Net-of-Tax Elasticity of Taxable Income Among Top-Income Single Taxpayers in Taiwan

Shih-Ying Wu and Wen-Chieh Wu

This study contributes to the literature by estimating the net-of-tax elasticity of taxable income (ETI) for top-income single taxpayers in Taiwan. Taiwan is a newly developed economy characterized by high tax noncompliance, the absence of tax treaties with major economies, a large underground economy, and a substantial gap between the top personal and corporate income tax rates. Using two-stage least squares (2SLS) and difference-in-differences (DID) approaches, we show that the ETI estimates for taxable income and gross income in response to the 2015 tax reform are substantially higher in Taiwan than the corresponding estimates documented for developed Western economies and Japan. Results also indicate that the ETI is largest for taxable income, moderate for gross income, and smallest for wage income. This pattern suggests that behavioral responses among top-income single taxpayers in Taiwan are driven primarily by tax avoidance, particularly through income shifting, instead of changes in labor supply or wage earnings. The analysis further shows that taxpayers' responses were strongest immediately following the reform but diminished over time. Lastly, the findings suggest that over longer adjustment horizons, taxable income becomes less sensitive (possibly because deductions and avoidance channels stabilize), whereas gross income continues to reflect

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gradual real behavioral adjustments.

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I. Introduction

The public finance literature has long emphasized that taxpayers adjust their reported income in response to changes in marginal tax rates following tax reforms (e.g., Feldstein, 1995). These adjustments may arise from changes in labor supply and labor-force participation (affecting wage income), shifts in savings and portfolio allocation (affecting capital income), or the timing of income realization and deductions (altering the tax base). Generally, such behavioral responses can be classified into real, supply-side adjustments and income-shifting or tax-avoidance responses.

A central concept in this literature is the net-of-tax elasticity of taxable income (ETI), which measures the sensitivity of taxable income to changes in the marginal net-of-tax rate. ETI is widely considered a key parameter in tax policy analysis. Feldstein (1999) emphasized that ETI serves as a sufficient statistic for evaluating revenue effects, conducting welfare analysis, and designing optimal income tax schedules. Consequently, estimating ETI has become a fundamental task in empirical public finance.

Although ETI can be estimated for corporate and individual income, empirical research has focused predominantly on individual taxpayers, with far fewer studies examining corporate responses (e.g., Devereux et al., 2014; Gawthorpe, 2015). Early ETI studies (largely conducted prior to 2000) focused on the United States (e.g., Lindsey, 1987; Feldstein, 1995; Auten and Carroll, 1999) and generally reported relatively large ETI estimates.

Subsequent work, primarily between 2000 and 2010, incorporated improved econometric techniques to address heterogeneity and endogeneity in U.S. data. Then, it expanded evidence to Canada and Europe. More recent estimates for the United States (e.g., Gruber and Saez, 2002; Saez, 2003; 2004; Kopczuk, 2005; Carroll and Hrung,

2005; Giertz, 2007; 2010; Auten et al., 2008; Auten and Joulfaian, 2009; Heim, 2009; Saez, 2010) are notably smaller than those found in early studies. Similarly, estimates for Canada (e.g., Sillamaa and Veall, 2001; Saez and Veall, 2005) and several European countries, including Norway (Aarbu and Thoresen, 2001), Germany (Gottfried and Schellhorn, 2004), Sweden (Hansson, 2007; Blomquist and Selin, 2010), and the United Kingdom (Brewer et al., 2010), tend to be even lower than those for the United States.

Since 2010, researchers have continued to update U.S. evidence and expanded coverage to a broader set of European countries. Recent U.S. studies include Weber (2014), Kawano et al. (2016), Burns and Ziliak (2017), Kumar and Liang (2020), and Sherpa (2024), who generally find ETI estimates well below one. Meanwhile, new evidence from Europe, including Sweden (Aronsson et al., 2024), Norway (Vattø, 2020; Berg and Thoresen, 2020), and Germany (Doerrenberg et al., 2017), shows similarly low elasticities. Additional studies from Finland (Harju and Matikka, 2016; Matikka, 2018), Denmark (Kleven and Schultz, 2014), Hungary (Kiss and Mosberger, 2015), Spain (Almunia and Lopez-Rodriguez, 2019; Rondinel et al., 2023), the Netherlands (Jongen and Stoel, 2019), and France (Fack and Landais, 2016) reinforce the general conclusion that ETI estimates in Europe are extremely low.

Compared with the evidence from the Americas and Europe, research from Asia-Pacific economies remains limited. New Zealand is a notable exception, with a substantial literature estimating ETI (e.g., Claus et al., 2012; Thomas, 2012; Carey et al., 2015; Alinaghi et al., 2021). Only recently have major economies such as China (He et al., 2021), Japan (Miyazaki and Ishida, 2022), and Australia (Johnson et al., 2024) begun to develop ETI estimates.

While most studies examine responses among the general taxpayer population, a smaller set of papers focus specifically on high-income earners. Following Feldstein (1995), subsequent research across various countries, including the United States (Auten and Carroll, 1999; Gruber and Saez, 2002; Giertz, 2010), Canada (Sillamaa and Veall, 2001; Saez and Veall, 2005), the United Kingdom (Brewer et al., 2010), Germany (Gottfried and Schellhorn, 2004; Doerrenberg et al., 2017), Spain (Almunia and Lopez-Rodriguez, 2019), Nordic countries (Hansson, 2007; Blomquist and Selin, 2010; Matikka, 2018; Vattø, 2020), Hungary (Kiss and Mosberger, 2015), New Zealand (Thomas, 2012), and Japan (Miyazaki and Ishida, 2022), consistently shows that high-income

taxpayers are more responsive to marginal tax rate changes than the average taxpayer.

Among the developed economies, ETI estimates for top-income taxpayers are typically higher in North America than in Europe or Japan. Feldstein (1995) reported an ETI of roughly 1.5 for U.S. high-income taxpayers, while Sillamaa and Veall (2001) found an ETI of 0.7 for high-income seniors in Canada. These findings are especially important in light of rising top-income shares, which have contributed substantially to increasing income inequality in the United States (Piketty and Saez, 2003). By contrast, Miyazaki and Ishida (2022) reported much lower ETI values of 0.158 to 0.226 for Japan's high-income taxpayers, likely reflecting Japan's relatively low levels of tax noncompliance and a small underground economy.

Generally, countries with widespread tax noncompliance and large underground economies are expected to have higher ETIs. Failure to account for these behavioral responses may risk underestimating the fiscal impact of tax reforms (Feldstein, 1999). Taiwan provides a compelling case for study. Despite its status as a newly developed economy, Taiwan exhibits higher tax noncompliance, a larger underground economy, and a high prevalence of family-owned businesses and self-employed taxpayers than many Western countries and Japan. Moreover, Taiwan's unique political status leads to the absence of tax treaties with most major economies, enabling wealthy individuals to shift income or assets abroad more easily. Given the rising concerns on income inequality (driven in part by top earners), estimating ETI for high-income Taiwanese taxpayers is crucial for designing effective and equitable tax policy. Without reliable ETI estimates, Taiwanese tax authorities risk misjudging the revenue impact of tax reforms, as illustrated by the 2011 luxury tax, for which actual revenues reached only 25% of government projections due to unanticipated behavioral responses.

To estimate ETI for top-income Taiwanese taxpayers, a tax reform that specifically targets the upper tail of the income distribution is required. Similar to the U.S. Tax Reform Act of 1993, Taiwan's 2015 Tax Reform Act (TRA2015) raised the top marginal tax rate, creating a natural experiment suitable for ETI estimation. Prior to 2015, Taiwan's graduated income tax schedule consisted of five brackets (i.e., 5%, 12%, 20%, 30%, and 40%) with the highest rate applied to taxable income above NT$4.4 million (with the NT$/US$ exchange rate averaging in

the range of 29 to 32 between 2012 and 2017). Beginning January 1, 2015, a new top rate of 45% was introduced for income above NT$10 million, whereas other brackets remained unchanged. This reform split taxpayers in the 40% bracket into the following two groups: those with income above NT$10 million (now taxed at 45%) and those remaining below the threshold. This quasi-experimental design provides credible variation for identifying behavioral responses to the reform.

Two major challenges arise when estimating ETI in response to TRA2015 for high-income individuals in Taiwan. First, obtaining tax return data for high-income earners is difficult, which often leads to a limited number of observations. Second, an institutional change in joint filing rules for married couples around 2015 creates difficulty in determining the correct marginal tax rates for married taxpayers. This study addresses both challenges by using administrative panel data from Taiwan's Fiscal Information Agency (FIA), which contain approximately six million individual income tax records per year, and by focusing exclusively on the top 0.2% of single taxpayers for whom tax-rate assignment is unambiguous.

The empirical strategy exploits the variation introduced by TRA2015. To address endogeneity arising from the mechanical dependence of marginal tax rates on taxable income, the analysis applies a two-stage least squares (2SLS) instrumental-variables framework. Following Feldstein (1995), a panel difference-in-differences (DID) approach is also employed for robustness. Apart from the estimated ETIs for taxable income, the study also provides estimates for gross income and wage income. Consistent with prior literature, the expectation is that the ETI for taxable income exceeds that for gross income, and that the ETI for wage income is the lowest. The study also investigates short- versus long-run responses, hypothesizing that ETI declines over longer adjustment horizons.

Using panel data for single taxpayers in the top 0.2% of the income distribution, the 2SLS and DID estimates show that ETIs for top-income Taiwanese taxpayers are significantly higher than those documented in developed economies. This result aligns with expectations and can be explained by Taiwan's elevated levels of tax noncompliance, large underground economy, and high proportion of self-employed and family-business owners. The study also finds that taxable income is the most responsive income measure, and wage income is the least responsive. Behavioral responses were strongest immediately after

the reform (primarily through avoidance and timing strategies) and diminished over time. Finally, as avoidance opportunities fade, gross income continues to reflect gradual real behavioral adjustments, whereas taxable income becomes less sensitive to marginal tax-rate changes.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the institutional background of TRA2015 and outlines the empirical strategy. Section 4 presents the main results. Section 5 concludes.

II. Literature Review

Public economists in the United States pioneered the empirical estimation of the net-of-tax elasticity of taxable income (ETI) in response to major tax reforms. Since then, the literature has expanded to other advanced economies (including Canada, European Union member states, and New Zealand) and more recently, to East Asia, with emerging evidence from Japan and China. This section reviews the literature in the following two parts: (1) cross-country evidence for the general population (Table 1), which covers estimates for the United States and the broader Americas, Europe, and the Asia-Pacific region; and (2) cross-country patterns among high-income taxpayers (Table 2).

A. Estimates of ETI for the general population

The U.S. ETI literature has evolved through several waves. Early studies reported very large elasticities: Lindsey (1987) and Feldstein (1995) estimated ETIs above one based on major tax reforms in the 1980s, but these results are now widely regarded as upward-biased due to data and identification limitations. Later work using panel data and improved instruments produced more moderate and credible estimates. Auten and Carroll (1999) and Gruber and Saez (2002) found overall ETIs of roughly 0.3–0.4, with larger responses among high-income taxpayers and negligible effects for low earners. Subsequent studies emphasized heterogeneity and institutional context, showing that ETI estimates depend on income definitions, decline over time, and are substantially higher for executives, the self-employed, and individuals with greater scope for income shifting or avoidance (Kopczuk, 2005; Auten and Joulfaian, 2009; Heim, 2009). Recent methodological

advances (including bunching designs and administrative panel data) generally confirm modest elasticities for broad income, near-zero responses for wage earners, and larger but variable estimates for high-income and self-employed taxpayers (Giertz, 2010; Saez, 2010; Weber, 2014).

Evidence outside the United States broadly reinforces these patterns. In Canada, studies find moderate ETIs for the general population but larger responses among top earners, which diminish once common international shocks are controlled for (Sillamaa and Veall, 2001; Saez and Veall, 2005). Conversely, evidence from developing economies remains scarce. Using Brazilian data, Mattos and Terra (2016) report small average elasticities but substantially larger responses among groups with greater opportunities for misreporting, suggesting that measured ETIs in weak-enforcement settings primarily reflect reporting behavior rather than real economic adjustments. Overall, the literature points to modest ETIs for the general population, higher responsiveness among top earners and the self-employed, and a crucial role for tax base definitions, enforcement, and avoidance opportunities in shaping observed elasticities. Table A1 summarizes the ETI estimates for the United States and the Americas and reports the corresponding methods, sample periods, and estimated elasticities.

Empirical studies using European data predominantly focus on Nordic and Western European countries and generally find modest ETIs. Evidence from Scandinavia points to particularly low responsiveness, consistent with strong enforcement and limited avoidance opportunities. Studies for Norway, Finland, and Denmark typically report ETIs close to zero for wage income and small overall elasticities (roughly 0.05–0.15); notably, most measured responses were driven by income shifting rather than real behavioral changes (Aarbu and Thoresen, 2001; Harju and Matikka, 2016; Matikka, 2018; Kleven and Schultz, 2014). Swedish evidence shows somewhat larger elasticities, especially among high-income taxpayers; however, recent work using structural and bunching approaches again suggests very small responses for the general population and higher elasticities for the self-employed (Hansson, 2007; Aronsson et al., 2024). Across Nordic countries, heterogeneity by income source and taxpayer type is pronounced, with self-employed individuals and capital income displaying greater responsiveness.

Evidence from Western, Southern, and Eastern Europe points to higher but still moderate elasticities. Studies for Germany, the United

Kingdom, France, and the Netherlands typically estimate ETIs between 0.2 and 0.5 for broad income measures, with substantially larger values for top earners and the self-employed (Gottfried and Schellhorn, 2004; Brewer et al., 2010; Fack and Landais, 2016; Jongen and Stoel, 2019). Southern European countries, particularly Spain, exhibit some of the highest elasticities, reflecting weaker enforcement and greater scope for evasion and misreporting (Almunia and Lopez-Rodriguez, 2019). Taken together, European evidence suggests small to moderate ETIs for the general population, stronger responses among high-income and self-employed taxpayers, and a dominant role for tax-base shifting and reporting behavior rather than genuine labor-supply adjustments. Table A1 presents methods, sample periods, and estimates from additional ETI studies for European countries.

Evidence from the Asia-Pacific region is relatively recent and centers on a small number of countries. New Zealand provides the earliest and most comprehensive estimates, with studies of the 1986 and 2001 reforms consistently finding moderate ETIs ranging from 0.2–0.6 (Claus et al., 2012; Thomas, 2012; Carey et al., 2015). These responses are concentrated among high-income and self-employed taxpayers, whereas wage earners exhibit substantially lower elasticities. Recent work using rich administrative panel data confirms this pattern and highlights important heterogeneity by income source and household type (Alinaghi et al., 2021). Based on the 2011 reform, China's evidence yields sharply divergent estimates across methods: bunching approaches imply modest elasticities, whereas reform-based estimates suggest implausibly large long-run responses; this finding highlights the capability of different identification strategies to capture distinct behavioral margins (He et al., 2021).

Other Asia-Pacific countries display relatively low responsiveness. For Japan, estimates for top taxpayers during the late 1980s reforms range from roughly 0.16 to 0.23, reflecting limited avoidance opportunities and broad income definitions (Miyazaki and Ishida, 2022). Australian evidence based on population-wide administrative data finds near-zero elasticities for wage earners but moderate responses (roughly 0.23) for the self-employed, again pointing to the central role of income-shifting opportunities (Johnson et al., 2024). Overall, the Asia-Pacific literature suggests modest ETIs at the population level, stronger responsiveness among high-income and self-employed taxpayers, and patterns more similar to Europe than to the United States.

B. Overall Patterns in High-Income ETI Estimates

Across countries, a consistent finding is that high-income taxpayers exhibit larger elasticities of taxable income than the general population. However, the magnitude of these elasticities varies substantially depending on institutional context, enforcement strength, and available avoidance channels.

Low range (≈0.2–0.4): Evidence from Hungary (Kiss and Mosberger, 2015), several Nordic countries (e.g., Matikka, 2018; Vattø, 2020), and Japan (Miyazaki and Ishida, 2022) indicates relatively modest elasticities among high earners. Strong enforcement regimes and limited opportunities for income shifting help explain these lower values.

Moderate range (≈0.4–0.7): Several modern U.S. studies (Auten and Carroll, 1999; Gruber and Saez, 2002; Giertz, 2010) as well as findings from Canada (Sillamaa and Veall, 2001), the United Kingdom (Brewer et al., 2010), and New Zealand (Thomas, 2012), place high-income elasticities within this middle range. These values reflect a combination of real supply-side responses and tax-planning behavior.

High range (≈0.7–1.4): The largest elasticities have been observed in Germany (Gottfried and Schellhorn, 2004; Doerrenberg et al., 2017), Spain (Almunia and Lopez-Rodriguez, 2019), and certain subgroups in Sweden (Hansson, 2007; Blomquist and Selin, 2010). In these settings, high-income taxpayers respond strongly to marginal tax-rate changes, often through deductions, income shifting, and self-employment structures.

Additional evidence from the United States further illustrates the wide variation in high-income elasticities. Weber (2014) argued that conventional IV methods may understate responsiveness and reported ETIs close to 0.8 for top earners. Using a structural differencing approach, Kumar and Liang (2020) found similarly large taxable-income elasticities for high-income U.S. taxpayers. In the analysis of the 2012 and 2017 federal tax reforms, Sherpa (2024) also estimated high-income ETIs of approximately 0.8. These findings complement evidence from Europe and the Asia-Pacific region by demonstrating that responsiveness among top earners can be substantial where avoidance channels (e.g., deductions, capital-income shifting, or self-employment

restructuring) are readily available.

Overall, while high-income taxpayers consistently exhibit greater responsiveness to tax-rate changes than the general population, the degree of responsiveness is highly context-dependent. Institutional features (e.g., enforcement capacity, availability of deductions, and opportunities for income shifting) play central roles in determining the magnitude and the nature of observed elasticities.

III. Empirical Strategies

A. Natural Experiment: The 2015 Tax Reform (TRA2015)

Taiwan's personal income tax system has long been criticized for its limited effectiveness in addressing income inequality. In response, the government introduced the Sustainable Fiscal Reform (hereafter referred to as the 2015 tax reform or TRA2015) in February 2014. The reform was enacted on May 16, 2014 and took effect in January 2015. A central component of the reform was the creation of a new top marginal tax rate of 45%, added on top of the previous highest rate of 40%.

Before the reform, all taxable income above NT$4.4 million was subject to the 40% rate. After the reform, income exceeding NT$10 million became subject to the new 45% rate. Meanwhile, income between NT$4.4 million and NT$10 million continued to be taxed at 40%. This reform increased the progressivity of the personal income tax system and directly targeted very high-income taxpayers.

Estimating the elasticity of taxable income (ETI) requires a natural experiment. The 2015 tax reform provides an ideal setting: it created a new upper tax bracket (45%) affecting only very high-income earners while leaving the tax rate for high-income taxpayers unchanged. In addition, the 2015 tax reform did not introduce any other major changes to the tax law. This clean and targeted change in marginal tax rates offers strong quasi-experimental variation for identifying ETI responses among top-income taxpayers.

B. Data and Sample

This study employs panel data on individual income tax returns provided by Taiwan's Fiscal Information Agency (FIA). To examine behavioral responses before and after TRA2015, we focus on a balanced subset of the panel spanning 2012–2017. We analyze multiple

adjustment horizons, defining the periods 2014–2015 (1-year short run), 2013–2015 and 2014–2016 (2-year medium run), 2013–2016 (3-year longer run), and 2012–2017 (5-year longer run).

The analysis focuses on high-income earners. These individuals are in the upper end of the gross income distribution who were potentially subject to the 40% top marginal tax rate in the 2014 pre-reform year. As shown in Table 3, the minimum gross income threshold for the top 0.2% of the distribution is NT$5,428,275, indicating that taxpayers in this group were very likely subject to the 40% rate. Accordingly, we use individuals in the top 0.2% of the gross income distribution as our sample of top-income taxpayers.

An additional complication arises from changes to joint filing rules. Prior to 2014, married couples were required to file jointly, with only salary income allowed separate calculation for each spouse. Beginning in 2014, married couples were permitted to calculate taxes separately for each category of income. Considering that this institutional change may cause married taxpayers to alter their filing strategies before and after the reform, accurately computing their tax prices (net-of-tax rates) becomes highly complex.

To avoid potential bias arising from the mismeasurement of marginal tax rates for married couples, this study restricts the sample to single taxpayers. In 2014, the top 0.2% of the gross income distribution comprised 9,092 taxpayers, including 5,656 single filers and 3,436 married filers. By excluding married filers, the final sample includes 5,656 top-income single taxpayers.

For the difference-in-differences (DID) approach, treatment and control groups must be clearly defined. Within the sample of taxpayers subject to the 40% marginal tax rate in 2014, we define the treatment group (T) as taxpayers with taxable income exceeding NT$10 million in 2014 and the control group (C) as taxpayers with taxable income between NT$4.4 million and NT$8 million in the same year. Taxpayers with taxable income in the "gray area" near the NT$10 million threshold are excluded to reduce potential classification errors. This classification identifies the effect of TRA2015, which introduced the new 45% rate only for taxable incomes above NT$10 million. Taxpayers in this gray area are likely to experience uncertainty on whether they will face a higher marginal tax rate in subsequent years. Consequently, regardless of whether they are classified as part of the treatment or control group, such misclassification could lead to biased estimates.

Given that the choice of gray area may influence the DID estimates, we conduct a robustness check by adopting an alternative control group consisting of taxpayers with taxable incomes between NT$4.4 million and NT$7 million in 2014.

C. Testable Hypotheses

This study proposes three testable hypotheses. The first hypothesis is that the net-of-tax elasticity of taxable income (ETI) among top-income single taxpayers in Taiwan is relatively large compared with estimates in developed economies. This expectation is based on four structural characteristics of Taiwan's economy: (1) high tax noncompliance, (2) the absence of tax treaties with major economies, (3) the prevalence of underground economic activities, and (4) a substantial disparity between personal and corporate tax rates.

First, tax noncompliance is particularly pronounced among wealthy households in Taiwan. Similar to high-income individuals in other countries, affluent Taiwanese have close access to sophisticated avoidance mechanisms otherwise unavailable to most taxpayers (Blank and Glogower, 2024). Moreover, Taiwan has a relatively high share of self-employed taxpayers, many of whom operate family-owned businesses and have considerable scope for tax avoidance and evasion. Therefore, Taiwan's avoidance problem is more severe than that observed in OECD countries. Crivelli et al. (2016) and Cobham and Janský (2018) estimate that OECD countries lose roughly 0.66% of GDP to tax avoidance, whereas Taiwan and other non-OECD economies lose approximately 1.32% of GDP.

Second, a considerable share of Taiwan's wealthy individuals earn income abroad, particularly from China; however, Taiwan lacks tax treaties or information-exchange mechanisms with many countries. This institutional gap facilitates offshore avoidance and underreporting, heightening noncompliance and amplifying the ETI observed among top earners.

Third, Taiwan's sizeable underground economy further increases income responsiveness. Bajada and Schneider (2005) estimate that underground activities account for nearly 20% of Taiwan's GDP; this figure is roughly twice the share found in most advanced economies, where underground activity typically represents less than 10% of GDP (Schneider and Buehn, 2012). High-income individuals involved in

informal activities can readily conceal income in response to higher tax rates, contributing to an elevated underground-economy effect on ETI.

Fourth, while the top marginal personal income tax rate is 45%, the corporate income tax rate is 20%, creating a large tax-rate gap. This disparity incentivizes high-income individuals to retain profits within corporate entities rather than report them as personal income, especially after the introduction of the 45% top rate in 2015. In particular, capital gains from shareholdings are either untaxed or taxed only very lightly. Such behavioral adjustments strengthen the tax-rate-disparity effect and further contribute to a high ETI among Taiwan's top-income taxpayers.

Apart from the standard ETI based on reported taxable income, we also estimate ETIs for gross income and wage income. Taxable reported income encompasses all behavioral margins, both real (labor supply and effort) and avoidance (timing, income shifting, deductions, and incorporation). Given that taxpayers can adjust deductions, exemptions, and the timing of income realization, the ETI for taxable income captures economic and avoidance responses, resulting in the largest elasticity estimates. Gross income includes deductions and exemptions; thus, avoidance through itemization plays a smaller role. Consequently, the corresponding elasticity primarily reflects real income-generation and labor-supply responses, making it smaller than that for taxable income. Wage income, which is third-party reported and subject to withholding, offers limited opportunities for avoidance. Therefore, adjustments must stem almost entirely from real labor-supply responses, which tend to be small for high-income individuals. Thus, our second hypothesis is that the ETI for taxable income is the highest, the ETI for gross income is intermediate, and the ETI for wage income is the lowest.

Finally, apart from short-run responses, we examine taxpayers' longer-run adjustments. Short-run elasticities capture immediate avoidance or timing behaviors, such as shifting bonuses, realizing capital gains, or accelerating or deferring income around the reform year. These temporary behaviors produce large ETI estimates in the short run but do not reflect persistent labor–supply choices. In the medium run, temporary avoidance responses dissipate, whereas real economic adjustments (e.g., hours worked, career decisions, incorporation) begin to play a larger role. Over longer horizons, income-shifting channels stabilize, and taxpayers adapt to the new tax

environment. The remaining elasticity primarily reflects persistent real responses, which tend to be small. Therefore, our third hypothesis is that the short-run ETI is the highest, the medium-run ETI is moderate, and the long-run ETI is the lowest. Moreover, over longer horizons, the ETI for taxable income is expected to decline more sharply than the ETI for gross income.

D. Existing Identification and Econometric Issues

Following the previous literature such as Saez et al. (2012), the basic model of taxpayer income reporting behavior can be expressed as follows:

$$\ln Y_{it} = \beta \ln\left(1 - \tau_{it}\right) + \ln Y_{it}^{0}, \tau_{it} = \tau\left(Y_{it}\right), \tag{1}$$

where Y_{it} denotes the taxpayer's reported income in year t, given the marginal tax rate τ_{it} in the same year. Y_{it}^{0} represents the taxpayer's potential income, i.e., the income that would be reported if the marginal tax rate were zero. Potential income includes permanent and transitory components (e.g., Weber, 2014). The net-of-tax rate or tax price is denoted by $(1 - \tau)$. Equation (1) shows that τ_{it} is a function of reported income, indicating an endogenous relationship between the marginal tax rate and reported income.

A substantial body of empirical work has examined how reported taxable income responds to changes in marginal tax rates induced by tax reforms. The standard panel regression specification for estimating the elasticity of taxable income (ETI) with respect to the net-of-tax rate is as follows:

$$\ln Y_{it1} / Y_{it0} = \beta \ln[\left(1 - \tau_{it1}\right) / \left(1 - \tau_{it0}\right)] + \varepsilon_{it}, \tag{2}$$

where Y_{it1} is the reported income in the post-reform year t_1, and Y_{it0} is the reported income in the pre-reform year t_0. The post-reform tax price (or net-of-tax rate) is $1 - \tau_{it1}$, while the pre-reform tax price (or net-of-tax rate) is $1 - \tau_{it0}$.

Early studies (e.g., Lindsey, 1987) relied on repeated cross-sections or synthetic panels to estimate ETI. However, this approach assumes that taxpayers maintain stable relative positions in the income distribution

over time. Such assumption is restrictive; consequently, it may not hold in practice. Violations of this assumption can bias elasticity estimates, particularly when income mobility or changes in inequality are substantial. Later studies, such as Feldstein (1995), addressed this limitation by employing true panel data, allowing researchers to track the same taxpayers across years. The panel approach mitigates unobserved heterogeneity and avoids the instability of income ranks inherent in repeated cross-sectional analyses.

Despite these advantages, panel regressions are also susceptible to mean reversion bias. For instance, individuals classified as top-income earners in the pre-reform period may appear to experience income declines in subsequent years simply because their initial classification was driven by unusually high transitory income. This issue intensifies as the time gap widens between t_0 and t_1. To mitigate this bias, later studies (e.g., Auten and Carroll, 1999; Gruber and Saez, 2002; Saez et al., 2012) include pre-reform income controls in the regression model:

$$\ln Y_{it1} / Y_{it0} = \beta \ln[(1-\tau_{it1}) / (1-\tau_{it0})] + f(Y_{it0}) + \varepsilon_{it}, \tag{3}$$

where f(Y_{it0}) denotes a function of the taxpayer's income in the pre-reform year, included as control variables to account for mean reversion. It can be expressed as f(Y_{it0}) = $X'\theta$, where X includes these pre-reform control variables.

In practice, tax reforms often affect only a subset of taxpayers, creating treatment and control groups. Treated individuals are those whose marginal tax rates change due to the reform, while unaffected individuals serve as the control group. The difference-in-differences (DID) framework compares the changes in reported income between these two groups before and after the reform:

$$\begin{aligned} \ln Y_{it} = {} & \beta \ln(1-\tau_{it}) + \alpha_1 dummy(t = t_1) + \alpha_2 dummy(i \in T) \\ & + X'\theta + \varepsilon_{it}, \end{aligned} \tag{4}$$

where the dummy variable for the post-reform year is denoted as dummy ($t = t_1$), and the dummy variable for the treatment group (T) is denoted as dummy (i ∈ T). X includes the pre-reform control variables.

The DID parameter β can be estimated using the following formulas,

where T represents the treatment group and C denotes the control group.

$$\beta = \frac{E(\ln \frac{Y_{it1}}{Y_{it0}} \mid T) - E(\ln \frac{Y_{it1}}{Y_{it0}} \mid C)}{E\left[\ln(\frac{1-\tau_{it1}}{1-\tau_{it0}}) \mid T\right] - E\left[\ln(\frac{1-\tau_{it1}}{1-\tau_{it0}}) \mid C\right]} \tag{5}$$

As mentioned earlier, an endogenous relationship exists between the marginal tax rate and reported income. In other words, the change in the natural logarithm of the net-of-tax rate is endogenous, as the marginal tax rate depends on taxable income. To address this endogeneity, an instrumental variable (IV) approach is required, and the two-stage least squares (2SLS) estimation method is employed. Two instruments are frequently used in the literature, each typically applied in different estimation contexts. For example, the instrument used in Equation (3) is the change in the natural logarithm of the synthetic net-of-tax rate (or synthetic tax price), which is constructed by applying the tax rules from year t_1 (post-reform) to the taxpayer's income from year t_0 (pre-reform), adjusted inflation to reflect income levels in year t_1. Moreover, the instrument used in Equation (4) is a binary indicator that equals one if the taxpayer was in the treatment group in the pre-reform year; otherwise, 0. The intuition behind this instrument is that being in the treatment group in the base year (pre-reform year) is independent of the tax reform itself but correlated with the magnitude of the reform's impact on taxable income. This instrument is particularly useful for isolating the treatment effects from broader trends in income dynamics.

Empirical applications of the DID framework typically estimate a local average treatment effect (LATE) for taxpayers near the policy threshold. However, substantial year-to-year income volatility complicates treatment assignment, as taxpayers may move between brackets across periods. Kawano et al. (2016) highlight that such volatility challenges the comparability of treatment and control groups. To address this problem, they propose a doubly robust estimator that integrates IPW into the DID framework. IPW, also known as the propensity score method, reweights the sample based on the estimated probability of treatment. This approach ensures that control units resembling treated individuals receive greater weights, thereby improving covariate balance and yielding more reliable estimates of behavioral responses to tax

reforms.

E. Estimation Specifications

This study begins by estimating the net-of-tax elasticity of taxable income (ETI) for top-income single taxpayers using the panel regression framework specified in Equation (3). To address the endogeneity between reported income and the net-of-tax rate, we employ an instrumental variables (IV) strategy using a two-stage least squares (2SLS) estimator.

The instrument is defined as the change in the natural logarithm of the synthetic net-of-tax rate (or synthetic tax price). This synthetic rate is constructed by applying the post-reform tax schedule to each taxpayer's pre-reform income, adjusted for inflation to reflect the post-reform income distribution. Given that the synthetic tax price captures only the statutory (mechanical) changes in marginal tax rates and is unaffected by taxpayers' behavioral responses, it serves as a valid instrument for identifying the causal effect of the net-of-tax rate on income.

We use the 2SLS method to estimate the net-of-tax elasticities of taxable income, gross income, and wage income for the period 2014–2015. The synthetic net-of-tax rate for the pre-reform year (2014) is used as an instrument for the actual net-of-tax rate.

In the first stage, the change in the natural logarithm of the actual net-of-tax rate between the pre- and post-reform years is regressed on the corresponding change in the natural logarithm of the synthetic net-of-tax rate. In the second stage, the dependent variable is the change in the natural logarithm of the income measure (i.e., taxable income, gross income, or wage income), while the key independent variable is the fitted value of the change in the natural logarithm of the net-of-tax rate obtained from the first stage. The resulting coefficient represents the estimated ETI for each income measure.

Apart from the primary regressor, the model includes several individual-level control variables to account for demographic and household heterogeneity. These controls include gender, age, residential location, and the number of household members with disabilities.

Beyond the 2SLS panel regression, this study also employs a panel-based difference-in-differences (DID) specification to exploit the quasi-

experimental variation created by the 2015 tax reform. The reform naturally divides high-income taxpayers into two groups. Taxpayers with taxable income exceeding NT$10 million in 2014, who are directly affected by the introduction of the 45% top marginal rate, constitute the treatment group. Taxpayers with taxable income between NT$4.4 million and NT$8 million (Control Group 1) or between NT$4.4 million and NT$7 million (Control Group 2) serve as alternative control groups. We estimate the DID model using Control Group 1 and then re-estimate it using Control Group 2 to assess robustness.

The DID framework, based on Equation (4), compares income changes between the treatment and control groups before and after the reform to estimate the behavioral response to the higher marginal tax rate. To address potential endogeneity in the DID estimation, we again employ a 2SLS approach, using a binary treatment indicator (i.e., equals one for taxpayers in the treatment group in the pre-reform year; otherwise, 0) as an instrument. This indicator captures exogenous exposure to the tax rate increase and enables consistent estimation of the reform-induced behavioral elasticity.

IV. Empirical Results

A. Descriptive Statistics

Table 4 presents the descriptive statistics for top-income single taxpayers. In 2014, their average age was 48.83 years, and 47% were male. On average, each household included 0.11 disabled individuals. The mean taxable income in 2014 was NT$16,418,050, which declined to NT$9,840,717 in 2015. This decrease accounts for 40%. Similarly, average gross income fell from NT$17,376,435 in 2014 to NT$10,725,634 in 2015. This drop accounts for 38.27%. Wage income decreased only slightly, from NT$2,960,129 in 2014 to NT$2,891,906 in 2015. This figure reflects a modest 2.3% decrease.

In comparison, the declines in taxable income and gross income between 2013 and 2015 are substantially smaller than those observed between 2014 and 2015, indicating that income responses occurred not only in the post-reform year (2015) but also in the pre-reform year (2014). Given that the 2015 tax reform was not widely discussed until 2014, most taxpayers were unlikely to have anticipated the reform or engaged

in tax-avoidance behavior prior to that year.

We illustrate the changes in various income components between 2014 and 2015 in Figure 1 and the corresponding changes between 2013 and 2015 in Figure 2. As shown in these figures, the responses are markedly stronger among the top decile of the top 0.2% of taxpayers (i.e., the top 0.02% who were more likely to face an increase in their applicable marginal tax rates).

The average marginal tax rate was 39.83% in 2014 but declined to 33.87% in 2015, indicating that some taxpayers experienced lower statutory tax rates following the reform. The mean synthetic tax rates for top-income single taxpayers range from 40.178% to 41.693%.

B. 2SLS Regression Results

As shown in Table 5, the estimated ETI for taxable income is 11.18, and the ETI for gross income is 10.37; both estimates are statistically significant. The finding that ETI for gross income remains large but is smaller than that for taxable income suggests that taxpayers' behavioral responses occurred mainly through time-shifting strategies in allocating gross income over time and partly through deductions and exemptions.

The estimated ETI for wage income is negative (near zero) and statistically insignificant, indicating that top-income single taxpayers in Taiwan exhibit minimal real labor-supply or wage-related responses. Taken together, these results suggest that tax avoidance and income shifting are the dominant behavioral channels following the 2015 tax reform that raised the top marginal tax rate.

C. DID Estimation Results

Table 6 reports the DID estimation results for the net-of-tax elasticities of taxable and gross income. Considering that wage-income responses were insignificant in the 2SLS estimation, we exclude wage income from the DID analysis. The estimated ETI for taxable income is 11.02 when using Control Group 1 and 10.63 when using Control Group 2. For gross income, the corresponding estimates are 8.97 and 8.64. These results confirm that taxable income is more responsive to tax-rate changes than gross income.

Both the 2SLS and DID estimates indicate that Taiwan's top-income single taxpayers exhibit much larger ETIs (i.e., for both taxable and gross income) than top-income taxpayers in developed economies, where

ETIs are generally below 1 (including Japan). These findings support the first hypothesis. Beyond the institutional factors previously discussed (e.g., widespread tax evasion stemming from a large underground economy and the high prevalence of self-employed individuals and family-owned businesses), the design of the 2015 tax reform, which merely added a higher tax bracket, may also have played a role.

This pattern is consistent with the institutional design of Taiwan's 2015 tax reform, which introduced an additional top tax bracket targeting very high-income taxpayers. Consequently, some taxpayers in 2014 may have adjusted their income, anticipating higher marginal tax rate the following year. Nonetheless, they ultimately experienced no change in their top marginal tax rate in 2015. Such anticipatory responses among taxpayers whose realized tax rates remained unchanged can mechanically generate large ETI estimates. Consequently, as shown in Tables A2 and A3, extending the sample to include taxpayers who were generally unlikely to face a higher marginal tax rate in 2015 tends to produce larger ETI estimates.

The 2SLS and DID results also support the second hypothesis: the ETI for taxable income is the highest, followed by the ETI for gross income; conversely, the ETI for wage income is the lowest. At the top of the income distribution, Taiwanese taxpayers tend to own closely held firms, engage in self-employment, and utilize specialized tax-planning strategies. These tools affect reported taxable income more readily than gross income because taxpayers can adjust deductions, timing, and income composition. Gross income, which does not exclude itemized deductions and exemptions, provides fewer avenues for avoidance and reflects mainly real or compositional adjustments. Wage income, which is subject to employer reporting and withholding, allows minimal scope for evasion; accordingly, adjustments in wage income arise almost entirely through real labor–supply responses, which the empirical literature consistently shows to be small among high-income individuals.

D. ETI Estimates over Different Time Horizons

Given that the 2SLS and DID estimates are broadly consistent, we rely on the 2SLS results to analyze ETIs across different time horizons. Table 7 summarizes the ETI estimates for taxable income across multiple horizons. The short-run ETI for 2014–2015 is 11.18, decreasing

to 7.81 for 2014–2016 (medium run). This pattern suggests that top-income single taxpayers' responses were strongest immediately after the reform and diminished over time. The ETI for 2013–2015 (also a two-year horizon) is 3.30, which is substantially smaller than the short-run estimate of 11.18, indicating that taxpayers likely shifted income into 2014. The latter is the year immediately preceding the reform. However, they were less inclined to shift income further back to 2013 or did not expect the tax rate hike in 2013.

Although both 2013–2015 and 2014–2016 cover two-year windows, their ETIs differ significantly (3.30 vs. 7.81). This finding underscores the asymmetric timing of income shifting around the reform. For the longer-run period 2013–2016, the ETI declines further to 1.55 and becomes statistically insignificant. This pattern supports the third hypothesis: ETI declines as the adjustment horizon lengthens, reflecting the fading of short-run avoidance and timing effects and leaving only small real income responses.

However, in the longest horizon (2012–2017), the ETI unexpectedly increases to 4.12. This long-run estimate likely reflects upward bias due to the policy change the following year, when the 45% top marginal rate introduced in 2015 was eliminated from the tax brackets in 2018. Accordingly, this estimate must be interpreted with caution.

Table 8 presents the ETI estimates for gross income across different time horizons. The pattern is broadly consistent: the ETI for gross income generally declines with longer horizons, except for the upward-biased long-run estimate. This evidence also supports the third hypothesis that ETI diminishes over longer horizons.

We also conduct robustness checks of the ETI estimates across alternative time horizons using the top 0.5% of taxpayers. The results are generally larger than the corresponding estimates based on the top 0.2% of taxpayers and are consistent with the explanation proposed above regarding the institutional design of the 2015 tax reform (Tables A2 and A3 in the Appendix).

Comparing Tables 7 and 8 reveals the following additional pattern: the ETI for gross income is smaller than that for taxable income during 2014–2015 (short run) but becomes larger during 2014–2016 (medium run). For the longer-run period 2013–2016, the ETI for gross income (3.06) is statistically significant, whereas the ETI for taxable income (1.55) is not. This pattern supports the following hypothesis: in the longer

run, the ETI for taxable income gradually becomes smaller than the ETI for gross income. This phenomenon happens because deductions and avoidance channels stabilize over time, reducing the sensitivity of taxable income; meanwhile, gross income continues to reflect gradual real behavioral responses.

As shown in Table 4 and further illustrated in Figure 1, taxpayers (particularly those in the top 0.02%) responded to the 2015 tax reform primarily by time-shifting business income, including dividend payments and profits from sole proprietorships and partnerships from 2015 to 2014. The aim was to reduce gross income and taxable income. However, Figure 2 indicates that such income shifting did not occur prior to 2014, when the tax reform proposal first became salient. Consequently, the change in business income between 2013 and 2015 is substantially smaller than that between 2014 and 2015. Moreover, the relatively small changes in exemptions and deductions reported in Table 4 suggest that they played a limited role in reducing taxable income.

V. Conclusion

Unlike prior studies of the elasticity of taxable income (ETI) that primarily focus on developed Western economies, this study contributes to the literature by providing new ETI estimates for Taiwan. The latter is a newly developed Asian economy characterized by high levels of tax noncompliance, the absence of tax treaties with major economies, a sizable underground economy, and a large disparity between the top personal income tax rate and the corporate income tax rate. This study also offers a novel contribution by examining the ETI of very high-income earners in the top 0.2% of the income distribution in response to a tax reform that exclusively targeted the top marginal tax rate. To avoid biases arising from institutional changes in joint filing rules, this study focuses solely on single taxpayers.

The 2015 tax reform, which introduced a new 45% top marginal rate above the previous 40% bracket, provides a valuable quasi-experimental setting for identifying behavioral responses among top earners. Using administrative panel data and applying 2SLS and DID methods, we find that the ETIs for taxable and gross income among very high-income single taxpayers are substantially larger than those typically found in developed economies, including Japan, the United States, and

European countries.

Furthermore, the results show a consistent pattern: taxable income is the most responsive to tax-rate changes, gross income is moderately responsive, and wage income exhibits minimal responsiveness. This hierarchy reflects the structure of avoidance opportunities at the top of the income distribution (primarily timing adjustments, income shifting, and the use of closely held firms). Short-run ETIs are substantially larger due to immediate avoidance and timing strategies, whereas longer-run elasticities fall considerably as temporary shifting effects dissipate. Over multi-year horizons, gross income becomes more informative than taxable income, reflecting gradual real behavioral adjustments rather than financial and accounting responses.

The exceptionally high ETIs estimated for Taiwan's top-income taxpayers carry important implications for tax policy design. First, high elasticities imply that raising top marginal tax rates in isolation may generate substantially less revenue than static projections suggest; in certain cases, it may even decrease revenues if avoidance margins expand. This scenario underscores the importance of complementing rate increases with strengthened enforcement, enhanced information reporting, and international tax cooperation, particularly given Taiwan's lack of tax treaties and the prominence of offshore income among wealthy taxpayers.

Second, the disparity between personal and corporate income tax rates may encourage high-income individuals to shift income into closely held firms. Policymakers may consider reducing this gap or adopting anti-income-shifting rules (e.g., controlled foreign corporation legislation, substance requirements, or withholding mechanisms on related-party transactions) to mitigate avoidance incentives.

Third, the finding that wage income is largely unresponsive whereas business and capital income are highly responsive suggests that Taiwan's tax system relies heavily on margins that are easy to avoid. A more neutral tax base (e.g., harmonizing labor and capital income taxation, broadening the tax base, or tightening deduction eligibility) could reduce opportunities for high-income taxpayers to exploit differences across income types.

Finally, given that short-run elasticities are driven by timing and accounting adjustments, policymakers should rely on medium- and longer-run ETI estimates when forecasting the fiscal effects of tax reforms. Temporary spikes in ETI around reform years should not be

interpreted as persistent behavioral responses.

Several directions remain for future research. Future studies may include married taxpayers once institutional rules stabilize, apply bunching methods to complement reform-based estimates, or investigate ETI behavior in other Asian economies to improve cross-country comparability.

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TABLE 1
ESTIMATES OF ETI FOR THE GENERAL POPULATION

Literature	Approach	Tax Reform (Country)	ETI (Main Result)
Studies based on the USA and Americas			
Lindsey (1987)	Panel (pre-post)	1981 ERTA (USA)	1.6-2.1
Feldstein (1995)	Panel (pre-post)	1986 TRA (USA)	1.1-1.5
Auten and Carroll (1999)	2SLS (IV)	1986 TRA (USA)	0.4–0.6
Gruber and Saez (2002)	2SLS (IV)	1980s Reform (USA)	0.4(Overall); 0.57(High Inc.)
Kopczuk (2005)	2SLS (IV)	1981 ERTA, 1986 TRA (USA)	0.2-0.4
Auten et al. (2008)	2SLS (IV)	2001 EGTRRA, 2003 JGTRRA (USA)	0.4–0.7
Auten and Joulfaian (2009)	2SLS (IV)	1986 TRA, 1990 OBRA, 1993 OBRA (USA)	0.4-0.5
Heim (2009)	2SLS (IV)	2001 EGTRRA, 2003 JGTRRA (USA)	0.2-0.3
Giertz (2010)	2SLS (IV)	1990 OBRA, 1993 OBRA (USA)	0.2–0.5
Saez (2010)	Bunching	Kinks (USA)	0.1-0.4
Weber (2014)	2SLS (IV)	1986 TRA (USA)	0.2-0.4
Sillamaa and Veall (2001)	DID	1988 Reform (Canada)	0.1-0.3
Mattos and Terra (2016)	Panel Regression	1997 Tax Reform (Brazil)	0.6-1.0
Studies based on European countries			
Aarbu and Thoresen (2001)	DID	1992 Dual Income Tax Reform (Norway)	0.2-0.3
Gottfried and Schellhorn (2004)	Panel Regression	1990 Tax Reform (Germany)	0.4
Hansson (2007)	Panel / Pooled	1990-1991 Reform (Sweden)	0.31-0.41
Blomquist and Selin (2010)	Panel IV	Pre-1990 Reform (Sweden)	0.19-0.21 (M); 0.7 (F)
Harju and Matikka (2016)	2SLS (IV)	Municipal Tax Rate Variation (Finland)	0.4-0.6
Jongen and Stoel (2019)	2SLS (IV)	Post-2001 Tax Reforms (Netherlands)	0.1-0.2
Matikka (2018)	2SLS (IV)	Municipal Rates (Finland)	0.2-0.3
Almunia and Lopez-Rodriguez (2019)	2SLS (IV)	1999–2014 Reform (Spain)	0.35

Literature	Approach	Tax Reform (Country)	ETI (Main Result)
Rondinel et al. (2023)	Bunching	Kinks (Spain)	0.4–0.7
Aronsson et al. (2024)	Bunching	Kinks (Sweden)	Small (ML bunching estimate)
Studies based on Asia-Pacific countries			
Claus et al. (2012)	2SLS (IV)	Around 2000 Top Rate Increase (New Zealand)	0.2-0.6
Thomas (2012)	2SLS (IV)	1986 Tax Reform (New Zealand)	0.3-0.6
Carey et al. (2015)	2SLS (IV)	2001 Top Tax Rate Increase (New Zealand)	0.5–0.7
Alinaghi et al. (2021)	Bunching	Kinks (New Zealand)	0.2-0.3
He et al. (2021)	Bunching/ 2SLS	2011 IIT Reform (China)	IV:0.5 (SR)- 4 (LR); Bunching:0.5
Miyazaki and Ishida (2022)	2SLS (IV) / Panel	1987-1989 Comprehensive Tax Reform (Japan)	0.16–0.23
Johnson et al. (2024)	Bunching	Kinks (Australia)	0 (wage earners); 0.23 (self-emp.)

Note: The table is summarized by this study.

TABLE 2
ETI ESTIMATES FOR HIGH-INCOME TAXPAYERS IN DEVELOPED ECONOMIES

Panel A: High-Income–Specific ETI Studies

Country	Study / Author(s)	Approach	High-Income Definition	ETI (High-Income)
United States	Auten & Joulfaian (2009)	2SLS (IV)	Top 1% of tax filers	0.4–0.5
United States	Gruber & Saez (2002)	2SLS (IV)	Income > $100k (1992 USD)	≈0.57
Japan	Miyazaki & Ishida (2022)	2SLS / Panel	Top taxpayers (≥10 million)	0.16–0.23
Hungary	Kiss & Mosberger (2015)	Quasi-exp.	Above extra tax threshold	≈0.24

Panel B: General ETI Studies with High-Income Heterogeneity

Country	Study / Author(s)	Approach	High-Income Definition	ETI (High-Income)
United States	Lindsey (1987)	Panel (pre-post)	top tax brackets	1.6-2.8
United States	Feldstein (1995)	Panel (pre-post)	Top 1% (approx.)	1.1-1.5
United States	Auten & Carroll (1999)	2SLS (IV)	Top-income taxpayers	0.4–0.6
United States	Kopczuk (2005)	2SLS (IV)	Top income percentiles	0.2 (Broad)–0.57(Narrow)
United States	Giertz (2010)	2SLS (IV)	Various high thresholds	0.3–0.5
United States	Weber (2014)	2SLS / DID	High-income subsample	0.4-0.8
Germany	Gottfried & Schellhorn (2004)	Panel	High-income earners	≈1.0
Sweden	Hansson (2007)	Panel / pooled	High-income subsample	0.4–0.5
New Zealand	Thomas (2012)	2SLS (IV)	Top bracket earners	0.34–0.67

Note: The table is summarized by this study.

Table 3
Taiwan's Top Income Distribution of Gross Income in 2014

Top Income Distribution	Minimum Income level	Mean Income Level
top 5%	1,508,823	2,688,083
top 1%	2,771,319	5,844,936
top 0.5%	3,716,383	8,526,318
top 0.2%	5,428,275	14,715,924
All	0	675,228

Source: Taiwan's Fiscal Information Agency
Note: All monetary amounts are presented in NT$.

Table 4
Descriptive Statistics of Top 0.2% Single Taxpayer

	2014–2015	2014–2016	2013–2015	2013–2016	2012–2017
Age 1	48.826 (14.889)	49.246 (14.876)	49.782 (13.852)	50.26 (13.71)	50.101 (13.685)
Age 2	49.825 (14.889)	51.243 (14.869)	51.781 (13.852)	53.25 (13.71)	55.101 (13.685)
Sex	47%	45.6%	46.3%	45%	43.7%
Disabled 1	0.11 (0.34)	0.10 (0.333)	0.105 (0.339)	0.104 (0.34)	0.095 (0.323)
Disabled 2	0.101 (0.33)	0.102 (0.328)	0.12 (0.36)	0.121 (0.359)	0.11 (0.332)
Wage 1	2,960,129 (5,202,804)	2,987,393 (5,375,159)	3,116,266 (4,561,831)	3,154,782 (4,686,333)	3,307,860 (5,207,217)
Wage 2	2,891,906 (5,031,835)	2,855,063 (5,120,277)	3,087,783 (5,089,851)	3,059,778 (5,245,556)	2,891,262 (5,508,512)
Business income 1	13,052,409 (54,862,080)	13,866,771 (57,658,328)	7,194,415 (27,289,972)	7,659,585 (28,796,236)	8,700,061 (27,121,114)
Business income 2	6,760,637 (28,348,200)	7,072,790 (35,448,948)	6,741,759 (29,781,640)	7,062,329 (37,219,444)	8,329,480 (39,657,484)
Gross 1	17,376,435 (56,220,400)	18,285,280 (59,107,940)	12,035,077 (28,884,710)	12,583,125 (30,410,488)	14,002,185 (30,710,592)
Gross 2	10,725,634 (29,490,716)	10,959,198 (36,652,456)	10,975,500 (30,865,760)	11,249,311 (38,421,984)	12,520,109 (41,070,988)
Taxable 1	16,418,050 (55,655,636)	17,300,210 (58,507,620)	11,161,420 (28,559,260)	11,689,151 (30,069,974)	13,208,814 (30,398,388)
Taxable 2	9,840,717 (28,906,314)	10,101,624 (36,151,740)	10,057,593 (30,486,616)	10,364,361 (38,109,156)	11,601,077 (40,660,496)
Exemption/ Deduction 1	958,385 (2,109,690)	985,070 (2,233,084)	873,657 (1,100,080)	893,974 (1,148,125)	793,371 (1,173,858)
Exemption/ Deduction 2	884,917 (1,757,372)	857,573 (1,720,501)	917,907 (1,298,033)	884,950 (1,191,948)	919,032 (1,444,045)
Tax Rate 1	39.83 (1.43)	39.90 (1.17)	39.03 (2.974)	39.33 (2.52)	39.91 (1.114)
Tax Rate 2	33.87 (12.2)	32.817 (12.99)	33.555 (12.455)	32.59 (13.28)	31.463 (13.97)
IV Rate	41.51 (2.86)	41.693 (2.735)	40.178 (3.936)	40.558 (3.56)	41.259 (2.848)
Obs	5,656	5,004	4,886	4,335	3,442

Source: Taiwan's Fiscal Information Agency

Note 1: Variable 1 refers to the value of the variable in the initial year, and Variable 2 refers to its value in the final year. For example, in the period 2014–2015, "Taxable 1" represents taxable income in 2014, and "Taxable 2" represents taxable income in 2015.

Table 5
ETI Estimates for Top 0.2% Single Taxpayers 2014–2015
(2SLS Estimation)

Second Stage: Δln (Taxable Income)			
Type of Income	Taxable income	Gross Income	Wage Income
Δln (1 − τ)	11.1871**	10.3764**	−1.2582
	(2.3460)	(1.5074)	(1.4972)
constant	−2.8544**	−2.3107**	0.5241*
	(0.4472)	(0.2873)	(0.2854)
Control Variable	Yes	Yes	Yes
Observations	5,656	5,656	5,656

Note 1: Standard errors are included in the parenthesis.
Note 2: *** p < 0.01, ** p <0 .05, * p < 0.1
Note 3: Gender, age, dummy of people with disabilities, and residential districts are controlled.

Table 6
ETI Estimates for Taxable Income and Gross Income 2014–15
(DID Estimation)

	ln (Taxable Income)		ln (Gross Income)	
	Model 1	Model 2	Model 1	Model 2
Control Group	Group 1	Group 2	Group 1	Group 2
ln (1 − τ)	11.0283***	10.6379***	8.9748***	8.6473***
	(1.6712)	(1.5933)	(0.9244)	(0.8753)
constant	21.5036***	21.3088***	20.5706***	20.4086***
	(0.8543)	(0.8146)	(0.4725)	(0.4475)
Control Variable	Yes	Yes	Yes	Yes
Observations	17,732	16,130	17,732	16,130

Note 1: Standard errors are included in the parenthesis.
Note 2: *** p < 0.01, ** p < 0.05, * p < 0.1
Note 3: Gender, age, dummy of people with disabilities, and residential districts are controlled.

Table 7
ETI Estimates for Taxable Income (2SLS Estimation)
Short Run vs Long-Run

Second Stage: Δln (Taxable Income)					
	2014–2015 (1 year)	2014–2016 (2 years)	2013–2015 (2 years)	2013–2016 (3 years)	2012–2017 (5 years)
Δln (1 − τ)	11.1871*** (2.3460)	7.8139*** (2.1839)	3.3055** (1.6495)	1.5503 (1.6645)	4.1211* (2.3027)
constant	−2.8544** (0.4472)	−3.0524** (0.4817)	−0.9568** (0.3098)	−1.0473** (0.3572)	−2.1363** (0.5064)
control	Yes	Yes	Yes	Yes	Yes
Observations	5,656	5,004	4,866	4,335	3,442

Note 1: Standard errors are included in the parenthesis.
Note 2: *** p < 0.01, ** p < 0.05, * p < 0.1
Note 3: Gender, age, dummy of people with disabilities, and residential districts are controlled.

Table 8
ETI Estimates for Gross Income (2SLS Estimation)
Short Run vs Long-Run

Second Stage: Δln (Gross Income)					
	2014–2015 (1 year)	2014–2016 (2 years)	2013–2015 (2 years)	2013–2016 (3 years)	2012–2017 (5 years)
Δln (1 − τ)	10.3764** (1.5074)	9.0150*** (1.4176)	3.2870*** (0.7844)	3.0625*** (0.7945)	4.2035*** (1.1267)
constant	−2.3107 (0.2873)	−2.5592** (0.3127)	−0.5807** (0.1473)	−0.7386** (0.1705)	−1.2828** (0.2478)
control	Yes	Yes	Yes	Yes	Yes
Observations	5,656	5,004	4,866	4,335	3,442

Note 1: Standard errors are included in the parenthesis.
Note 2: *** p < 0.01, ** p < 0.05, * p < 0.1
Note 3: Gender, age, dummy of people with disabilities, and residential districts are controlled.

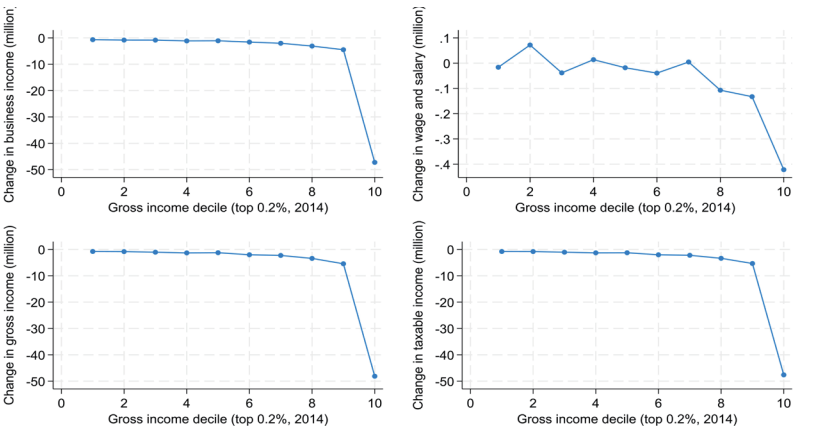

FIGURE 1
CHANGE OVER 2014–2015

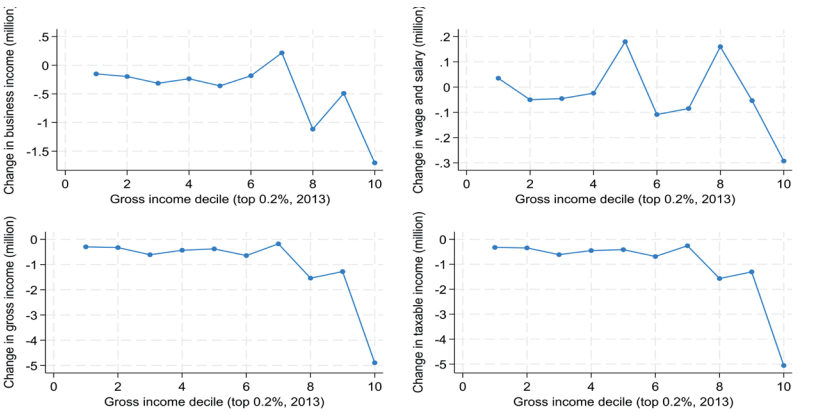

FIGURE 2
CHANGE OVER 2013–2015

Appendix

Table A1
Other Estimates of ETI for the General Population

Literature	Approach	Tax Reform/Period	ETI
Studies based on the USA and Americas			
Saez (2003)	IV	1979–81	0.4, Wage: 0
Saez (2004)	Top share	1960–2000	0.50 (top 1%)
Giertz (2007)	2SLS	TRA86	0.26–0.4
Kawano et al. (2016)	Robust	2013 top-rate increase	EBI: 0.013 to 0.034.
Burns and Ziliak (2017)	IV	1980–2009	0.4–0.55
Kumar and Liang (2020)	IV	1979–1990	0.23–0.57
Sherpa (2024)	IV	2012, 2017	0.81
Studies based on European countries			
Vattø (2020)	DID	1995–2008 Norway	0.11–0.15
Doerrenberg et al. (2017)	2SLS	2001; 2008 Germany	0.54–0.68
Kiss and Mosberger (2015)	2SLS	2007 Hungary	0.24

Note: The table is summarized by this study.

Table A2
ETI Estimates for Taxable Income (2SLS Estimation)
Short Run vs Long-Run

Second Stage: Δln (Taxable Income)					
	2014-2015 (1 year)	2014-2016 (2 years)	2013-2015 (2 years)	2013-2016 (3 years)	2012-2017 (5 years)
$\Delta \ln (1-\tau)$	39.7396***	28.8619***	7.5224**	5.1804	3.0039*
	(10.6018)	(8.3282)	(3.0665)	(3.3549)	(1.7072)
constant	−4.5832***	−4.3875***	−1.1940***	−1,1289***	−1.4521***
	(1.0787)	(1.0033)	(0.2594)	(0.2888)	(0.2973)
control	Yes	Yes	Yes	Yes	Yes
Observations	14,141	12,511	12,166	10,839	8,605

Note 1: Standard errors are included in the parenthesis.
Note 2: ***p < 0.01, **p < 0.05, *p < 0.1
Note 3: Gender, age, dummy of people with disabilities, and residential districts are controlled.

Table A3
ETI Estimates for Gross Income (2SLS Estimation)
Short Run vs Long-Run

Second Stage: Δln (Gross Income)					
	2014–2015 (1 year)	2014–2016 (2 years)	2013–2015 (2 years)	2013–2016 (3 years)	2012–2017 (5 years)
$\Delta \ln (1-\tau)$	35.4370***	30.0086***	7.7232***	8.3213***	3.0255***
	(8.2478)	(6.8883)	(1.6702)	(2.0064)	(0.7315)
constant	−3.9177***	−4.0288***	−0.6509***	−0.6904***	−0.6952***
	(0.8392)	(0.8298)	(0.1413)	(0.1727)	(0.1274)
control	Yes	Yes	Yes	Yes	Yes
Observations	14,141	12,511	12,166	10,839	8,605

Note 1: Standard errors are included in the parenthesis.
Note 2: ***p < 0.01, **p < 0.05, *p < 0.1
Note 3: Gender, age, dummy of people with disabilities, and residential districts are controlled.