binwidth, the noisier the histograms, while revealing more of the variation in the data. I compute the optimal binwidth based on the data, and also use other, arbitrary binwidths for comparison. For the optimal bindwidth selection, I use the rule-of-thumb Freedman-Diaconis method:

$$k = 2 * IQR * n^{-1/3}$$

Where k is the binwidth, IQR is the interquantile range of the distribution, and n is the number of observations. I find k to be USD 3,074. I also use other binwidths, including USD 10,000, USD 5,000 and USD 1,000.

Besides generating visual evidence of bunching via histograms, I also quantify the amount of bunching in the bunching region. Since taxpayers are unable to bunch perfectly, apparently due to optimization frictions, I observe excess, diffuse mass around the intersection kink, instead of perfect bunching at the kink point. In the presence of such noise, I utilize Chetty et al. (2011, QJE) to find an estimate for bunching. I estimate a counterfactual density which presumably would have existed in the absence of the change in tax rates generated at the intersection kink. I divide the range of taxable incomes relative to the intersection kink into bins of the above-mentioned bin sizes. I then fit a polynomial of order 8 to the counts for each of the taxable income bins, excluding data near the kinks by estimating a regression of the form:

$$C_j = \sum_{i=0}^{p} \beta_i Z_j^i + \sum_{-r}^{r} \phi_k D_j + \epsilon_j$$

Where C_j is the count of observations found in bin j, Z_j is the midpoint level of the key variable for bin j, and D_j is a dummy for each bin found in the bunching region. In other words, there are r indicators such that $D_j = 1$ if $Z_j \in [c - l, c + l]$, where c is the location of the kink and l is the distance from the kink measured in terms of taxable income. The counterfactual frequency of observations, $\hat{C}_j^{cf}$, is then derived using predicted counts from $\hat{C}_j^{cf} = \sum_{i=0}^{p} \hat{\beta}_i Z_j^i$, which omits the impact of the dummies. Using the actual and the estimated counterfactual density, the quantity of "excess bunching" can be estimated using:

$$\hat{b} = \sum_{j=c+l}^{c} \frac{(C_j - \hat{C}_j^{cf})}{N}$$

I impose the constraint that taxpayers who bunch do so by reducing their taxable income, so that the number of taxpayers missing from the right of the intersection kink is equivalent to the number of individuals bunching to the left of the intersection kink.

III Estimate the elasticity of taxable income with respect to the net-of-tax rate for higher-income individuals using the Saez bunching estimator

Using estimates for the quantity of excess bunching around the intersection kink, I estimate the elasticity of taxable income using the traditional bunching estimator, developed by Saez (2010). Saez uses a simple parameterized model with a quasi-linear and iso-elastic utility function of the form:

$$u(c,z) = c - \frac{n}{1+1/e}\left(\frac{z}{n}\right)^{1+1/e}$$

Where c is consumption, z is before-tax income, n is an ability parameter distributed with density $f(n)$, and e is compensated elasticity of reported income. Maximizing this with a linear budget constraint and letting $H_0(z)$ be the cumulative distribution of earnings when there is a constant marginal tax rate t_0 throughout the distribution, Saez introduces a convex kink in the budget set at z^*. Taking this kink point into account, individuals with $n \in [z^*/(1-t_0)^e, z^*/(1-t_1)^e]$ choose $z = z^*$ and bunch at the kink point. This process leads to the fraction of the population bunching:

$$b = z^*\left[\left(\frac{1-t_0}{1-t_1}\right)^e - 1\right]\frac{h(z^*)_- + h(z^*)_+/\left(\frac{1-t_0}{1-t_1}\right)^e}{2}$$

Which can be solved explicitly to express e as a function of observable or empirically estimable variables. Simplification leads to:

$$\epsilon = \frac{b(t_0,t_1)}{z^*\log\left(\frac{1-t_0}{1-t_1}\right)} = \frac{\hat{b}}{\left|\frac{z}{w}\cdot\frac{\Delta\tau}{1-\tau_0}\right|}$$

Where t_0 and t_1 are the effective marginal tax rates on either side of the intersection kink and are known. b is amount of bunching within a given bandwidth around the kink point. This is the excess bunching parameter that we estimated using Chetty et al. (2011) in the form of $\hat{b}$. w is the binwidth.

The traditional bunching estimator uses a fixed z^*. However, as noted, the location of the intersection kink varies along the taxable income spectrum. Borrowing from Saez (2010), I take the weighted average of the adjusted gross income in the bunching region as an estimate of z. Plugging in the observed marginal tax rates and estimates of excess bunching and z^*, provides estimates of the elasticity of taxable income.

Section IV: Results

Graphical Evidence

This section provides graphical evidence of bunching around the intersection kink point. The data used is from 1993-2011. For individuals facing the effective schedule, increasing taxable income shifts them from the left, towards the kink, and then to the right of it. As expected, at higher income levels, the number of taxpayers decreases with increasing taxable income. For example, the figure below provides a simple histogram of taxable income for taxpayers in the PUF sample with incomes between USD 100,000 to USD 800,000 from 1993-2011.

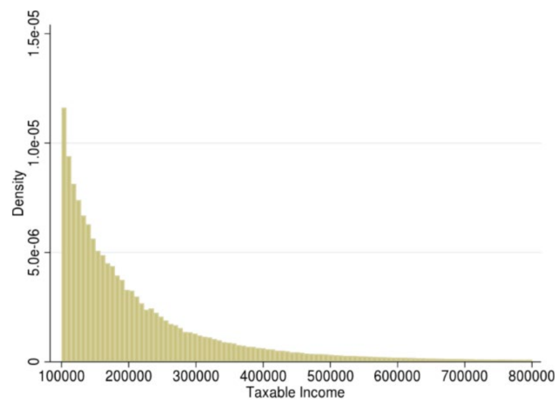

Figure 5: Distribution of Taxable Income ($100K - $800K)

I find that the distribution of taxable incomes around the intersection kink are also decreasing, though with visible, diffuse clustering to the left of the intersection kink. Figure 6a below provides the weighted distribution of taxable income relative to the intersection kink for taxpayers in the sample. Note that for convenience, I am focusing on the distribution within generally wide range of -$200,000 to $200,000. Taxpayers bunch around the intersection kink, represented by the break in the downward sloping distribution to the left of the zero point. Figures 6b and 6c disaggregate the data by two time periods: 1993-2002 and 2003-2011.

AMT fixed deduction amounts remained constant from 1993-2000. Between 2001 and 2002, the increase in the fixed deduction amount was small. Further, the top marginal tax rate on the regular income tax schedule remained close to 39 percent during this time, even after the Economic Growth and Tax Relief Reconciliation Act (EGTRRA) of 2001. From 2003 onwards, AMT fixed exemption amounts saw larger annual increases, and the top marginal tax rate underwent a drop to 35 percent after the Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) of 2003. Both periods reveal patterns of manipulation, with a bump in the distribution around the intersection kink between 1993-2002, and clustering to the left of the intersection kink in the 2003-2011 time period.

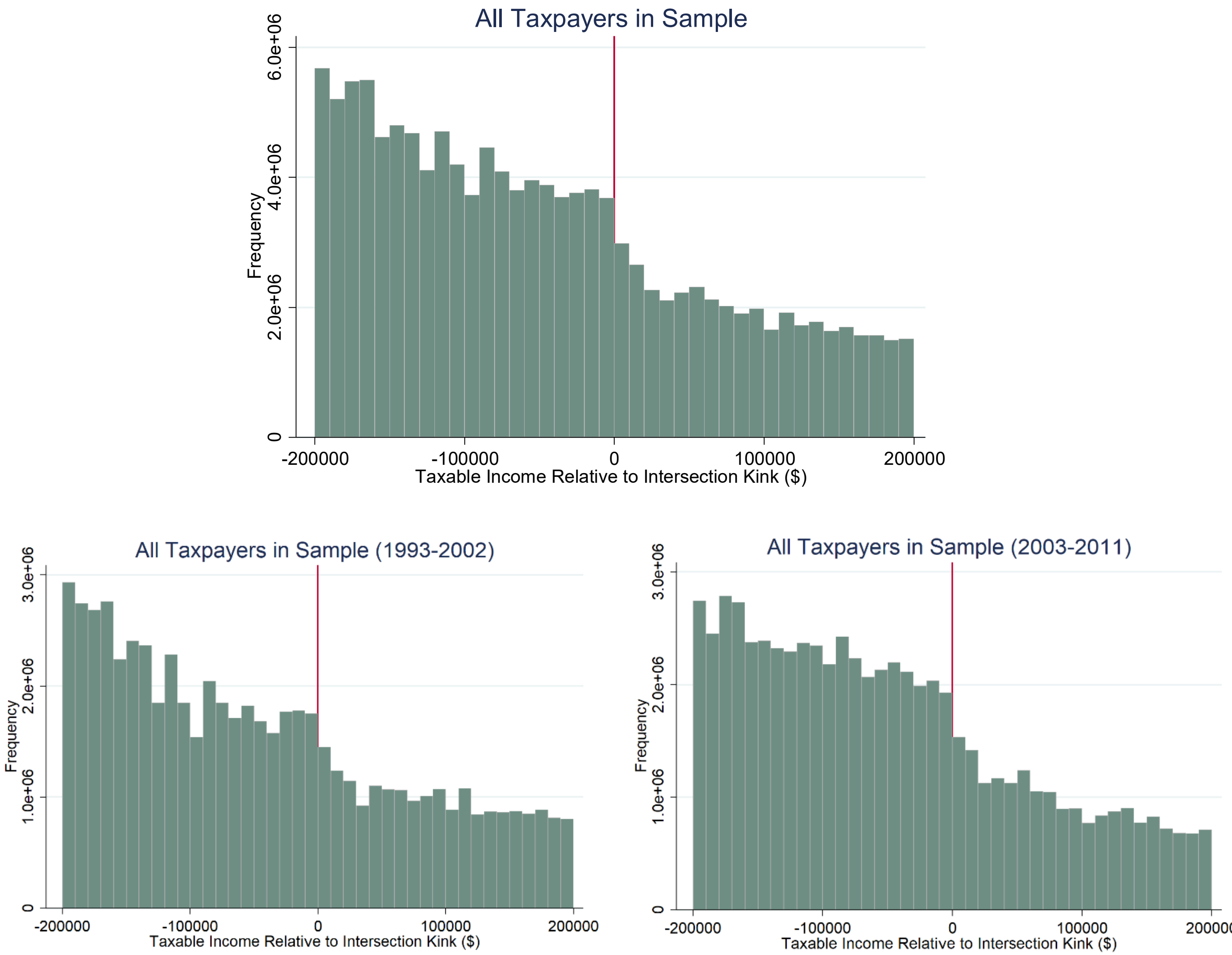

Figure 6a, 6b, and 6c: Bunching around the intersection kink for the overall sample for all time periods (6a), for the time period 1993-2002 (6b), and for the time period 2003-2011 (6c). For illustrative purposes, all histograms have binwidths of USD 10,000 each.

I further disaggregate the total sample into wage earners and the self-employed. Self-employed are defined as taxpayers who revealed any non-zero income from non-wage sources, including sole proprietorship, partnerships and S-Corporations, and farming. This suggests that these individuals had access to less transparent streams of income. Wage earners are those taxpayers who reported zero earnings from these sources.

Existing literature has predicted, and shown for other segments of the income distribution, significant avoidance behavior by self-employed individuals as compared to wage earners. Pure wage earners face third-party reporting, with the employer sending the W-2 form containing information on the employee's earnings to the IRS, which the IRS uses to test for any mismatches between employee- and employer-reported incomes. Self-employed individuals do not face third-party reporting, and therefore, have greater flexibility in reporting their self-employment income, allowing them to manipulate taxable income more easily.

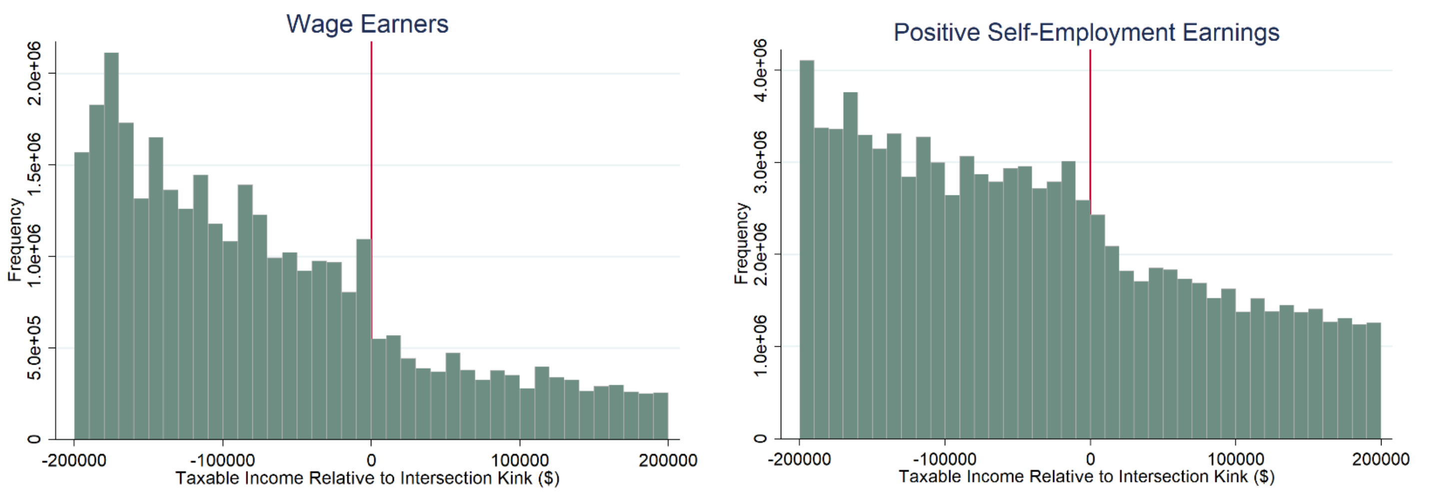

Figure 7a and 7b: Bunching around the intersection kink for wage earners in the sample (7a), and for individuals with any positive self-employment earnings (7b). Positive self-employment earnings are defined as non-zero earnings from sole proprietorship (Schedule C), partnerships or S-Corporations (Schedule E), and farming (Schedule F). For illustrative purposes, all histograms have binwidths of USD 10,000 each.

However, graphical evidence in figure 7 reveals that pure wage earners also cluster to the left of the intersection kink, similar to self-employed individuals. There are two reasons why this might be the case. Firstly, higher-income wage earners who are the subject of this study have multiple streams of income across which they can shift their incomes. These include not only pure wage earnings, but also, capital earnings Further, it is likely that higher-income taxpayers can adjust their compensations via converting monetary compensations to non-monetary benefits at work. High-income wage earners can also accelerate their taxable incomes for a given year by, for example, undertaking traditional IRA to Roth IRA conversions.

I test for this by comparing local differences in non-deductible IRA contributions around the intersection kink, controlling for adjusted gross income. I do not directly observe Roth IRA conversions. However, data is available on non-deductible IRA contributions, and I use these as a proxy for Roth IRA conversions. Fitting local linear polynomials to the conditional function of non-deductible IRA contributions shows that these deductions increase up until the intersection kink, after which they decrease, as show in figure 8.

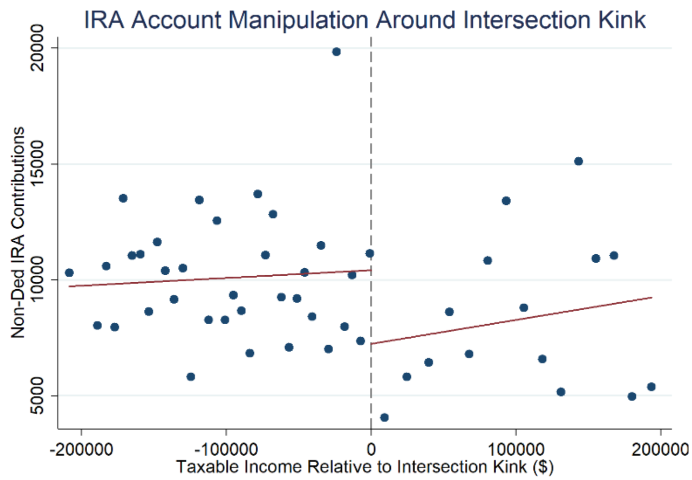

Figure 8: Non-Deductible IRA contributions around the kink point

Elasticity Estimates

I estimate an excess mass of 0.75 in the bunching window around the intersection kink using my overall analysis sample, implying that the excess mass around the intersection kink is 75% of the average height of the counterfactual distribution. As in Chetty et al. (2011), I calculate the standard error for $\hat{b}$ using a parametric bootstrap procedure. I draw from the estimated vector of errors for the counterfactual estimation equation with replacement to generate a new set of counts and apply the above technique to calculate a new estimate of $\hat{b}^k$. I define the standard error of $\hat{b}$ as the standard deviation of the distribution of $\hat{b}^k s$.

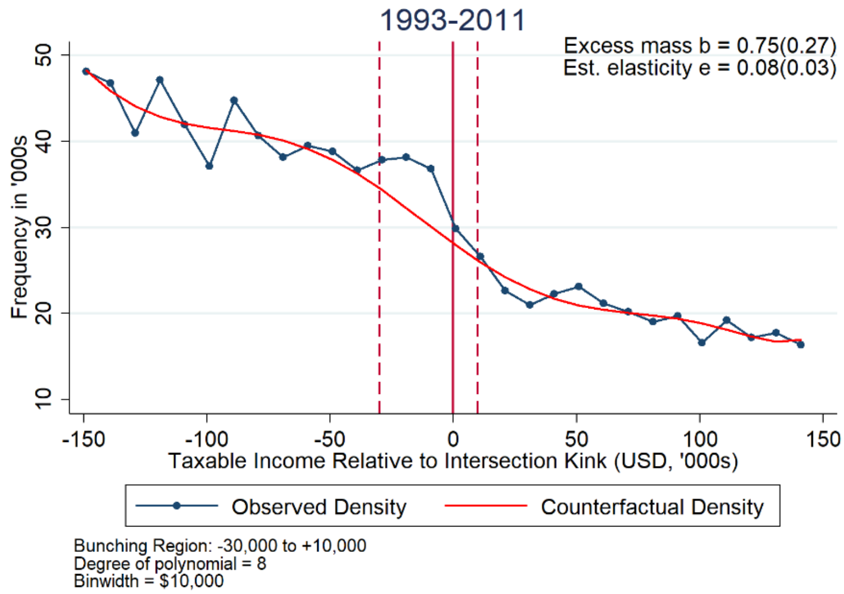

Figure 9: Observed versus counterfactual distributions of taxable income around the kink point, for full analysis sample.

Table 4 shows elasticity estimates obtained using Saez (2010) and Chetty (2011). I find that for a bunching window of -$30,000 to $10,000 and a binwidth of $10,000, the estimated elasticity of taxable income with respect to the net-of-tax rate is 0.08. This estimate is statistically significant at the 99 percent confidence level. I also find that this estimate is relatively robust to the choice of different bin widths. The estimate obtained using binwidths of $5,000 and $1,000 are 0.07 and 0.06, respectively.

Table 4: Elasticity Estimates

Years	**MTR Change**	**Bin Width**	**Bunching region**	**All Filers**	**Self-employment Income**	**Wage earners only**	**Positive Long-Term Gains**	**Non-positive Long-Term Gains**
1993-2011	28% - 37.5%	10,000	-30,000 – 10,000	0.08*** (0.03)	0.07*** (0.03)	0.11* (0.06)	0.04 (0.03)	0.15*** (0.04)
		5,000	-30,000 – 10,000	0.07*** (0.03)	0.07*** (0.03)	0.08 (0.06)	0.04 (0.03)	0.12*** (0.04)
		1,000	-30,000 – 10,000	0.07*** (0.02)	0.06*** (0.02)	0.07 (0.05)	0.03 (0.02)	0.12*** (0.03)

* Bootstrapped standard errors in parentheses
** Order of polynomial is 8

Further, elasticity estimates for self-employed taxpayers and wage earners, as defined earlier, are 0.07 and 0.11, respectively. Overall estimates as well as for the self-employed are statistically significant at the 99 percent confidence level. For wage earners, elasticity estimates are statistically significant at the 90 percent confidence level with a binwidth of USD 10,000, but not so for other binwidths.

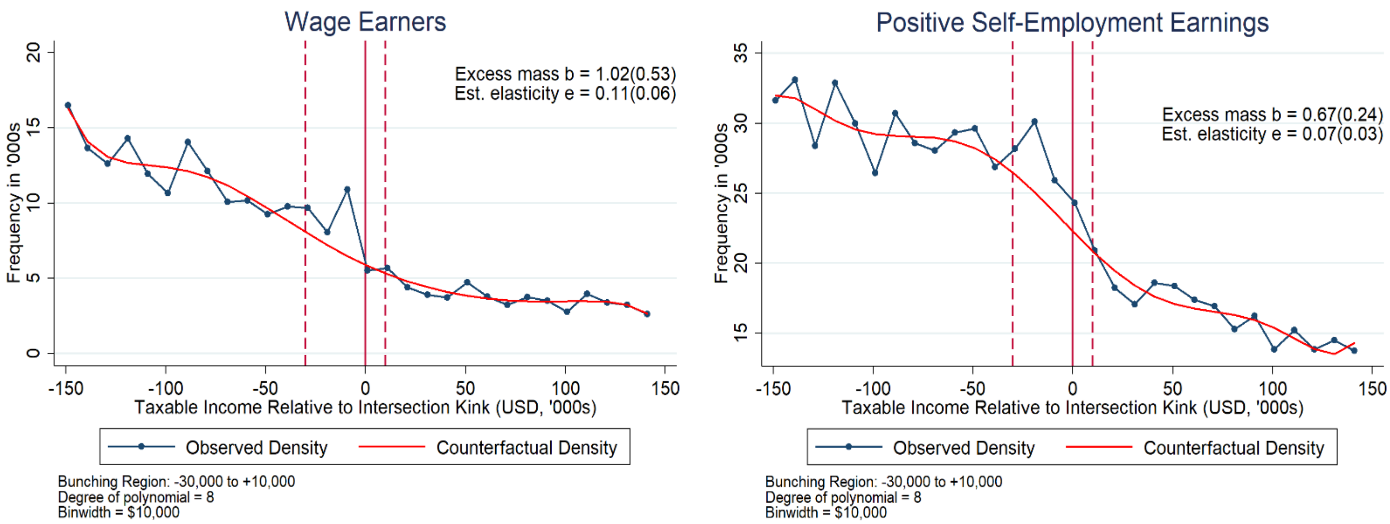

Figure 10a and 10b: Observed versus counterfactual distributions of taxable income around the kink point, for wage earners (10a), and for taxpayers with positive self-employment earnings (10b)

Positive long-term capital gains complicate the analysis by decreasing the gradient of the top piece of both, the regular tax and the AMT schedules. Therefore, I also run a sub-analysis of taxpayers reporting no taxable long-term gains. This group, therefore, provides the cleanest estimates of the elasticity of taxable income. The elasticity of taxable income with respect to the net-of-tax rate for taxpayers without taxable long-term gains is estimated at 0.15. This is statistically significant at the 99% confidence level.

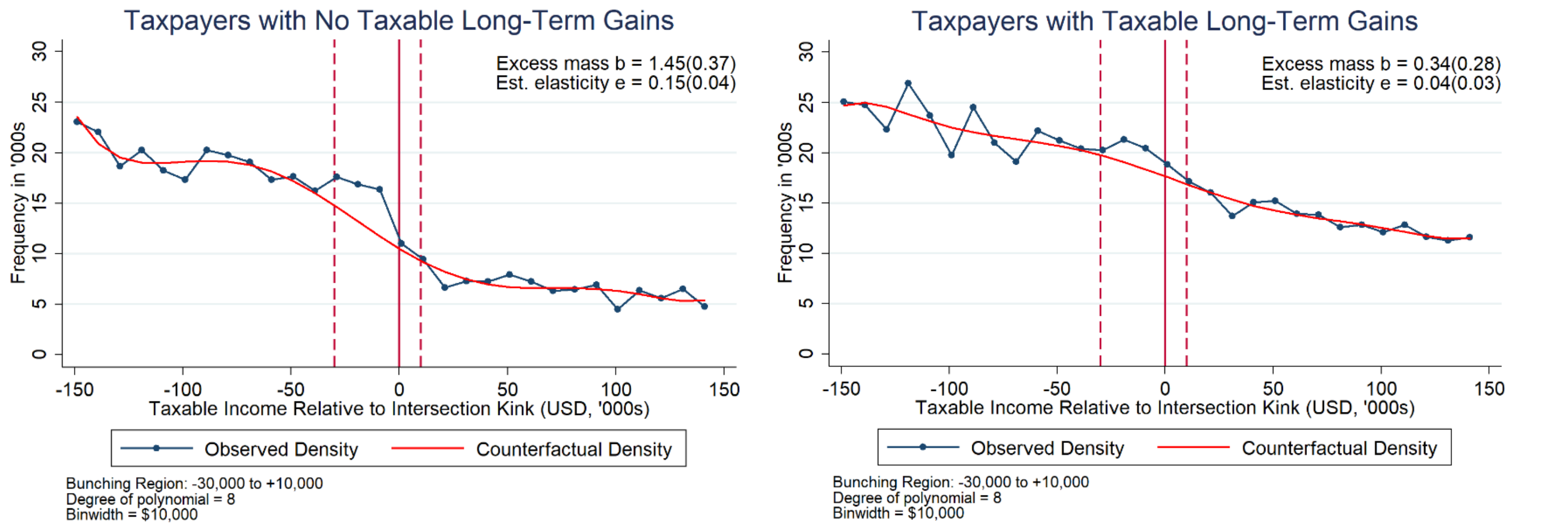

Figure 12a and 11b: Observed versus counterfactual distributions of taxable income around the kink point, for taxpayers with no taxable long-term capital gains (11a), and taxpayers with positive taxable long-term capital gains (11b)

I further divide the overall sample into two time periods: 1993-2002 and 2003-2011. From 1993-2002, the change in slopes at the intersection kink was represented by the 28 percent marginal tax rate on the effective schedule contributed by the AMT schedule, to the 39.6 percent (39.1 percent and 38.6 for 2001 and 2002 respectively) marginal tax rate on the effective schedule contributed by the regular income tax schedule.

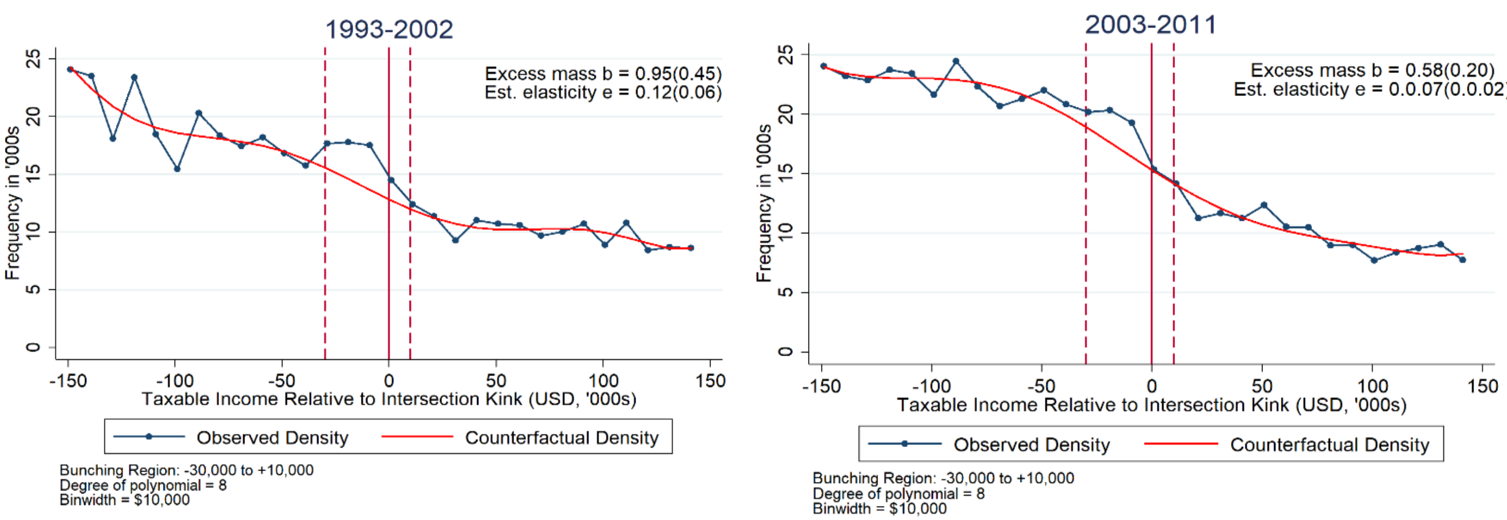

Figure 11a and 12b: Observed versus counterfactual distributions of taxable income around the kink point, for the time period 1993-2002 (12a), and for the time period 2003-2011 (12b)

Table 5: Period-wise Elasticity Estimates

Years	Description	MTR Change	Binwidth	Bunching region	All Filers
1993-2011	Entire sample period	28% - 37.5%	10,000	-30,000 – 10,000	0.08*** (0.03)
1993-2002	Two acts (OBRA and EGTRRA): High MTR	28% - 39.4%	10,000	-30,000 – 10,000	0.12** (0.06)
2003 - 2011	JGTRRA of 2003	28% - 35%	10,000	-30,000 – 10,000	0.07*** (0.02)

* Bootstrapped standard errors in parentheses
** Order of polynomial is 8

Section V: Robustness Check

This paper utilizes new methodologies in the bunching literature (Blomquist et al., 2018; Hines et al., 2019) that weaken many of the assumptions of the traditional bunching estimator. Hines et al. (2019) provide a compendium of these methods, which include: nonparametric bounds on elasticity estimates, control group method, middle censoring model, and flexibly local model. In this paper, I utilize the nonparametric estimation of bounds for elasticity estimates, to provide a robustness check for my estimated elasticity.

The key idea is that the slope of the unobserved distribution (in the absence of the kink) must be bounded above and below by some amount M. Following Bertanha et al. (2016), I calculate the bounds for a range of potential slopes M, according to the following equations:

$$\underline{\epsilon} = \frac{2\left[\frac{f(\eta^+)^2}{2} + \frac{f(\eta^-)^2}{2} + M\,B\right]^{\frac{1}{2}} - \left(f(\eta^+) + f(\eta^-)\right)}{M(\ln(1-\tau_0) - \ln(1-\tau_1))}$$

$$\overline{\epsilon} = \frac{-2\left[\frac{f(\eta^+)^2}{2} + \frac{f(\eta^-)^2}{2} - M\,B\right]^{\frac{1}{2}} - \left(f(\eta^+) + f(\eta^-)\right)}{M(\ln(1-\tau_0) - \ln(1-\tau_1))}$$

I find that elasticity estimates are bounded below at 0.04, and above at 0.09. The overall estimate of 0.08 lies within these bounds. Further, even the lower bound elasticity estimate is an order of magnitude higher than that found in Saez (2009), and four times as high as the elasticity estimated by Chetty et al. (2011) using Danish data.

Conclusion

This paper uncovers the effective schedule faced by higher-income taxpayers in the United States, and exploits taxpayer bunching behavior around the highest effective kink to estimate the elasticity of taxable income with respect to the net-of-tax rate. As discussed, previous research that has ignored this interaction can fail to detect bunching, which is a result of changes in taxpayer behavior, resulting in estimated elasticity of trivial magnitude. This paper finds higher estimates ranging from 0.08 to 0.15.

This serves as a significant contribution to the refinement of estimates for this important policy parameter. A higher estimated elasticity indicates more substantial changes in taxpayer behavior when tax rates change, specifically, a reduction in the tax base with an increase in the marginal tax rate. This has important policy as well as welfare implications. A larger estimated elasticity indicates a greater erosion of the tax base under larger marginal tax rate changes, as well as lower implied optimal tax rates.

Further, the paper reveals that the robust differential in estimated elasticity between wage earners and the self-employed dissipates for higher-income individuals, potentially as a result of availability of multiple channels for income-shifting, and better tax advisers for wage earners whose income is high. Further, behavioral changes for the full analysis sample are higher during 1993-2002, when tax policy is more certain, as compared to 2003-2011 when it is less so.

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ANNEX

Annex A: Legislative History

Policy Instrument (Year)	Description
Tax Reform Act of 1969 (P.L. 91-172)	Introduced the "add-on" minimum income tax of 10% in excess of an exemption of $30,000.
Excise, Estate, and Gift Tax Adjustment Act of 1970 (P.L. 91-614)	Allowed deduction of the "unused regular tax carryover" from the base for the minimum tax.
Revenue Act of 1971 (P.L. 92-178)	Imposed minor provisions regarding foreign income.
Tax Reform Act of 1976 (P.L. 94-455)	Raised rate of minimum income tax to 15% and lowered exemption to $10,000 or half of regular taxes.
Tax Reduction and Simplification Act of 1977 (P.L. 95-30)	Reduced minimum tax preference for intangible costs of drilling oil and gas wells.
Revenue Act of 1978 (P.L. 95-600)	Introduced AMT alongside minimum income tax and moved certain itemized deductions and capital gains to AMT. AMT had graduated rates of 10%, 20%, and 25%, and an exemption of $20,000.
Economic Recovery Tax Act of 1981 (P.L. 97-34)	Lowered AMT rates to correspond with reductions in rates of regular income tax.
Tax Equity and Fiscal Responsibility Act of 1982 (P.L. 97-248)	Repealed "add-on" minimum tax. Made AMT rate a flat 20% of AMT income after exemptions of $30,000 for individuals and $40,000 for joint returns.
Deficit Reduction Act of 1984 (P.L. 98-369)	Made minor changes concerning investment tax credit, intangible drilling costs, and other items.
Tax Reform Act of 1986 (P.L. 99-514)	Raised AMT rate to 21%. Made high-income taxpayers subject to phase-out of exemptions. Increased number of tax preferences. Allowed an income tax credit for prior year AMT liability.
Revenue Act of 1987 (P.L. 100-203)	Made technical corrections related to Tax Reform Act of 1986.
Technical and Miscellaneous Revenue Act of 1988 (P.L. 100-647)	Made technical corrections related to Tax Reform Act of 1986.
Omnibus Budget Reconciliation Act of 1989 (P.L. 101-239)	Made further technical amendments.
Omnibus Budget Reconciliation Act of 1990 (P.L. 101-508)	Raised AMT rate to 24%.
Energy Policy Act of 1992 (P.L. 102-486)	Changes regarding intangible costs of drilling oil and gas wells.
Omnibus Reconciliation Act of 1993 (P.L. 103-66)	Introduced graduated AMT rates of 26% and 28%. Increased exemption to $33,750 for individuals and $45,000 for joint returns. Changed rules about gains on stock of small businesses.
Taxpayer Relief Act of 1997 (P.L. 105-34)	Changes regarding depreciation and farmers' installment sales.

Tax Technical Corrections Act of 1998 (P.L. 105-206)	Adjusted AMT for new capital gains rates.
Tax Relief Extension Act of 1999 (P.L. 106-170)	Changed rules about nonrefundable credits.
EGTRRA (2001)	Tax Cuts and No change in AMT
2006	Introduction of calculator
American Taxpayer Relief Act of 2012	Indexes to inflation the income thresholds for being subject to the tax
2001-2012	Changes in Exemption Rates

Annex B: Exemption Rates Across Time

Years	Individual tax rate	Married filing jointly (USD)	Single or head of household (USD)
1986–1990	21%	40,000	30,000
1991–1992	24%		
1993–2000	26% / 28%	45,000	33,750
2001–2002		49,000	35,750
2003–2005		58,000	40,250
2006		62,550	42,500
2007		66,250	44,350
2008		69,950	46,200
2009		70,950	46,700
2010		72,450	47,450
2011		74,450	48,450
2012		78,750	50,600
2013		80,800	51,900
2014		82,100	52,800
2015		83,400	53,600
2016		83,800	53,900
2017		84,500	54,300
2018		86,200	55,400

Annex C: Exemption Rates and Phase-Out in the Early 2000s

Status	**Single**	**Married filing jointly**	**Married filing separately**	**Trust**	**Corporation**
Tax Rate: Low	26%*	26%*	26%*	26%*	20%*
Tax Rate: High	28%*	28%*	28%*	28%*	20%*
High Rate Starts (2012 and earlier)	$175,000	$175,000	$87,500	$175,000	n/a
High Rate Starts (2013)	$179,500	$179,500	$89,750	$179,500	n/a
Exemption in 2009	$46,700	$70,950	$35,475	$22,500	$40,000
Exemption in 2010	$47,450	$72,450	$36,225	$22,500	$40,000
Exemption in 2011	$48,450	$74,450	$37,225	$22,500	$40,000
Exemption in 2012	$50,600	$78,750	$39,375	$22,500	$40,000
Exemption in 2013	$51,900	$80,800	$40,400	$23,100	$40,000
Exemption phase-out starts at (2012 and earlier)	$112,500	$150,000	$75,000	$75,000	$150,000
Exemption phase-out starts at (2013)	$115,400	$153,900	$76,950	$76,950	$150,000
No more exemption in 2009 at	$299,300	$433,800	$216,900	$165,000	$310,000
No more exemption in 2010 at	$302,300	$439,800	$219,900	$165,000	$310,000
No more exemption in 2011 at	$306,300	$447,800	$223,900	$165,000	$310,000
No more exemption in 2012 at	$314,900	$465,000	$232,500	$165,000	$310,000
No more exemption in 2013 at	$323,000	$477,100	$238,550	$165,000	$310,000
Long-term capital gains rate	15%	15%	15%	25%	20%

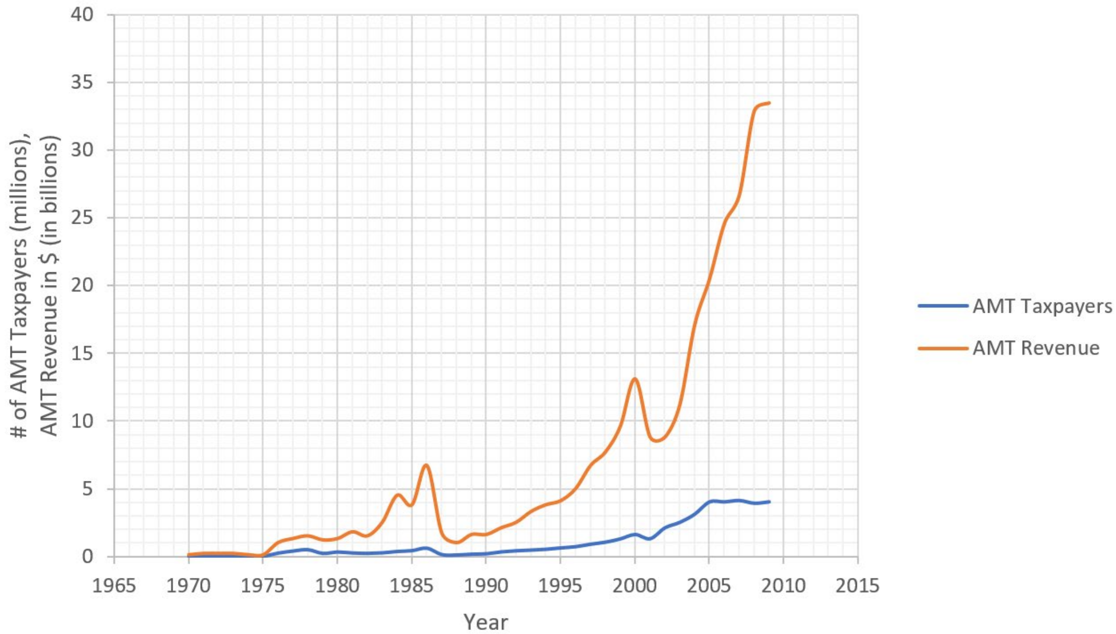
** For income within the exemption phase-out, marginal tax rates are effectively multiplied by 1.25, which changes 20% to 25%, changes 26% to 32.5%, and changes 28% to 35%.*

Annex D: Estimates of the Elasticity of Taxable Income from Non-Bunching Papers

Author (date) (1)	Data (years) (2)	Tax change (3)	Sample (4)	Controls for mean reversion and income distribution (5)	Income definitions (6)	Elasticity results (7)
Lindsey (1987)	Repeated tax cross-sections (1980–1984)	ERTA 81	AGI>$5K	None	Taxable income	Elast.: 1.05–2.75 Central estimate: 1.6
Feldstein (1995)	NBER tax panel (1985 and 1988)	TRA 86	Married, non-aged non-S corp creating Income>$30K	None	AGI Taxable income	Elast. of AGI: 0.75–1.3 Elast. of taxable income: 1.1–3.05
Navratil (1995)	NBER tax panel (1980 and 1983)	ERTA 81	Married, income>$25K	Use Average Income	Taxable Income	Elast. of taxable income: 0.8
Auten and Carroll (1997)	Treasury tax panel (1985 and 1989)	TRA 86	Single and married age 25–55, inc.>$15K Non-S corp creating	Include Log Income in base year	Gross Income Taxable Income	Elast. of gross inc.: 0.66 Elast. of taxable income: 0.75
Sammartino and Weiner (1997)	Treasury tax panel (1985–1994)	OBRA 1993	Less than 62 years old	None	AGI	Close to zero permanent response of AGI
Goolsbee (1998)	Panel of corp. exec. (1991–1994)	OBRA 1993	Corporate executives 95% with income>$150 K	Use Average Income	Wages, Bonus and Stock Options	Short run elast.: 1 Long run elast.: 0.1
Carroll (1998)	Treasury tax panel (1987 and 1996)	OBRA 1993	Married aged 25–55 Income>$50 K	Use Average Income	Taxable Income	Elast.: 0.5
Saez (1999)	NBER tax panel (1979–1981)	Bracket Creep	Married and singles only	Include Log Income and Polynomials in Income	AGI Taxable Income	Elast. of AGI: 0.25 Elast. of taxable income 0.4
Moffitt and Wilhelm (2000)	SCF panel (1983 and 1989)	TRA 86	High incomes oversampled	Use various Sets of Instruments	AGI	Elast. of AGI: 0 to 2 depends on instruments
Goolsbee (1999)	Tax statistics tables (1922–1989)	Various tax ref.	Incomes>$30 K	None	Taxable Income	Elast. from −1.3 to 2 depending on tax reform

Source: Saez (1999)

Annex E: Growth of the Impact of the Alternative Minimum Tax over Time



Annex F: Comparison of How the Two Taxes are Calculated

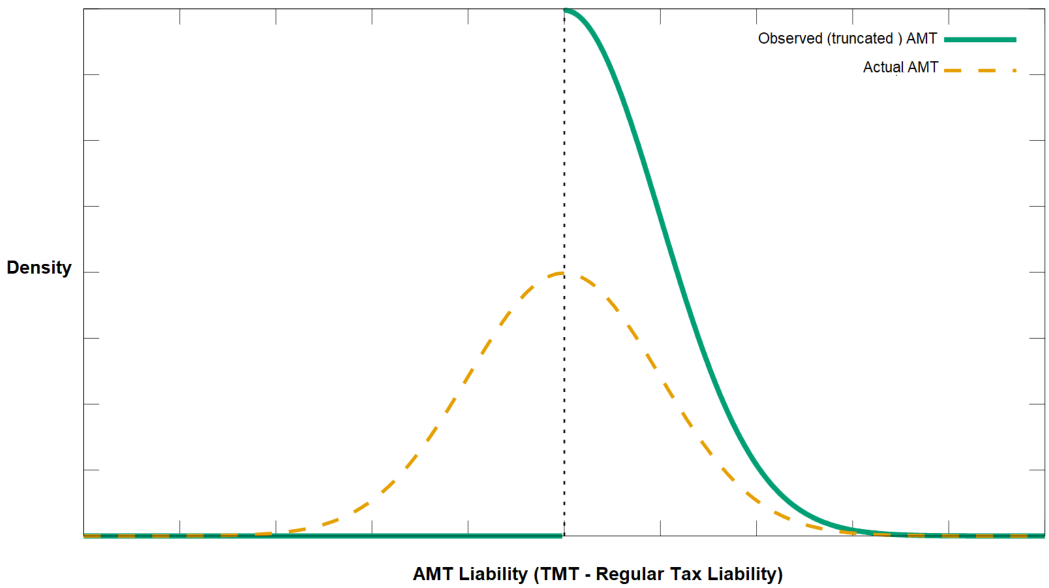
AMT Calculation
Married couple filing jointly with four children, 2007

Calculate Regular Tax		**Calculate Tentative AMT**	
Gross income	$75,000	Taxable income	$43,900
Subtract deductions		*Add preference items*	
Personal exemptions	$20,400	Personal exemptions	$20,400
(6 x $3,400)		Standard deduction	$10,700
Standard deduction	$10,700	**AMTI**	**$75,000**
Taxable income	**$43,900**	*Subtract AMT exemption*	
Tax before credits	**$5,803**	AMT exemption	$45,000
Child tax credit	**$4,000**	**Taxable under AMT**	**$30,000**
		Tax (tentative AMT)	**$7,800**
Tax after credits	**$1,803**		
Tax bracket	15%	*AMT bracket*	26%

AMT = the excess of tentative AMT over regular income tax before credits
AMT = $7,800 - $5,803 = $1,997

Tax after AMT and Credits = $1,803 + $1,997 = 3,800

Annex G: Reconstruction of AMT Liability Distribution



Annex H: Data Manipulation

The IRS deletes identifiers such as names, addresses and social security numbers. Also deleted are the state sales tax deduction, and alimony paid and received. For the purpose of this paper, identifiers are irrelevant, since I use counts of taxpayers. Further, items such as state are removed after 2008, and imputed for adjusted gross income (AGI) > $200,000 before that. But since I am not disaggregating the analysis by state, the lack of geographical information of taxpayers does not compromise the results of this paper.

For taxpayers with AGI > $200,000 and for whom the number of children living at home is three or more, the number of children living at home is capped at three. All other dependent information is set to zero. However, the total number of personal exemptions taken is a sum of all the dependents, with number of children capped at three. While this prevents identification of taxpayers via disaggregation by type of dependents for taxpayers with AGI > $200,000, it does not affect the total number of personal exemptions taken, except for suppressing the total number of children at home to three. This raises the possibility that for "high income" families with more than three children, the number of personal exemptions taken are understated. However, these changes do not flow into taxable income, income tax, or AMT, for which the taxpayer-reported data is provided, and therefore, do not affect the crux of the analysis.

The IRS also applies multivariate blurring (values for multiple variables replaced with averages of those variables across tax returns) to high-income taxpayers using the following three variables: salaries and wages, state and local income taxes, and real estate taxes. In general –

protocols have varied in minor ways across the considered time period – returns for "high-income" individuals are sorted in descending order with respect to each of these variables, and then means calculated for every three consecutive records, which are substituted in for actual values for these three variables. IRS also applies univariate blurring (values for selected variables replaced by their respective averages across tax returns) to "low income taxpayers for the following six variables: alimony paid, alimony received, salaries and wages, medical and dental expenses, state and local income taxes (only in Wisconsin only), and real estate taxes.

Neither multivariate nor univariate blurring affects the core analysis presented in this paper, since I use aggrege taxable income and alternative minimum taxable income (AMTI), for which the PUF provide taxpayer-reporteddata, even after blurring of components. However, for high-income individuals, this is a challenge for conducting disaggregated analysis by male/female salary (check).

For some years, high income taxpayers who were widowers with surviving dependents (surviving spouse) are recoded to be reflected as married filing jointly. In the overall population of taxpayers, on average, this can result in a 0.1% inflation in the number of taxpayers identified as married filing jointly.

The PUF rounds all records to the four most significant digits. For taxpayers with incomes below $10,000, this implies no rounding. For high-income taxpayers between $100,000 and $999,999, this implies rounding up to the nearest hundred (e.g. $782,421 = $782,400). For very high-income taxpayers, this can result in substantial rounding issues for variables such as taxable income or AMTI, generating potential measurement error in the computation of the TMT e.g. AMTI of $49,995,000 being rounded up to $50,000,000, TMT can be overstated by $1,400 (($50,000,000-$49,995,00) x 28%)[5]. Taxpayers at such higher income levels comfortably face the top MTR (39.6% in year 2000) and have very negative AMT liabilities. Thus, overstating the TMT will most likely result in overstating the AMT, causing it to be *less negative*, bringing it closer to the AMT crossover point, resulting in the increase of distributional mass to the left of the crossover point. If anything, an overestimate of the mass to the left of the crossover point will cause the estimate for excess bunching to the right of the crossover point to be underestimate. This can lead to the elasticity of taxable income being underestimated. Therefore, estimates provided in this paper should be viewed as the lower bound of the elasticity of taxable income.

[5] AMT = TMT – regular tax

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