

# The sources of declining effective tax rates: Insight from effective tax rate reconciliations

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January 2018

Working paper

## **ABSTRACT:**

Dyreng, Hanlon, Maydew, and Thornock (2017) find declining cash effective tax rates for both domestic and multinational firms from 1998-2012. We investigate the source of the decline for domestic firms using a large data set of firms' GAAP effective tax rate (ETR) reconciliation disclosures. Our analysis suggests that the observed decline in domestic firms' ETRs is largely attributable to the ETR effects of changes to the valuation allowance (VA). Namely, the sample disproportionately includes VA decreases, which decrease ETRs, while excluding observations where VA increases are most likely (i.e., loss years). Additionally, we find that the decline in U.S. multinational (MNE) firms' ETRs over our sample period arises from a combination increasing tax benefits from international operations and declining ETR effects from state taxes. Our results provide more granular insight into how ETRs have changed over time.

Keywords: effective tax rates, book-tax differences, domestic and multinational firms, time trends

JEL codes: G38, H25, H26, H32

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We thank Jenny Brown, Andrew Finley, Nathan Goldman, Ryan Huston, Christina Mueller, Christian Paparcuri, Jim Stekelberg, Steven Utke (NTA discussant), and participants at the National Taxation Association's 110<sup>th</sup> Annual Conference on Taxation, the 2018 Lone Star Accounting Research Conference, and the University of Arizona Tax Readings Group for their valuable comments and suggestions. Some portions of the data collection were facilitated by Perl programs written by Andy Leone.

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## I. INTRODUCTION

Dyreng et al. (2017) examine time-series trends in firms' cash effective tax rates. One key finding of their study is that the decline in cash effective tax rates is pervasive across *both* domestic and multinational (MNE) firms. They conclude that "purely domestic firms do not appear to be disadvantaged relative to multinational firms in terms of tax avoidance and ... both types of firms are benefitting from decreased effective tax rates over time" (p. 462). As they note, this result is "surprising" because while MNEs have benefitted from declining foreign tax rates, the U.S. corporate statutory rate has remained constant over their sample period. Additionally, while Congress has passed several tax provisions that likely benefit domestic firms over the sample period (e.g., the Domestic Production Activities Deduction (DPAD) and changes to the calculation of the research credit), it is unclear whether these effects are significant enough to drive the downward trend in domestic firms' effective tax rates. Thus, utilizing tax rate reconciliation schedules, we further investigate the findings of Dyreng et al. (2017) by examining the *source* of changes in domestic firm ETRs over time.

Public firms are required to provide a detailed reconciliation between the statutory federal income tax rate and the firm's GAAP effective tax rate (ETR).<sup>1</sup> This reconciliation lists the specific tax benefits (i.e., tax-decreasing reconciling items, such as foreign tax rate differentials) and tax costs (i.e., tax-increasing reconciling items, such as state tax effects) that cause firms' ETRs to differ from the federal statutory rate. Graham, Hanlon, Shevlin, and Shroff (2013)

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<sup>1</sup> Throughout the study, we refer to a firm's GAAP ETR as ETR and distinguish it from a firm's cash ETR. See additional discussion in Section II.

highlight, “The exact methods managers use to reduce the GAAP ETRs are not completely known” (p. 1011). However, by utilizing a large hand-collected dataset of ETR reconciliation items, we are able to provide insight into this “black box” by identifying the specific reconciling items that commonly cause a firm’s ETR to differ from the statutory rate. In addition, examining how the magnitude of particular reconciling items change over the sample period provides insight into the time trends observed in Dyreng et al. (2017).

We gather our dataset of tax rate reconciliations from the income tax footnotes in firms’ 10-K filings between 1996 and 2015, the period in which SEC disclosures are widely available for our Perl script data extraction. Our final sample of 23,479 validated observations consists of 11,112 domestic and 12,367 MNE firm-year observations. We classify the rate reconciliation items into 23 categories. We use our detailed rate reconciliation data to further delve into the source of the ETR decline for domestic firms. Additionally, we provide insight into the decline in ETRs for MNE firms. Several other studies seek to examine the results of Dyreng et al. (2017) in greater detail. For example, Gaertner, Laplante, and Lynch (2016) use macro-level tax return data and find increases in both temporary and permanent book-tax differences from firms’ tax schedule M-3, stemming from firms’ operating and financing structures, as well as economy-wide trends. Edwards, Kubata, and Shevlin (2017) model a linear tax function and suggest that the trends documented in Dyreng et al. (2017) may be a function of growth in pretax income rather than increased tax avoidance efforts. Lastly, Chyz, Luna, and Smith (2016) find that the decreasing trend in both domestic and MNE cash ETRs is only partially offset by increases in implicit taxes and that MNE firms bear a lower implicit tax burden than domestic firms. Our detailed data allows us to build on this concurrent literature and provide further evidence about the time trends in ETRs.

Consistent with Dyreng et al. (2017)'s cash ETR findings, we observe a long-run decline in both domestic and MNE ETRs over time. On average, the ETRs of our sample firms have decreased by 0.33 percentage points per year over the past 20 years. The trend is economically large, representing a cumulative decline of between 5.8 and 7.2 percentage points, which is equivalent, on average, to \$19.78 million less tax expense (\$5.9 million less for domestic firms and \$107 million less for MNE firms) in 2015 compared to what would have been reported had the ETR remained the same since 1996. While we observe a declining ETR trend across all firms, we note a greater declining time trend for MNE firms than domestic firms. However, as Dyreng et al. note, the decline in MNE firms' ETRs over time is associated with declining foreign tax rates. However, they are unable to identify specific sources of the decline in ETRs among domestic firms; thus, our primary focus is on the source of the decline in ETRs for domestic observations.

We begin our detailed analysis considering the decline in ETRs for domestic firms from 1996 - 2015. To determine which components of the rate reconciliation may be responsible for the observed downward trend in domestic firms' ETRs we consider the frequency of the reconciling item (i.e., the percentage of non-zero observations per year in our sample), the average ETR effects, the average dollar effect of each reconciling item, and the trends in these reconciling items over our sample period. Through this process we identify that the reconciling item for valuation allowances (VAs) is a common reconciling item among domestic firms. Likewise, we observe that this reconciling item appears in our data more frequently and is increasing in negative magnitude (i.e., reducing ETRs by a greater amount) over time.

To examine whether VA explains a significant portion of the downward trend in domestic firms' ETRs we adjust ETR by removing the component related to VAs. After

adjusting domestic firms' ETRs for the effect of VAs, we no longer observe a significant decline in domestic ETRs over time. Thus, the observed downward trend in ETRs for domestic firms results not primarily from changes to the tax law or firm behavior, but, rather, as a result of firms recording and releasing valuation allowances. Consistent with this notion, we note that only 38.41 percent of the VA rate reconciliation adjustments in our sample are positive (increasing the VA and increasing the ETR), while 61.59 percent are negative (decreasing the VA and decreasing the ETR). Likewise, the magnitude of the negative VA adjustments tend to be larger than the magnitude of the positive VA adjustments.

Our findings pertaining to the VA trend for domestic firms provide new insight into the time trend of domestic firms' ETRs. We perform several additional tests to consider the source of the time trend for VA reconciling items. First, we note that the VA ETR effect is positively associated with prior pretax losses. Second, since VA increases most likely occur in loss years, we gather data on the magnitude of VA reconciling items in loss years. We observe that the dollar amount of net VA increases in loss-year observations (omitted from our main sample) more than offset the net VA releases observed in our sample of profitable domestic firm-years. This result suggests that the net effect of VA adjustments on ETR is an increase (not a decrease) for domestic firms, at least when considering both profit and loss year observations. We also extend our analysis to examine domestic firms' cash ETRs. Our results suggest that the decline in cash ETRs also relates to the firms in our sample with VA reconciling items. Thus, we suggest that the downward trend in domestic firms' ETRs and cash ETRs that we observe in our sample is largely an artifact of the data collection process we employ (and employed by many other tax studies). Namely, consistent with the tax literature, we omit loss years from our analysis, due to the difficulty of interpreting ETRs for loss firms. However, by omitting loss years, we are

omitting years that firms create or increase VAs. Thus, by including only profitable years, the ETR time trends are disproportionately affected by VA decreases, which decrease ETRs.

Additionally, we examine the time trend of ETRs for the subset of domestic firms that do not report VA reconciling items. For these observations, we note a much smaller decline in ETRs over time; this small residual declining trend in domestic firms' ETRs arises from increased benefits over time from research credits and DPAD tax initiatives. This finding is also of interest because it suggests the residual declining trend is a product of changes to federal income tax policy rather than an increased focus of domestic firms on aggressive tax planning.

We also use our rate reconciliation data to further examine the decline in ETRs for MNE firms. Dyreng et al. (2017) find that the decline in cash ETR is only partially explained by a decline in foreign statutory rates. We find the decline in MNEs' ETRs is primarily associated with two effects, the increasing downward effect of foreign tax rate differentials on ETRs and the decreasing upward effect of state income taxes on ETRs. The foreign tax rate reconciliation item results from declining foreign statutory tax rates, or a greater proportion of pre-tax income reported as permanently reinvested, or both. The state tax effect, which is typically a net increase to ETR, is declining over time, suggesting either a decline in statutory state tax rates, or a smaller proportion of the firm's pre-tax income being subject to state taxes. The falling state income tax burden we observe relates to greater percentages of income outside the U.S., leaving less income to be taxed by states. When we adjust MNEs' ETRs by removing the ETR effects of foreign operations and state income taxes, we no longer observe a significant decline in MNE ETRs over time, suggesting these two effects account for substantially all of the net ETR decline for MNEs during our sample period.

In our additional analyses, we further examine differences in ETR time trends between MNE and domestic firms with additional sample partitions on firm size and growth. We note an increasing trend in the benefit of research credits for the small domestic firms, but not the large domestic firms. However, for MNE firms we observe the opposite trend, with the benefits of research credits increasing for large MNE firms and not for small MNEs. Examining firms based on growth, we note the declining state tax time trend is only significant for high-growth MNE firms, consistent with firms “growing away from” states, rather than taking actions to reduce state taxes (e.g., Dyreng, Lindsey, and Thornock (2013) document that firms use Delaware holding companies as domestic tax havens).

We contribute to the tax literature by providing insight into the observed decline in domestic firms’ ETRs. Our findings suggest that, unlike multinational firms, domestic firms have *not* significantly benefitted from declining tax burdens, as their ETRs (exclusive of VA effect) are essentially unchanged over our sample period. Additionally, the results of our study highlight an important challenge that researchers face when limiting samples to profitable years, since our results show that failure to adjust for the effect of VA releases can bias results, creating an appearance of lower ETRs. Our study has implications for researchers examining ETRs, as well as time trends in ETRs, by highlighting the need to understand how underlying transactions and sample selection affects firms’ reported ETRs.

We also contribute to the tax literature by providing some of the first large-scale detail of the components of firms’ ETR reconciliations. Book-tax differences are closely related to measures of tax avoidance, but it is not our intent to characterize the propriety of the tax items (i.e., intentional, benign, aggressive, legal, or illegal) that give rise to the observed ETR differences. A long stream of literature considers broad measures of tax outcomes (e.g., ETRs,

book-tax differences, etc.) as well as firm, executive, and governance determinants of ETRs (see Hanlon and Heitzman 2010, for a recent review). However, because our data provides details of firm-level specific differences between the statutory and effective tax rates, we offer insight into transactions that give rise to observed ETR behavior.

In December 2017, the Tax Cuts and Jobs Act drastically changed the taxation of U.S. firms. The law reduces the statutory corporate tax rate, which decreases the tax burden on domestic operations, and thus reduces the difference in ETRs between domestic and multinational firms. While Dyreng et al. (2017) suggest similar time trends in cash ETRs for MNE and domestic firms, our results suggest that domestic firms have not benefitted from decreasing tax burdens. Rather, the observed trends in our study result from sample construction: excluding loss-years omits the majority of VA increases, and thus, including only profitable years (i.e., the years when VA releases are most common) identifies a downward trend in ETRs. To that end, while the full effect of the new tax law on firm incentives and outcomes is unclear, the results of our study remain relevant. That is, to the extent loss firms record and release VAs, the effect we document will continue to affect ETRs.

## **II. INSTITUTIONAL BACKGROUND AND LITERATURE REVIEW**

### **Income Tax Rate Reconciliations**

Firms report earnings to investors in accordance with GAAP and to taxing authorities in accordance with the tax law, resulting in book-tax differences (BTDs). BTDs can be favorable (i.e., adjustments that result in book income > taxable income) or unfavorable (i.e., adjustments that result in taxable income > book income) and either permanent or temporary. Temporary differences are items for which the *timing* of recognition differs between GAAP and tax, which reverse over time (e.g., over the life of an asset, total depreciation for GAAP and tax are equal, but annually firms report different amounts of depreciation expense under the two systems). All

other differences between GAAP and tax are permanent differences.<sup>2</sup> Permanent differences include items that are recognized in only one of the two systems (e.g., municipal bond interest is never recognized for tax purposes, while items such as tax credits are never recognized as a part of GAAP pretax income). Hanlon and Heitzman (2010) note that transactions that yield favorable permanent book-tax differences are ideal because they reduce firms' ETRs and increase accounting earnings.<sup>3</sup>

Firms disclose material permanent differences affecting the GAAP ETR (total tax expense/pre-tax book income) in the financial statements. ASC 740-10-50-12 requires public entities to provide an annual reconciliation between the U.S. statutory tax rate of 35 percent and the firm's ETR. This schedule provides detail of specific differences between GAAP and taxable income.

SEC Regulation S-X, Rule 4-08(h) requires firms to disclose all "significant" book-tax differences in the rate reconciliation, where significant is defined as amounts that are more than five percent of the product of pretax income times the statutory tax rate. See Appendix A for an example disclosure. From our discussion, note that the reconciliation between the statutory rate and a firm's ETR captures only permanent differences between GAAP and tax reporting. While our study is limited to permanent differences, the rich data available in the ETR reconciliations provides unique insight into firms' transactions.

We focus on the permanent differences available in the rate reconciliation to aid in identifying the sources of declining ETRs for several reasons. First, survey evidence suggests

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<sup>2</sup> Technically, ASC 740 does not use the term permanent differences. However, both the practitioner and academic literatures consider all non-temporary GAAP versus tax differences as permanent.

<sup>3</sup> While Hanlon and Heitzman (2010) note that tax shelters that generate permanent book-tax differences are considered the most "aggressive," our intent is not to determine the aggressiveness of any particular item, but rather to identify differences in the types of permanent differences disclosed across firms and over time.

that managers are more focused on ETR than cash ETR because ETR affects reported earnings (Graham et al. 2013). Second, ETR is arguably more salient and visible to investors, for the same reason. Third, firms' benefits from permanent differences between GAAP and taxable income are greater than temporary differences because they will not reverse over time. Fourth, the level of detail provided in the ETR reconciliation table allows us to identify each element of the ETR; there is no corresponding schedule in public filings that allows us to identify the elements of a firm's cash effective tax rate.

A few studies in the tax literature use details of the ETR reconciliation, typically in small samples. For example, McGill and Outslay (2004) use Enron's tax rate reconciliation to identify tax shelter usage and highlight the lack of information in tax disclosures, Shackelford and Slemrod (1998) use details from 46 firms' rate reconciliations over a five-year period to estimate firms' foreign ETRs, and Minnick and Noga (2010), focusing on S&P 500 firms, use details from the rate reconciliation to estimate firms' domestic, state, foreign, and VA ETR effects. Bauman, Bauman, and Halsey (2001) measure the earnings effect of recording a VA using a small sample of VA rate differentials from rate reconciliations. Lastly, Chychyla, Falsetta, and Ramnath (2017) examine whether the reporting of ETR reconciliations in dollars versus percentages influences the ability of investors and analysts to interpret the information. However, to the best of our knowledge, ours is the first study to examine the details of each line item of rate reconciliations from a large sample of diverse firms over a long time period.

### **ETR Time Trends**

Dyreng et al. (2017) document a decline in cash ETRs in both domestic and MNE firms over the 25-year period from 1988 to 2012. Several studies, including ours, seek to examine the results of Dyreng et al. (2017) in greater detail. For example, Gaertner et al. (2016) use macro-

level tax return data and find increases in reported book-tax differences from firms' tax schedule M-3, stemming from both temporary and permanent adjustments, and economy-wide effects. Edwards et al. (2017) disaggregate the changes in cash ETR into taxes paid and pretax income and identify that the trends documented in Dyreng et al. (2017) may be a function of growth in pretax income rather than increased tax avoidance efforts. Lastly, Chyz et al. (2016) find that the decreasing trend in both domestic and MNE cash ETRs is only partially offset by increases in implicit taxes and that MNE firms bear a lower implicit tax burden than domestic firms, an effect that increases in foreign income.

### **III. RESEARCH DESIGN AND RESULTS**

#### **Rate Reconciliation Data Collection**

Tax rate reconciliation disclosures are not available to researchers in a harmonized, machine-readable format. Therefore, we automate the process of collecting these ETR reconciliation tables using a series of Perl scripts. In particular, using Perl we download all electronically available 10-Ks from the SEC website and then locate the rate reconciliation table to extract details of the permanent differences affecting a firm's ETR. We verify the accuracy of this process by comparing the ETR calculated from the extracted rate reconciliation data with the ETR calculated using Compustat data. We describe our data collection and validation process in detail in Appendix B. We summarize the various components of the rate reconciliations and organize them into 23 categories. We describe our ETR taxonomy in Appendix C.

#### **Sample Selection**

Table 1 describes our sample selection process. We begin with 195,223 Compustat observations of U.S. domiciled firms between 1996 and 2015, the years we are able to extract data from SEC EDGAR. Similar to other tax studies, we exclude firms with total assets less than

\$10 million and firms with negative pre-tax income, because prior literature highlights that negative pre-tax income makes interpreting ETRs difficult (Hanlon, Mills, and Slemrod 2005). Additionally, we exclude utilities and financial firms because they have different tax planning opportunities and incentives, resulting in a sample for Perl extraction of 63,578 observations. Our Perl data extraction process successfully extracts 23,479 observations, consisting of 12,367 MNE and 11,112 domestic firm-years.<sup>4</sup> We follow Dyreng et al. (2017) and classify an observation as MNE if pretax foreign income is greater than zero or if the absolute value of foreign income tax is greater than zero, all others we identify as domestic.

## INSERT TABLE 1

### **Descriptive Statistics**

Given our interest in the *source* of the decline in domestic firms' ETRs over time, we first consider the frequency, average tax rate effect, and dollar magnitude of the various types of reconciling items for our domestic sample. In Table 2, we present descriptive statistics for each ETR rate reconciliation item.<sup>5</sup> We include the mean ETR effect, as well as the frequency (labeled as “% ≠ 0”), and the mean of the ETR effect for the non-zero observations. Additionally, because examining the mean ETR effect of each reconciling item treats firms with all levels of pretax income equally, we also include the mean raw dollar effect (in \$ millions) of each reconciling item, calculated by multiplying the ETR effect by pretax income. We note a high frequency

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<sup>4</sup> We discuss potential reasons for our sample attrition in our data gathering process in Appendix B. Additionally, we examine trends in ETRs and cash ETRs in our sample compared to a general sample of Compustat firms subject to similar data screens and find similar time trends in both samples.

<sup>5</sup> Using our rate reconciliation data, we observe that 8.47 percent of our domestic firms report an international ETR effect. We examine several observations and note, particularly in early years in our sample, that some firms with foreign operations (e.g., American Airlines, Boeing, Lockheed) are categorized as domestic. We review several 10-Ks for these observations and note that these firms, in these early years, are not as likely to separate pretax income or tax expense into domestic and foreign components. Thus, we suggest these firms changing categories between MNE and domestic stem from inconsistent population of the PIFO and TXFO variables and caution researchers from relying too heavily on this data. In untabulated analysis, we eliminate firms that switch between domestic and MNE during our sample period and note all inferences remain unchanged.

(86.03 percent) of observations report a reconciling item for state taxes. We also note a significant percentage of observations report reconciling items for valuation allowances (19.61 percent), as well as the miscellaneous (22.23 percent) and other (80.28 percent) categories.<sup>6</sup> In terms of magnitude, the reconciling items with the largest average effect on ETRs among domestic firms with the adjustment are from the VA (-20.93 percentage points), NOL (-15.68 percentage points),<sup>7</sup> and depletion effects (-8.73 percentage points). However, some of these large reconciling items only occur in a small set of firms. For example, while the firms that have depletion deductions benefit greatly from them, only 2.49 percent of our firm-year observations report a reconciling item related to depletion. Thus, when we examine the average effects of each reconciling item for the full sample (including observations where the effect is zero), we note the reconciling items that contribute most to sample-wide ETRs are state tax effects (3.05 percentage points), VA (-4.10 percentage points), other credits (-0.82 percent), and municipal interest (-0.74 percentage points).<sup>8</sup>

## INSERT TABLE 2

### **ETR Time Trends**

First, similar to Dyreng et al. (2017), we graph the downward trend in ETRs over our sample period.<sup>9</sup> While our sample period is similar to theirs, our data collection methodology

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<sup>6</sup> Firms typically disclose reconciling items that are less than five percent of pretax income times the statutory tax rate as “other”. We create the “miscellaneous” category as a residual category for infrequent items. See Appendix C for further details.

<sup>7</sup> In general, NOL adjustment result in *temporary* differences between book and taxable income, and thus will not appear as an ETR reconciling item. However in some situations, such as the expiration of NOLs, limitations on the usage of NOLs, and NOL carrybacks, NOLs may result in a permanent difference. We review a sample of ETR reconciliations that include a NOL rate reconciliation item. Upon examination, it is unclear whether, on average, reconciling items labeled as NOL are in fact a VA-related effect or something unrelated to VA. Thus, in untabulated analysis we combine NOL ETR effects and VA ETR effects into one variable and all inferences from our tests remain unchanged.

<sup>8</sup> In Table 8 we present similar data for our MNE sample.

<sup>9</sup> We note, however, that our GAAP ETR trends look very similar to the Dyreng et al. (2017) cash ETR trends, suggesting that our study provides important insight into these observed trends.

(outlined in Appendix B) limits the observations we are able to collect. Additionally, we focus on ETRs, while Dyreng et al. (2017) study cash ETRs. Despite these design differences, both studies show substantial declines in tax rates over time (see Figure 1).

#### INSERT FIGURE 1

As highlighted in a number of studies, MNEs have distinctly different opportunities for tax planning than purely domestic firms (e.g., Rego 2003). Thus, we next consider time trends in ETRs for both MNE and domestic firms. In Figure 2, we graph the annual mean of ETR across our sample period separately for domestic and MNE firms. We include linear time trend lines for each sample. We note at the start of our sample period MNEs have higher ETRs than domestic firms; however, the trend lines converge and eventually cross around 2006, at which point domestic firms generally have higher ETRs than MNEs. Overall, Figures 1 and 2 are consistent with the trends in Dyreng et al. (2017); that is both domestic and MNE firms exhibit significant downward ETR trends over time.

#### INSERT FIGURE 2

We also analyze the broad time trend in tax rates using the following model from Dyreng et al. (2017):

$$ETR_{it} = \alpha_0 + \alpha_1 Time_t + \varepsilon_{it} \quad (1)$$

Where  $ETR$  is a firm's GAAP ETR as defined above, and we measure  $Time$  as the fiscal year of the observation less the number 1996, which is the first year in our dataset. Thus, the coefficient on  $Time$  captures any linear trend in  $ETR$  over the sample period.

In Table 3, we present the results of estimating Equation (1) for domestic and MNE firms separately. Consistent with Figures 1 and 2, we note a negative and significant ( $p < 0.01$ ) coefficient on  $Time$  in both the MNE and domestic samples. Though the downward time trend is

significant across all firms, a test of the difference in the coefficient on *Time* across the domestic and MNE samples suggests that the effect of time on ETR is significantly larger ( $\chi^2 = 4.15^{**}$ ) for multinational firms relative to domestic firms. In particular, the economic magnitude of the coefficients suggests that ETRs are decreasing at a rate of approximately 0.36 percentage points per year for MNEs and 0.29 percentage points per year for domestic firms. In terms of economic magnitude, this translates into an ETR decrease of approximately 7.2 percentage points (MNE) and 5.6 percentage points (domestic) over our 20-year time period, which equates to an average \$107 million less tax expense (MNE) or \$5.8 million (domestic) compared to what would have been reported had the ETR remained the same since 1996. While both trends are significant, our primary focus is on identifying the source of the decline of domestic firms' ETRs over time.<sup>10</sup>

INSERT TABLE 3

### **ETR Component Time Trends**

Next, we examine the time trend in firms' use of the various permanent difference across the 20 years of our sample. Our unique data allows us to delve more deeply into the source of changes in ETRs.<sup>11</sup> To conduct this analysis, we replace the dependent variable in Equation (1) with rate reconciliation components to examine time-series changes in the magnitude of the various ETR effects:

$$ETR\_EFFECT_{it} = \alpha_0 + \alpha_1 Time_t + \varepsilon_{it} \quad (2)$$

Where *ETR\_EFFECT* is the magnitude (in percentage points) of the various ETR reconciliation items from firms' rate reconciliations. This test allows us to consider changes in the various

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<sup>10</sup> We test for significant differences across industries and find a statistically similar time trend across all industries, except for mining, which has a small number of observations (untabulated).

<sup>11</sup> Relatedly, Edwards et al. (2017) model a linear tax function instead of the proportional tax function typically assumed in prior research. They find that the association between taxes paid and pretax income been relatively constant over this time period, which they suggest indicates little change in firms' tax avoidance activities over time. However, BTDs (temporary or permanent) that are independent of current period pretax income are captured by the intercept in their linear tax function and thus not reflected in the association they study.

reconciling items over our sample period, providing insight into the specific components affecting the overall observed downward trend in ETRs. Since particular reconciling items need to be relatively frequent in order to influence the broad downward trend in ETRs we observe, we focus on the 13 reconciling items that occur regularly in the sample. In Table 4, we present the time trend regression of Equation (2) for these 13 ETR reconciliation items for the sample of domestic firms. While we note a significant time trend in a number of components, we highlight several important results.

While the descriptive statistics in Table 2 identify a large portion of observations with state tax ETR adjustments, we do not observe a significant coefficient on *Time* in the state ETR effect component. A number of studies examine changes in state income tax rates over time (e.g., Heider and Ljungqvist 2015; Fox and Luna 2005) and highlight that state tax trends are not homogenous and that while some states have been decreasing their statutory tax rates over time, other states are increasing their statutory tax rates. Thus, it appears that decreases in domestic firms ETRs over time are unaffected by changes in state tax burdens.

We also note a positive trend for the ETR effect of municipal bond interest, suggesting that this is becoming a less meaningful component of firms' ETR reduction strategies. In addition, we observe decreasing trends for both research credits and DPAD, suggesting these tax provisions are potentially contributing to the downward trend in domestic firms' ETRs over our sample. However, we note that the largest coefficient on *Time* among all 13 component regressions is related to the VA reconciling item. We observe a significant and economically meaningful (i.e., 0.29 percentage point decrease in ETR per year) decreasing time trend for the VA reconciling item. In general, firms record (i.e., increase) a valuation allowance when management determines it is not more likely than not that the future benefits of deferred tax

assets (most often net operating losses and tax credit carryforwards) will be realized (ASC 740-10-30-5(e)). Recording a valuation allowance generally creates a permanent difference, increasing a firm's effective tax rate. If, in a future period, expectations of future income have changed and the firm determines a valuation allowance is no longer required, the firm will reverse (i.e., decrease) the valuation allowance, creating a permanent difference that decreases the effective tax rate. The significant and economically meaningful VA trends observed in the domestic sample suggest reductions in VA affect observed ETRs for our sample of profitable domestic firms. We examine this finding in more detail below.

INSERT TABLE 4

### **Sample Construction and VA Time Trends**

As we note above, VA reconciling items are both frequent and display a significant downward trend. A negative average ETR effect from VA can only arise if the sample includes a disproportionate number of VA decreases relative to VA increases. Given that VA increases are most likely to occur in loss years, we suggest that the decline in domestic firms' ETRs associated with VAs may be an artifact of the data screening process employed in most tax research, since we omit loss years but include profitable years. Thus, we adjust each observation's ETR for any VA effect in the current year. In Figure 3 we plot this adjusted ETR for domestic firms. If the decreasing trend in ETRs is associated with changes in firms' VAs, we expect that the downward trend in domestic firms' ETRs in Figure 3 will flatten relative to Figure 2. In Figure 3, we note that, after excluding the VA effect for domestic firms, the linear trend no longer exhibits a strong decline. We next empirically test whether the VA effect contributes to the observed decline in ETRs.

INSERT FIGURE 3

In Table 5, we repeat the tests using Equation (1); however, we again adjust ETR to exclude the effect of VA. Consistent with Figure 3, we find that when we exclude the VA effect from ETR that the time trend is no longer significant in the domestic firms. This suggests that substantially all of the downward time trend in ETR for domestic firms in our sample can be explained by ETR effects related to VAs. We delve into this result further by examining the association between the VA effect and firms' loss history, and by considering the VA effect of loss-year observations excluded from our sample.

#### INSERT TABLE 5

In Table 6 Panel A, we first examine the magnitude of the dollar amount of VA increases (which increase ETRs) and VA decreases (which decrease ETRs) in our sample. We note that in our sample VA decreases exceed VA increases. Given that no individual firm may have a VA balance below zero, we attribute the disproportionate amount of VA decreases in the sample relative to increases to the sample construction excluding loss years. In Table 6 Panel B we examine the frequency of losses, and its association with firms' ETRs and VA ETR effects. We note that the reported ETR and the VA ETR effect monotonically decrease with the number of losses in the five-year period from  $t-4$  to  $t-1$ . Taken together, these results suggest that excluding loss years from our overall analysis has the effect of excluding firm-year observations with VA increases from the analysis, resulting in the observed downward trends in ETR.

#### INSERT TABLE 6

Next, in Figure 4, we plot VA trends. Specifically, in Panel A we present the net VA ETR effect (decreases and increases) in our sample of profitable domestic firms over time. Consistent with the results in Tables 5 and 6, suggesting that the observed decline in ETRs is

associated with reported VA differences, we observe a significant downward trend in the VA ETR effect.

In Panels B and C of Figure 4, we consider how sample selection may affect the ETR trends we observe. First, we gather the dollar magnitude of the VA ETR effect for the loss observations previously eliminated from our sample.<sup>12</sup> In Panel B, we present the mean dollar value (in \$ millions) of VA increases and VA decreases for our domestic sample and include the mean dollar value of the VA reconciling item recorded by any of the firms in our sample during loss years, which were not included in our initial sample. We present these graphs by year and include trend lines for each. We note a significant trend in VA decreases across our sample period, while the level of VA increases for observations in our initial sample remains stable. However, we note that the trend line for VA increases for loss observations is sloping upward. Thus, the exclusion of loss years from our initial sample dramatically understates the amount of VA increases each year, biasing mean ETRs downward. In Figure 4 Panel C we sum the dollar effect by year for our profitable observations plus the loss observations previously excluded from the sample. We note an upward sloping line, suggesting that when including both profit and loss years, the dollar magnitude of VA adjustments is increasing (i.e., increasing the ETR) over time. These graphs, along with the findings above, suggest that the decline in ETRs observed for domestic firms is largely due to omitting loss years (i.e., the observations most likely to have VA increases) from our sample.

#### INSERT FIGURE 4

Additionally, we examine the time trend of domestic observations that do not report a VA reconciling item in the current year. For these observations, in Table 7 Panel A, we note a much

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<sup>12</sup> To avoid creating a denominator effect of ETRs with loss years, our interest for the graphs in Panels B and C is the dollar value of VA increases and decreases.

smaller decline in ETRs over time than observed in our primary analysis. Specifically, the coefficient on *Time* suggests an average decline of 0.09 percent per year, or less than a total of two percent decline over our sample period. As we note, domestic firms have been subject to a constant statutory U.S. tax rate over our sample period. However, several tax law changes during our sample period may benefit domestic firms. First, the American Jobs Creation Act of 2004 created Internal Revenue Code (IRC) §199, *Income attributable to domestic production activities* (DPAD, also known as the manufacturing deduction) allowing a deduction for a portion of income related to domestic production activities.<sup>13</sup> Additionally, while research credits are also a relatively common ETR difference, the implementation of the alternative simplified credit in 2007 resulted in increased eligibility for the research credit as well as potentially credits of larger magnitude (Finley, Lusch, and Cook 2015). Thus, in Table 7, Panel B, we note that excluding the ETR effect of DPAD and research credits results in an insignificant time trend, suggesting the small declining time trend in ETRs for domestic firms without VA reconciling items is associated with DPAD and research credits. This is of interest because this result suggests that the declining trend that is not attributable to VA is attributable to changes in the tax law. Thus, the observed decline is likely a product of legislative actions, rather than an increase in firms' aggressive tax planning.

#### INSERT TABLE 7

In sum, our analysis of changes in domestic firm ETRs over time suggests the observed downward ETR trend results primarily from the frequent occurrence of VA decreases in our sample relative to VA increases, which is a function of the sample selection process that eliminates loss observations. Dyreng et al. (2017) also consider how losses might affect their

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<sup>13</sup> For a summary of the history and specific provisions of DPAD, see Lester and Rector (2016) who use 2012 corporate income tax data to study the distribution of firms claiming benefits under §199.

observed results. They examine three different loss-related subsamples, all of which include both domestic and MNE firms: 1) a sample of firms with 25 consecutive profitable years, 2) firms with at least five profitable years, and 3) firms that do not report a NOL. In each of these specifications, they continue to observe a negative time trend in cash ETRs. However, our results, separating domestic firms and examining the VA ETR effect, provide a more nuanced analysis of how loss observations affect the decline in domestic firms ETRs over time.

### **Analysis of Domestic Firms' Cash ETR Trends**

Given that we find that VAs influence the ETR time trend for domestic firms, we seek to triangulate our results with the finding in Dyreng et al. (2017). While VAs do not have a direct effect on cash ETRs, the events that give rise to VA adjustments do. In particular, VAs are commonly created in loss years where cash ETRs are typically zero. VA decreases signal that management's assessment of the realizability of the tax benefits of NOL and credit carryforwards has changed. Thus, a decrease in the VA account will typically be associated with NOL and credit carryforward usage in the current year and the years immediately following the VA decrease. The use of these tax benefits will result in lower cash ETRs. Thus, while we are not able to make a direct adjustment to cash ETR as we are in our ETR analysis, we seek to understand whether cash ETR time trends differ for domestic firms with VA balances relative to those that do not have VA balances.

To do so, we identify firms in our sample that report an ETR adjustment for VA at any point in our sample period. Since our primary analysis only includes profitable firm-years, we re-run our PERL script in loss years to identify observations with VA adjustments. We then code the variable *EverVA* as one if the firm has a VA adjustment at any point during our sample period and zero if the firm never has a VA adjustment in our sample. Consistent with Dyreng et

al. (2017) we calculate cash ETR as cash taxes paid divided by pre-tax income (TXPD/PI) and we winsorize cash ETR at zero and one. Relative to our ETR analysis, the requirement for non-missing TXPD slightly reduces our sample, resulting in 8,945 domestic firm-year observations. Of these, 4,783 have a VA adjustment at some point during our sample period (i.e.,  $EverVA = 1$ ) and 4,162 never have a VA adjustment in our sample period (i.e.,  $EverVA = 0$ ). In Figure 5, we plot mean cash ETR over time for our domestic firm-year observations partitioned on  $EverVA$ . We note that the firm-year observations where  $EverVA = 0$  have a cash ETR trend that is much flatter than that observed for domestic firm-year observations where  $EverVA = 1$ . This is consistent with our primary analysis focusing on ETR. Overall, our evidence suggests that the observed decline in both ETR and cash ETR largely results from exclusion of loss years from the sample and the subsequent usage of NOL and tax credit carryforwards when the firm becomes profitable. Thus, understanding firms' current and prior loss history is important for evaluating time trends in cash and GAAP ETRs.

INSERT FIGURE 5

### **Analysis of MNE firm ETR decline**

While Dyreng et al. document a downward trend for MNE firms, our data allows us a more detailed analysis of the source of the decline. Thus, we next conduct several analyses on the sample of MNE firms. In Table 8, we present descriptive statistics for our MNE firms. We compare these to the descriptive statistics for our domestic observations, which are reported in Table 2. We note some differences in ETR reconciling items between domestic and MNE firms. Specifically, while the frequency of VA ETR adjustments is greater for the MNE firms (35.14 percent versus 19.61 percent), the mean ETR effect of VA is greater for domestic firms (-4.10 percentage points versus -2.29 percentage points). Unsurprisingly, given the literature on tax-

motivated foreign activities, the effect of international operations on ETR is significant. We also note a greater frequency of ETR adjustments related to uncertain tax positions among MNEs relative to domestic firms (15.95 percent versus 4.48 percent). This is unsurprising, since the IRS has identified that many uncertain tax positions relate to transfer pricing (related to multi-jurisdictional operations) (Towery 2017). Lastly, we note a greater frequency of observations in our MNE sample report ETR differences from DPAD relative to the domestic sample (12.69 percent versus 5.19 percent).

#### INSERT TABLE 8

In Table 9, we present time trends for various ETR components for our MNE sample for the same 13 reconciling items reported in Table 4. In terms of international rate effects, the decreasing time trend of the international effect suggests either a decrease in foreign tax rates, or a greater amount of foreign income classified as permanently reinvested, or both. In fact, in 1996, the average adjustment for international effects for MNE firms is insignificantly different from zero. However, the coefficient on *Time* suggests that, on average, this effect is decreasing at a rate of 0.27 percentage points per year for MNE firms. Given the magnitude of this time trend, we examine this finding in more detail below.

We also note, the coefficient on *Time* in the state ETR effect component regression is negative and significant. Any state income tax that a firm bears will be shown as an increase in ETR. In addition to reflecting changes in state income tax *rates*, the state income tax reconciling item also reflects the portion of a firm's income subject to state income tax. Thus, to the extent that a larger percentage of a firm's income arises outside the U.S., the state income tax burden will decrease. Our results support the notion that time-series differences in the state tax effect relate to a greater portion of income not subject to state taxes.

Additionally, we note that the decreasing time trend for the VA ETR effect is not significant for MNE firms. Overall, the results in Table 9 suggest distinctly different sources of the decline in ETRs for MNEs relative to domestic firms.

#### INSERT TABLE 9

Dyreng et al. (2017) specifically test how the decline in statutory tax rates around the world affect U.S. firm's reported cash ETRs. Using Exhibit 21 data that lists the location of significant firm subsidiaries, they estimate firm-specific average foreign statutory tax rates. Using their firm-level average foreign rate measure, they find that the decline in average foreign statutory tax rates explains a portion of the downward trend in cash ETRs for multinational firms; however, they conclude the foreign tax rate decline does not fully explain the decrease. Our data allows us a more precise measure of firm-specific foreign tax rate differentials, allowing for a more nuanced examination of the decline in firm ETRs. In Figure 6, we present a graph of MNE ETRs by year, excluding the effects of international operations and state income taxes. As we note above, we observe high frequencies and large decreasing trends in these ETR effects. Consistent with our expectations, we note that excluding foreign and state ETR effect largely eliminates the downward slope in ETRs over time, which we empirically test below.

#### INSERT FIGURE 6

In Table 10, we present the results of estimating Equation (1) using a modified ETR excluding the effect of international operations and state income tax differences as the dependent variable. Consistent with Figure 6, when we exclude the effect of international and state tax reconciling items from ETR, we no longer observe a negative and significant coefficient on *Time*. Thus, the combined effect of an increasing tax benefit associated with international operations and a decreasing state tax cost explains substantially all of the decreasing trend in

ETRs among MNEs in our sample. In addition, our results support the notion that time-series differences in the state tax effect relate to a greater portion of income not subject to state taxes.<sup>14</sup>

#### INSERT TABLE 10

Next, we examine the results of Table 10 more closely. Specifically, in Figure 7 and Table 11 we consider the source of the declining ETR for MNEs from international operations. In general, firms report a favorable (i.e., ETR decreasing) foreign ETR differential when three factors are present: 1) the MNE has foreign operations in a foreign subsidiary, 2) the foreign tax rate on foreign income is less than the U.S. tax rate, and 3) the MNE identifies the profits of its foreign subsidiary as permanently reinvested outside the U.S. (ASC 740-30-25-17).<sup>15</sup> Thus, a favorable foreign ETR difference is a function of both the MNE's income derived from foreign sources as well as the difference between the foreign tax rate and the U.S. statutory rate.<sup>16</sup>

While the U.S. statutory rate has remained static over our sample period, the tax rates of other OECD countries have fallen. For example, in 1996, the first year in our sample, the average OECD combined country-level and sub-central level (i.e., state, province, etc.) corporate tax rate was approximately 36.6 percent; including six countries that had higher rates than the U.S. In contrast, in 2015, the last year of our sample, the average OECD rate had fallen to approximately 25 percent, with no rates higher than that of the U.S. In particular, from 1996 – 2015, the average statutory rate decrease of OECD countries was approximately 10.85 percentage points, with

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<sup>14</sup> In untabulated analysis we reestimate the tests from Table 10 on our sample of domestic observations and continue to note a significant time trend, suggesting that the time trend for domestic observations is not associated with the international or state tax effects.

<sup>15</sup> If the MNE conducts foreign operations in a low-tax jurisdiction through a U.S. entity or a branch, the foreign income will be immediately subject to U.S. tax less any credit for foreign taxes paid and the firm will not report any foreign ETR difference.

<sup>16</sup> Firms are required to disclose the total amount of foreign earnings identified as permanently reinvested, and, to the extent practicable, the deferred taxes that would be recorded if the earnings were not permanently reinvested. A number of studies examine determinants of permanently reinvested earnings and firms' disclosure choices. For example, see Ayers, Schwab, and Utke (2015).

Germany, Ireland, and Italy all decreasing their rates by over 20 percentage points. In addition to the OECD countries, there are numerous countries offering very low or zero percent rates on corporate taxable income (e.g., Bermuda, Cayman Islands, Jersey, and the British Virgin Islands).

A decline in ETR could result from a decline in foreign tax rates, greater percentage of income reported overseas, or some combination thereof. Thus, we create two variables to test the source of the decline. We use a firm's foreign ETR (*FETR*) measured as foreign tax expense divided by foreign pretax income and the foreign income percentage (*FIncPerc*) measured as the ratio of foreign income to total income, and separately graph the time trends of each in Figure 7. Dyreng et al. (2017) use a weighted average of a firm's foreign subsidiary locations to estimate a firm's foreign statutory tax rate.

INSERT FIGURE 7

Additionally, we test for significant time trends in *FETR* and *FIncPerc* and present these results in Table 11. We note that both measures exhibit significant time trends. Thus, we conclude that the decline in MNE ETRs results from both a decline in foreign tax rates, but also the percentage of income reported outside the U.S.

INSERT TABLE 11

#### **IV. ADDITIONAL ANALYSIS**

##### **VA Time Trends in MNE Firms**

Our results above provide evidence that the observed decline in ETRs for domestic firms is associated with decreases in VA. Thus, we next test whether VA decreases affect MNE firms similarly. Specifically, In Figure 8 we graph both domestic and MNE firms ETRs over time, excluding the effect of VA from the rate reconciliations. We continue to observe a downward

trend in ETRs over time for the MNE firms, however, consistent with our results above, we do not observe a significant downward trend for the domestic observations.

INSERT FIGURE 8

Next, in Table 12, using only MNE observations, we examine the same test as in Table 5 – estimating the time trend of firm’s ETRs using a dependent variable that excludes the VA ETR effect. We note the coefficient on *Time* is negative and significant and similar in magnitude to the coefficient on *Time* in Table 3 Column ii, testing the time trend of ETRs for MNE firms. Overall, we conclude that the evidence we find of a VA ETR effect for domestic firms does not similarly affect MNE firms’ ETRs.

INSERT TABLE 12

#### **ETR Time Trends – Size and Growth Partitions**

In Table 13, we further partition our domestic and MNE samples into large and small firms and high- and low- growth firms to examine whether there are different ETR time trends across cross-sections of firms. We identify large (small) firms based on the top (bottom) quartile of assets. Similarly, we identify high growth (low growth) firms as those in the top (bottom) quartile of Tobin’s Q. First, we focus on size because while prior research predicts an association between firm size and ETR, the empirical results have been mixed (e.g., Mills, Erickson, and Maydew 1998; Rego 2003; Omer, Molloy, and Ziebart 1993). Thus, understanding the time trends of various components of the ETR may vary by size and MNE/domestic is of interest. Second, we focus on growth opportunities because a number of tax policies are designed to spur economic growth, and tax planning opportunities and incentives vary based on growth.

We note several key findings from this analysis. First, using Equation (1) we note the downward time trend in ETRs is pervasive across all cross-sections of firms, however we note

the trend for large domestic firms is significantly smaller than the other three subsamples (untabulated).

In Panel A of Table 13, we analyze the time trend for the various components of the ETR reconciliation for four subsamples of firms: large domestic firms, small domestic firms, large MNEs, and small MNEs. We note several key results. First, in Table 9, we do not note a significant VA time-trend effect for MNE firms. However, when we partition the MNE group into large and small firms, we note a significant downward trend in the ETR effect from VAs for the small MNE firms. Second, we note differences in benefits from the research credit across these four groups of firms. Among domestic firms, we note small firms realize increased ETRs benefit from research credits over time, while large firms do not. However, among MNEs, this relationship reverses, and we observe large MNEs garnering greater benefits from research credits over time, while small MNEs are not. Third, small domestic firms do not realize a downward trend in the ETR effect from uncertain tax positions, while the other three groups do. Finally, we observe a downward trend in the ETR effect from DPAD in all four subsamples.

We next consider ETR trends for high and low growth domestic and MNE firms. In untabulated analysis, using Equation (1), across all four subsamples of firms we observe a significant downward trend in ETR. We test ETR decline across the groups and find no significant differences.

In Panel B of Table 13, we analyze the time trend for the various components of the ETR reconciliation for the four high/low growth and MNE/domestic subsamples. First, we note the time trend on the state tax effect is not significant for either high or low growth domestic firms, consistent with the results in Table 4. However, we also note the state tax time trend is only significant for high-growth MNE firms, consistent with firms “growing away from” states, rather

than taking actions to reduce state taxes (such as establishing Delaware holding companies, etc.). In examining the time trend of the international ETR effect, we note that both high- and low-growth MNEs exhibit a significantly negative time trend. When we examine the research credit effect, we note that high-growth domestic firms do not exhibit an increasing time trend for the credit. On the other hand, we note that high growth MNEs exhibit an increasing benefit from the research credit over time. Lastly, we note that the increasing time trend benefit of DPAD is present in high-and low-growth, domestic and MNE firms.

INSERT TABLE 13

## **V. CONCLUSION**

Motivated by the Dyreng et al. (2017) finding that domestic and MNE firms exhibit similar decreasing tax burdens over time, we use a unique dataset of hand-collected tax rate reconciliation disclosures to examine time-series changes in firms' ETRs. Our data provides insight into the frequency, tax rate effect, and dollar benefit/cost of specific reconciling items, as well as how those tax items are distributed between domestic and MNE firms. Additionally, we provide details of the nature of differences between book and tax reporting that gives rise to the declining cash ETRs observed in Dyreng et al. (2017). We expand their study by providing details of the specific sources of decline.

First, we document that for domestic firms, the decline we observe is primarily associated with the frequency and magnitude of VA decreases in our domestic sample relative to VA increases. Our analysis suggests that this is due to including only profitable years in the sample. Specifically, we note that the mean VA ETR effect is essentially negated when loss observations are included. However, since the ETR benefit of valuation allowance releases stems from prior losses, rather than any tax strategy or specific tax benefit, our results suggest that that domestic

firms have not enjoyed similar reductions in tax burdens over our study period compared to MNE firms. For our MNE sample, we expand the findings in Dyreng et al. (2017) and find the decline in ETRs is primarily associated with foreign tax rate differentials and state income tax effects, and that the decline relates to both decreasing foreign tax rates and increases in the percentage of income reported outside the U.S.

The findings in our study are subject to several caveats. First, our data-gathering algorithm captures a significant portion, but not all, of the firm-year observations during our time period. While we lose a portion of the population due to data collection limitations, we suggest our sample is representative of the population of profitable firms. Additionally, we are not able to identify the intent or aggressiveness of any specific transactions, only the amounts reported in the tax rate reconciliation table. Lastly, the time trends we observe in our data may not be tax driven, but result from changes in the underlying firm economics, including changes in recording and releasing valuation allowances.

The Tax Cuts and Jobs Act, passed in 2017, alters the taxation of both domestic and multinational firms; however, the results of our study remain relevant. While the ultimate effects of tax reform are unclear, to the extent firms record and release VAs, observable trends in firms' ETRs will continue to be affected by loss years and sample selection choices. The results of our study suggest that researchers seeking to understand firms' ETRs need to consider the source of rate differences, and a firm's history of profit and loss. Lastly, our unique data offers insight into firms' tax rate differences, and we provide large sample descriptives of firm's ETR reconciling items.

## References

- Ayers, B. C., C. M. Schwab, and S. Utke. 2015. Noncompliance with mandatory disclosure requirements: The magnitude and determinants of undisclosed permanently reinvested earnings. *The Accounting Review* 90 (1):59-93.
- Bauman, C. C., M. P. Bauman, and R. F. Halsey. 2001. Do firms use the deferred tax asset valuation allowance to manage earnings? *Journal of the American Taxation Association* 23 (s-1):27-48.
- Chyhyly, R., D. Falsetta, and S. Ramnath. 2017. Determinants and Consequences of Presentation Format: The Case of ETR Reconciliations: Working paper, University of Miami.
- Chyz, J., L. Luna, and H. Smith. 2016. Implicit Taxes of US Domestic and Multinational Firms Over the Past Quarter-Century: Working paper, University of Tennessee.
- Dyregang, S., M. Hanlon, E. Maydew, and J. Thornock. 2017. Changes in Corporate Effective Tax Rates Over the Past 25 Years. *Journal of Financial Economics* 124 (3):441-463.
- Dyregang, S. D., B. P. Lindsey, and J. R. Thornock. 2013. Exploring the role Delaware plays as a domestic tax haven. *Journal of Financial Economics* 108 (3):751-772.
- Edwards, A., A. Kubata, and T. Shevlin. 2017. The Decreasing Trend in Cash Effective Tax Rates: Working paper, University of California at Irvine.
- Finley, A. R., S. J. Lusch, and K. A. Cook. 2015. The effectiveness of the R&D tax credit: Evidence from the alternative simplified credit. *Journal of the American Taxation Association* 37 (1):157-181.
- Fox, W. F., and L. Luna. 2005. Do limited liability companies explain declining state corporate tax revenues? *Public Finance Review* 33 (6):690-720.
- Gaertner, F., S. K. Laplante, and D. Lynch. 2016. Trends in the Sources of Permanent and Temporary Book-Tax Differences during the Schedule M-3 Era. *National Tax Journal* 69 (4):785-808.
- Graham, J. R., M. Hanlon, T. Shevlin, and N. Shroff. 2013. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review* 89 (3):991-1023.
- Hanlon, M., and S. Heitzman. 2010. A review of tax research. *Journal of Accounting and Economics* 50 (2):127-178.
- Hanlon, M., L. Mills, and J. Slemrod. 2005. An Empirical Examination of Corporate Tax Noncompliance. In *Taxing Corporate Income in the 21st Century*, edited by A. Auerbach, J. R. Hines and J. Slemrod. Cambridge: Cambridge University Press.
- Heider, F., and A. Ljungqvist. 2015. As certain as debt and taxes: Estimating the tax sensitivity of leverage from state tax changes. *Journal of Financial Economics* 118 (3):684-712.
- Lester, R., and R. Rector. 2016. What Companies Use the Domestic Production Activities Deduction. *TaxNotes* 152 (9):1269-1292.
- McGill, G. A., and E. Outslay. 2004. Lost in translation: Detecting tax shelter activity in financial statements. *National Tax Journal*:739-756.
- Mills, L., M. M. Erickson, and E. L. Maydew. 1998. Investments in tax planning. *Journal of the American Taxation Association* 20 (1):1-20.
- Minnick, K., and T. Noga. 2010. Do corporate governance characteristics influence tax management? *Journal of Corporate Finance* 16 (5):703-718.
- Omer, T. C., K. H. Molloy, and D. A. Ziebart. 1993. An investigation of the firm size—effective tax rate relation in the 1980s. *Journal of Accounting, Auditing & Finance* 8 (2):167-182.

- Rego, S. O. 2003. Tax-avoidance activities of US multinational corporations. *Contemporary Accounting Research* 20 (4):805-833.
- Shackelford, D., and J. Slemrod. 1998. The revenue consequences of using formula apportionment to calculate US and foreign-source income: a firm-level analysis. *International Tax and Public Finance* 5 (1):41-59.
- Towery, E. M. 2017. Unintended consequences of linking tax return disclosures to financial reporting for income taxes: Evidence from Schedule UTP. *The Accounting Review* 92 (5):201-226.

## APPENDIX A: Example Tax Rate Reconciliation Disclosure

### THE HERSHEY COMPANY NOTES TO CONSOLIDATED FINANCIAL STATEMENTS December 31, 2012

The following table reconciles the federal statutory income tax rate with our effective income tax rate:

For the years ended December 31,	2012	2011	2010
Federal statutory income tax rate	35.0 %	35.0 %	35.0 %
Increase (reduction) resulting from:			
State income taxes, net of federal income tax benefits	3.2	2.4	2.8
Qualified production income deduction	(2.5)	(2.2)	(2.4)
Business realignment and impairment charges and gain on sale of trademark licensing rights	0.2	(0.1)	1.8
International operations	(0.1)	(0.6)	0.4
Other, net	(0.9)	0.2	(0.6)
Effective income tax rate	<u>34.9 %</u>	<u>34.7 %</u>	<u>37.0 %</u>

Tax rates associated with business realignment and impairment charges increased the effective income tax rate from the federal statutory income tax rate by 0.2 percentage point for 2012. Tax rates associated with business realignment and impairment charges and gain on sale of trademark licensing rights reduced the effective income tax rate from the federal statutory income tax rate by 0.1 percentage point for 2011. Tax rates associated with business realignment and impairment charges increased the effective income tax rate from the federal statutory income tax rate by 1.8 percentage points for 2010. The effect of international operations varied based on the taxable income (loss) of our entities outside of the United States.

## APPENDIX B: Perl Script Data Collection

We begin by downloading all 10-Ks electronically available from the SEC website covering years 1996 through 2015, using a set of Perl scripts developed by Andy Leone. We then develop two sets of Perl scripts to locate and extract the ETR table, one script for plain-text filings (generally present in 2004 and earlier years), and another script for HTML filings (more common in later years). ASC 740 permits firms to report this table in either percentages or dollars, and our program converts all dollar tables into percentages. We extract the data by firm-year.

In order to confirm the accuracy of our data extraction, we compare the total of the Perl generated table (which should be the firm's GAAP ETR for the year) to the same information computed from Compustat data (TXT/PI). For firms that have equity ownership reporting, we compute an alternative measure of Compustat ETR as  $\text{TXT}/(\text{PI}-\text{ESUB})$ . To ensure the integrity of our data, we discard any firm-year observations where our Perl data differs from both Compustat computations by more than 0.10 (i.e., the ETRs differ by more than 0.10 percentage points).<sup>17</sup>

ASC 740 does not prescribe precise location, wording, or presentation format for the ETR reconciliation table. As such, our Perl script is unable to identify and extract the ETR table for every firm. In addition, after identifying the ETR table, there are other challenges to extracting this data successfully. For example, for firms that present dollar-based ETR tables, our script must determine the scale of the dollar amounts presented in the footnote (i.e., whether the

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<sup>17</sup> Due to heterogeneity in how firms report the tax effects of minority interest, we note that it is another reconciling item that may cause a difference between the ETR from the rate reconciliation and the ETR calculated from Compustat. We find that adjusting the ETR calculated from Compustat for minority interest only results in a small increase in sample size.

numbers presented are in thousands, millions, etc.) in order to correctly convert the amounts into percentages.

We summarize the reasons that a firm-year might not be included in the sample as follows:

1. The program is not able to locate the ETR table within the 10-K, based on the search algorithm we developed.
2. The program erroneously identifies a non-tax table as the ETR reconciliation table. In this case, it is very likely we delete this firm-year observation during the data validation process described above.
3. The firm's tax footnote reverses the normal order of the prior and current year columns (i.e., it varies from the traditional process by displaying the prior year on the left, and the current year on the right).
4. The firm presents the ETR footnote in an unusual way (for example, listing each year in a separate ETR reconciliation table, with the earliest year listed first).
5. The firm provides the ETR reconciliation in narrative form only (e.g., "...the only difference between the statutory tax rate and our effective tax rate is result of state income taxes..."). Since this is not in tabular format, our Perl program cannot extract the data.

Overall, our results could be biased if there is a systematic bias in the program's ability to capture the data that is correlated with our variables of interest (time). However, we do not believe that any of these reasons for non-collection pose a significant concern.

## APPENDIX C: ETR Taxonomy

As described in Appendix B, we develop a Perl script to collect detailed information from each firm's ETR reconciliation schedule. We group these individual line items into the categories below. Our discussion is not necessarily all encompassing, but offers some insight into basic book-tax differences that give rise to ETR rate reconciling items.

**Depletion\_Effect** - Under IRC §613, certain firms are allowed depletion deductions for costs associated with natural resources. To the extent that these tax deductions are unrelated to financial statement basis in the underlying mineral rights, excess tax deductions are permanent benefits that reduce the ETR.

**DivReceivedDed\_Effect** - IRC §243 provides a 70 to 100 percent deduction for dividends received from most non-affiliated, domestic corporations, resulting in a permanent difference between book and taxable income.

**InProcessR&D\_Effect** - Prior to SFAS 141R, if a portion of the stock purchase price of an acquired firm is allocated to in-process research and development and the amount was subsequently written off, the financial statement write off does not generate a tax deduction, creating an adverse permanent difference that increases the ETR.

**Intang&GW\_Effect** - Prior to SFAS 142, firms generally capitalized and amortized goodwill for financial statement purposes. If the firm had no tax basis in the goodwill (for example, because the acquisition was structured as an ordinary stock acquisition), this financial statement expense without a corresponding tax deduction would give rise to an adverse permanent difference and appear in the ETR as a positive value. However, after the effective date of SFAS 142, goodwill was no generally longer amortizable for financial statement purposes, so the frequency of this item declines in the ETR reconciliation schedule.

**International\_Effect** – If a firm determines earnings of its foreign subsidiaries operating in jurisdictions where the foreign tax rate is lower than the U.S. statutory tax rate are permanently reinvested under APB 23, these lower foreign rates will result in a favorable decrease in the ETR. However, simply having foreign earnings taxed at lower rates will not, by itself, affect the GAAP ETR.

**LifeIns\_Effect** - Under IRC §101, the proceeds from life insurance proceeds are not taxable, nor are mere increases in cash surrender value amounts.

**M&A\_Effect** – This difference often results from merger and acquisition transaction-related costs that are not deductible for tax purposes.

**ManufDeduction\_Effect** - Under IRC §199 (i.e., DPAD), firms are allowed an incremental tax deduction for a portion of their domestic manufacturing profits. The benefit phases in with a

three percent deduction in 2005, rising to nine percent for years 2010 and later. Since there is no corresponding financial statement expense, firms recognize the benefit of this incremental tax deduction as a reduction in the GAAP ETR.

**Meals&Ent\_Effect** - Under IRC §274(n), only 50 percent of most meal and entertainment costs are deductible; the disallowance of the remainder of these costs results in a permanent difference between book and taxable income.

**MinorityInt\_Effect** - For financial statement purposes, firms may subtract the pretax income associated with minority ownership from pretax income on the face of the income statement. However, if the parent owns at least 80 percent of the stock of a domestic subsidiary, the consolidated tax return generally includes 100 percent of the subsidiary's income, resulting in a permanent difference.

**Miscellaneous\_Effect** - This is a residual category we create to capture infrequent items that are not included in other categories. Examples from the data include adjustments titled "the rate effect of a nondeductible fine from the Environmental Protection Agency," "implied interest on structured note," "book vs. tax bond differences," "non-deductible amortization," "nontaxable income earned," etc.

**MuniInterest\_Effect** - Interest income on municipal bonds is generally not taxable under IRC §103, resulting in a decrease to the ETR.

**NOL\_Effect** – This category captures the permanent ETR effect of net operating losses (NOLs), including NOL carrybacks, expiration of existing NOLs, or limitations on the use of NOLs. Because of the close relationship of this category with the VA\_Effect category, we re-perform our primary analyses by recharacterizing amounts in this category as VA items and find substantially similar results.

**NonDedExp\_Effect** - This category represents rate reconciliation items where the firm uses the terminology "nondeductible expenses." Since they broadly categorize these items into one line item, we cannot see the particular types of nondeductible expenses included for each firm, but it likely contains a collection of various items that are never deductible, such as government fines and penalties, expenses of earning tax-exempt income, etc. We retain firms' terminology and group all non-deductible expense effect items in this category.

**OtherCredits\_Effect** - This category includes a variety of infrequently identified credits such as the low-income housing credit, the orphan drug credit, alternative fuel tax credit, work opportunity credit, FICA tip credits, etc. We specifically exclude the research credit, which is included in a separate category, as well as the foreign tax credit, which is included in the "international" category.

**Other\_Effect** - SEC Regulation S-X, Rule 4-08(h) requires firms to disclose all "significant" items, defined as amounts that are more than five percent of the product of pretax income times the statutory tax rate. Amounts below this level are aggregated into a single category, typically

labelled as “other” by the firm in their rate reconciliation. We have no further data on these items as this is the level of detail disclosed in public filings.

**PermDiff\_Effect** - Similar to the Nondeductible Expenses category, firms use this category as a catch-all for a variety of items that will never be deductible, such as government fines and penalties, or expenses of earning tax exempt income, etc. We retain firms’ terminology and group all permanent difference effect items in this category.

**PYandAudit\_Effect** - This category contains changes in the ETR that arise from tax authority audits, beyond the amounts that were already provided in the financial statements. Amounts may be positive or negative depending on the size of any audit adjustment and whether the firm had reserved for the amount.

**ResearchCredit\_Effect** – IRC §41 provides a credit for incremental research and experimentation spending, resulting in a favorable ETR difference.

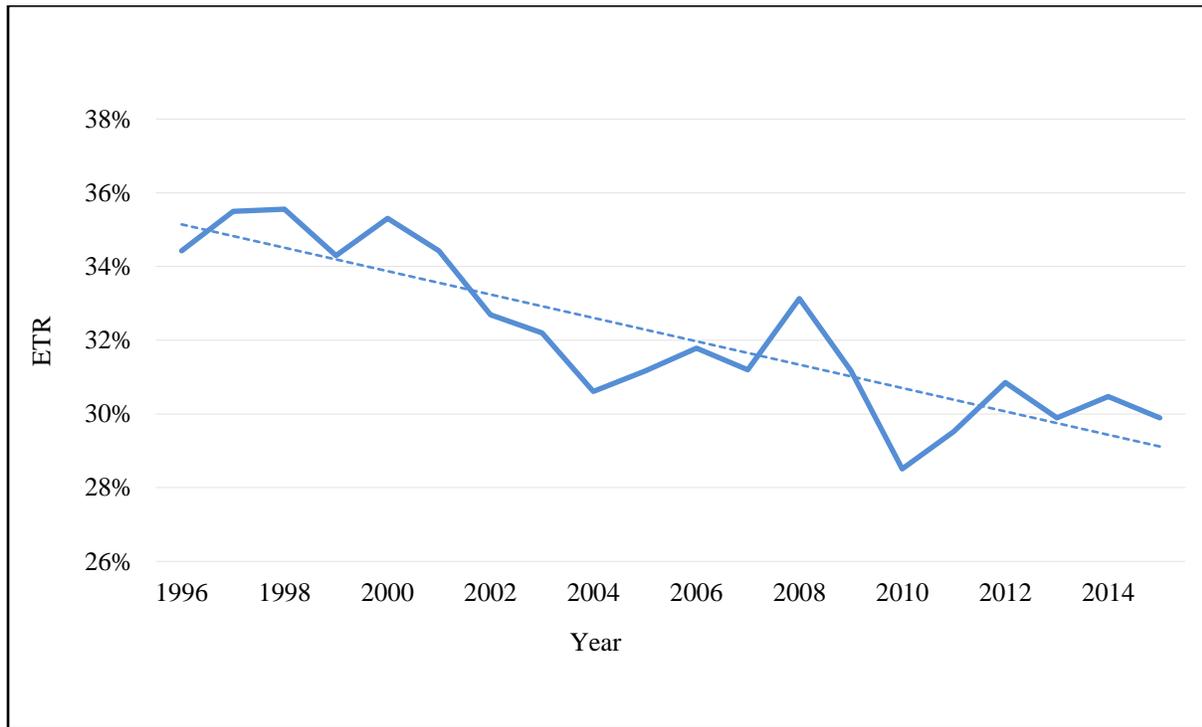
**State\_Effect** - The amount of state income tax effect disclosed in the ETR reconciliation table is often stated net-of-tax (i.e., the state income tax rate appears to be only about  $(1 - 0.35)$  of the average state statutory rate).

**StockOption\_Effect** - Virtually all observations are after the effective date of SFAS 123R, and most represent “shortfalls” in tax benefits associated with stock options. These shortfalls occur when the actual stock option tax benefit at exercise is lower than the tax benefit that was estimated when the stock options were issued. Since excess tax benefits are charged to capital, but shortfalls in tax benefits are charged to tax expense (unless an APIC pool is available), stock options tend to have either no effect or an adverse effect on the ETR.

**UncertTaxPositions\_Effect** - Under FIN 48 (later codified as ASC 740-10-25-6), firms are required to establish a reserve in their financial statements for uncertain tax positions. De-recognizing these benefits can result in an ETR impact, unless the effect is driven solely by potential changes to temporary differences.

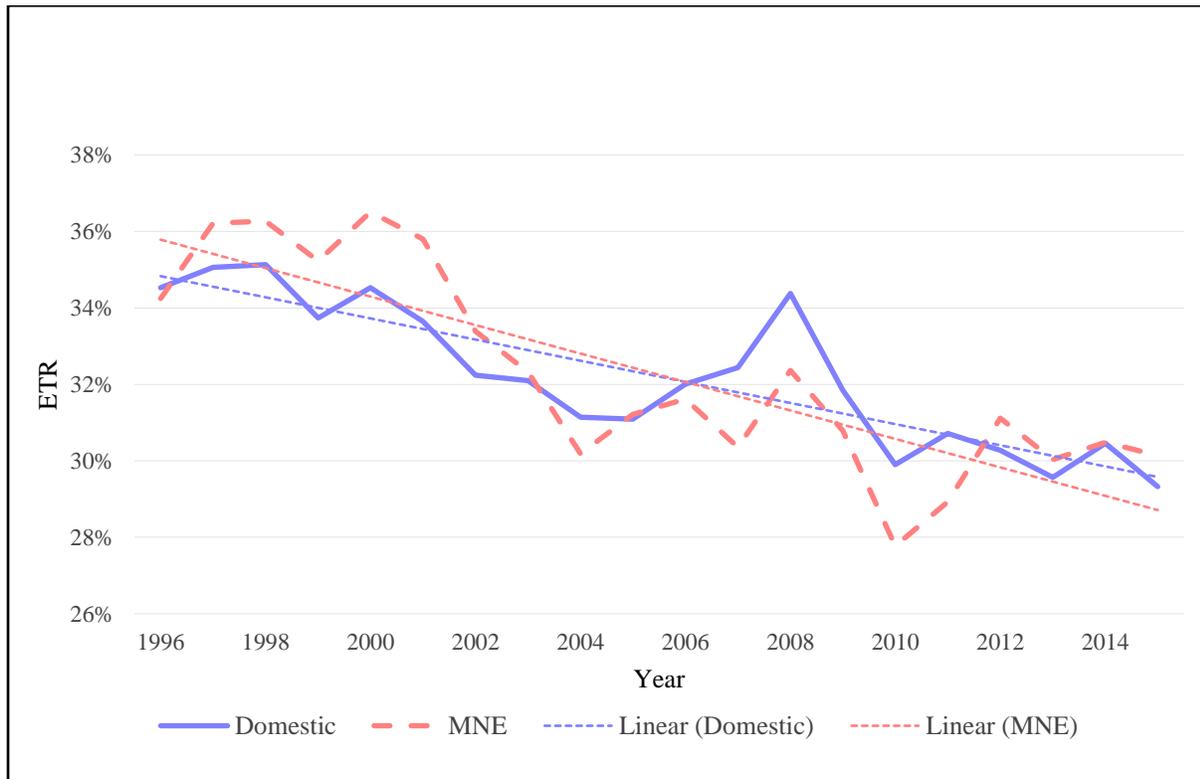
**VA\_Effect** - Under ASC-740-10-30-5(e), when firms establish, increase, or decrease a valuation allowance, the corresponding offset is typically made to deferred tax expense. Thus, changes in valuation allowance amounts will normally impact the ETR reconciliation schedule because they generally impact the GAAP ETR.

**Figure 1 – ETR by Year - All Firms**



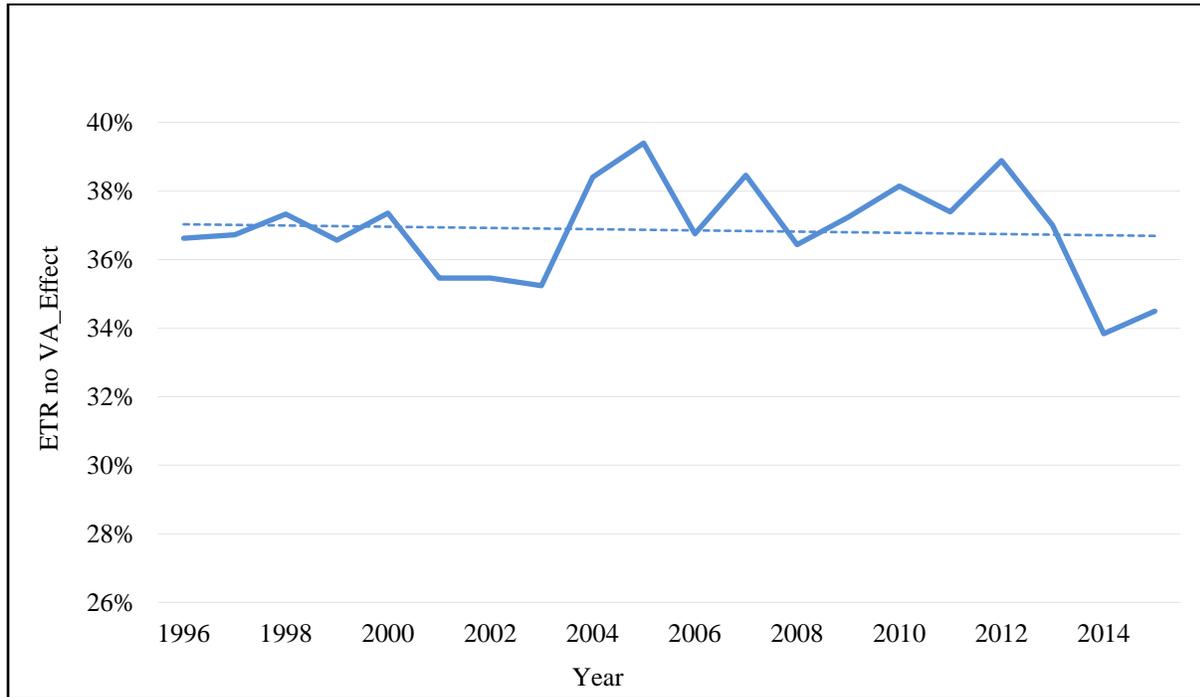
**Notes:** Figure 1 plots the mean ETR by year over the sample period (1996 – 2015). We include a linear trend line for the plot. We outline our sample selection criteria in Table 1.

**Figure 2 – ETR by Year - Domestic and MNE**



**Notes:** Figure 2 plots the mean ETR by year over the sample period (1996 – 2015) separately for MNE and domestic firms. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ). We include a linear trend line for each plot. We outline our sample selection criteria in Table 1.

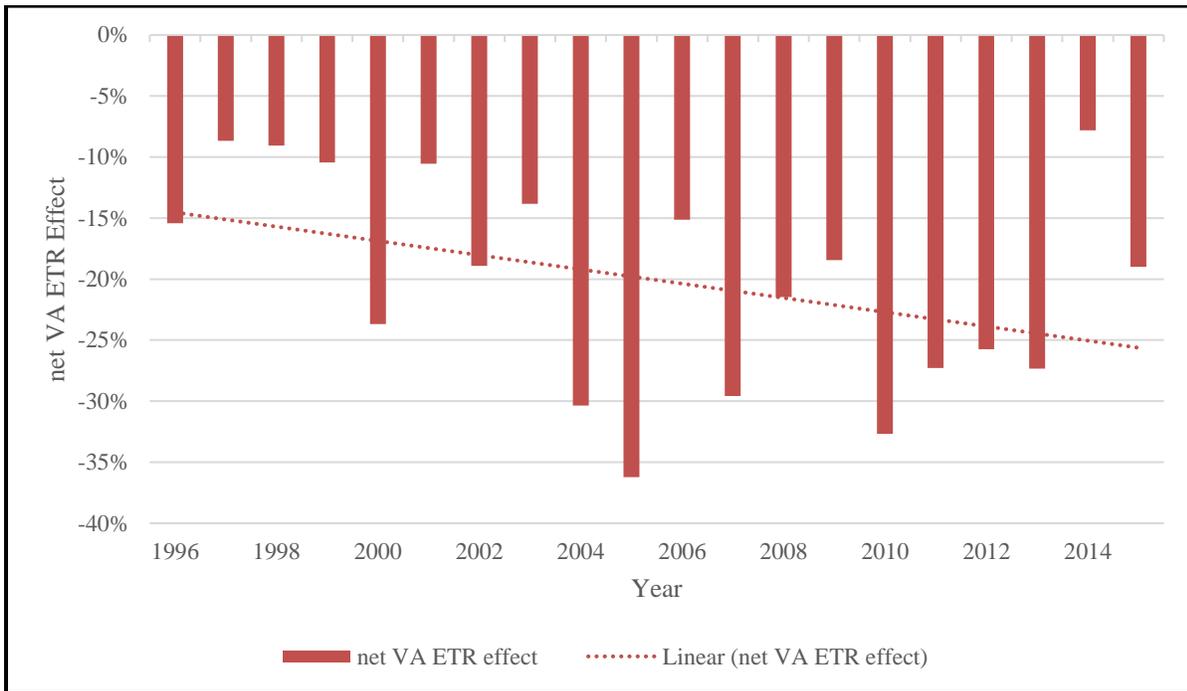
**Figure 3 – ETR Excluding the Effect of Valuation Allowances by Year – Domestic Firms**



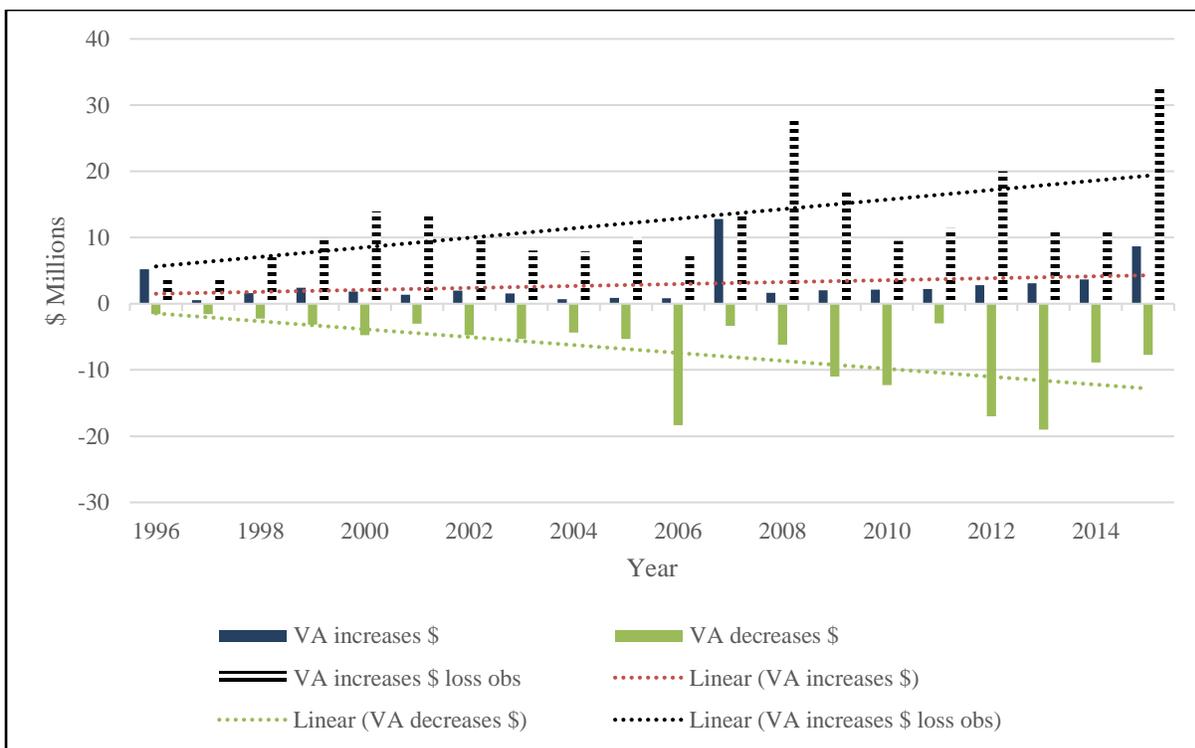
**Notes:** Figure 3 plots the mean ETR excluding the effect of Valuation Allowance (VA\_Effect) by year over the sample period (1996 – 2015) for our sample of domestic firms. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We include a linear trend line. We outline our sample selection criteria in Table 1.

**Figure 4 – VA Trends for Domestic Observations**

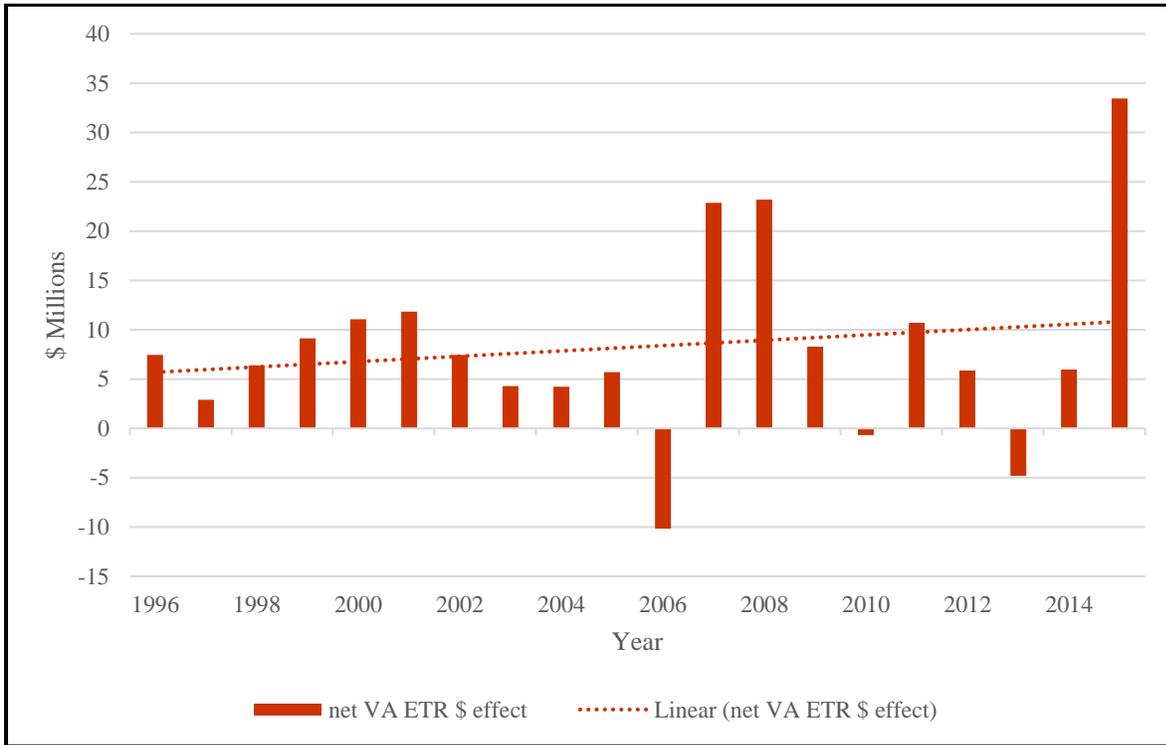
**Panel A – Net VA ETR Effect by Year for Domestic Observations**



**Panel B – Trends in VA Increases and Decreases for Domestic Firms Including Loss Year Observations**

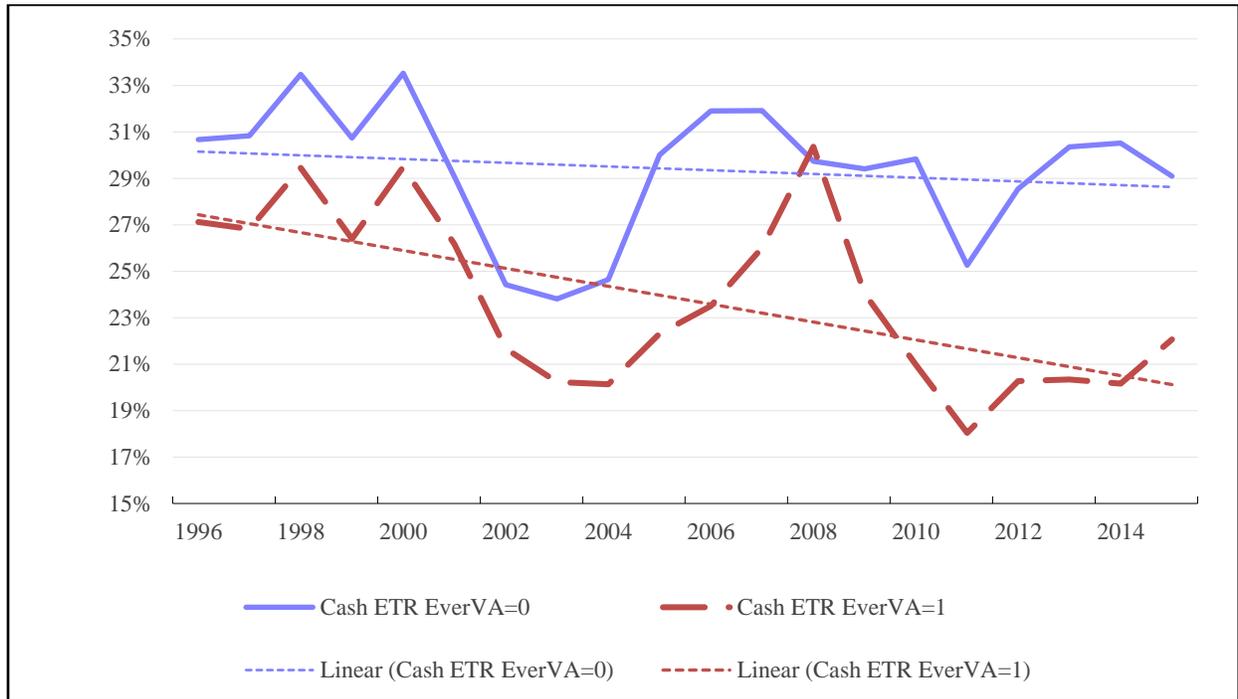


**Panel C – Net VA Dollar Effect by Year for Domestic Firms Including Loss Observations**



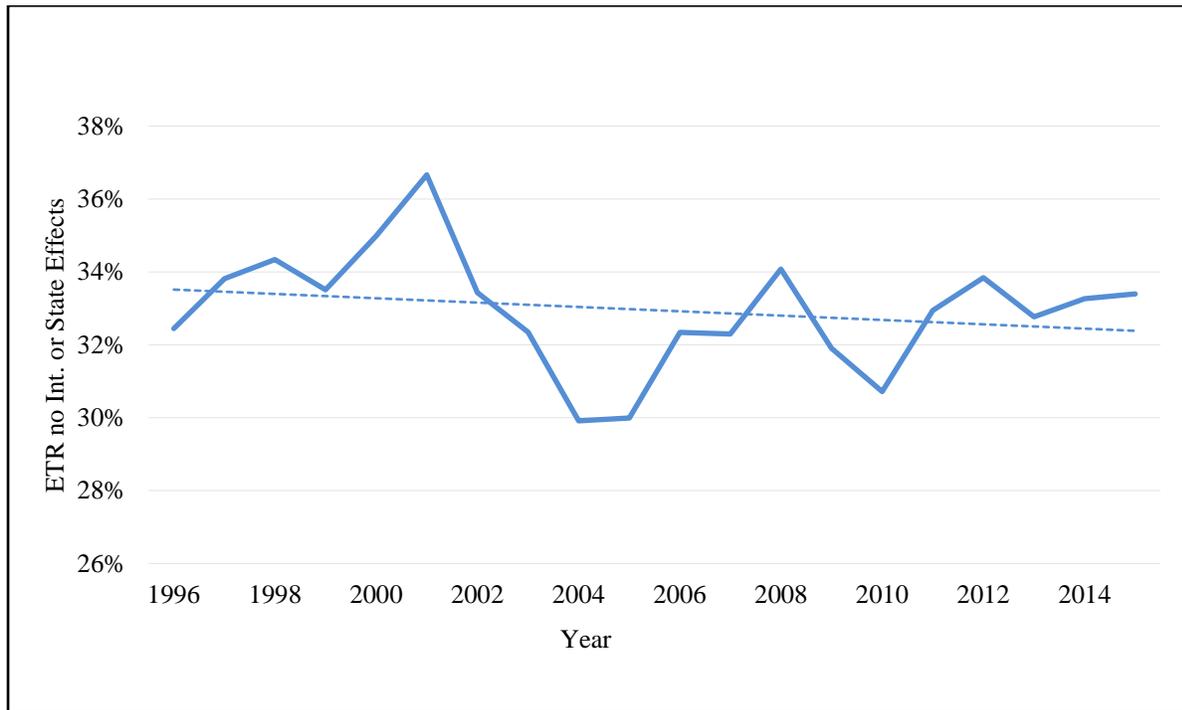
**Notes:** Figure 4 Panel A plots the net VA ETR effect by year for our domestic sample. This figure only includes firms that report a nonzero VA ETR effect in its rate reconciliation in the year. Panel B plots the annual means of VA ETR increases and decreases (in \$ millions) for our domestic sample by year over the sample period (1996 – 2015) for firms that report a VA ETR effect and includes the VA effect from loss observations excluded from the sample. Panel C plots the mean VA effect (in \$ millions) by year over the sample period (1996 – 2015) summing both profit and loss observations. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We include a linear trend line for each plot. We outline our sample selection criteria in Table 1.

**Figure 5 –Cash ETR Results for Domestic Observations – Cash ETR for *EverVA* = 1 and *EverVA* = 0**



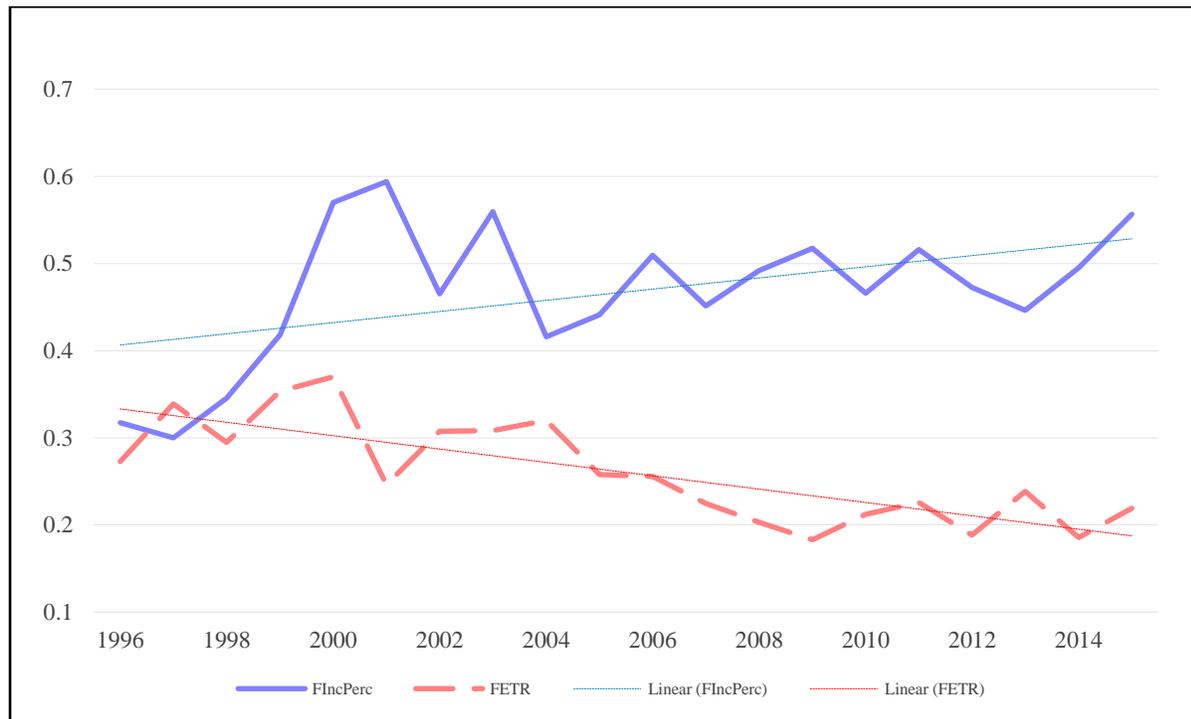
**Notes:** Figure 5 plots mean cash ETR by year for our domestic sample partitioned into firms that ever report a VA ETR adjustment in our sample period (in profit or loss years). *EverVA* equals one if the firm ever reported a VA during the sample period, zero otherwise. We include a linear trend line for each plot. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Figure 6 – ETR Excluding the Effect of International Operations and State Taxes by Year – MNE Firms**



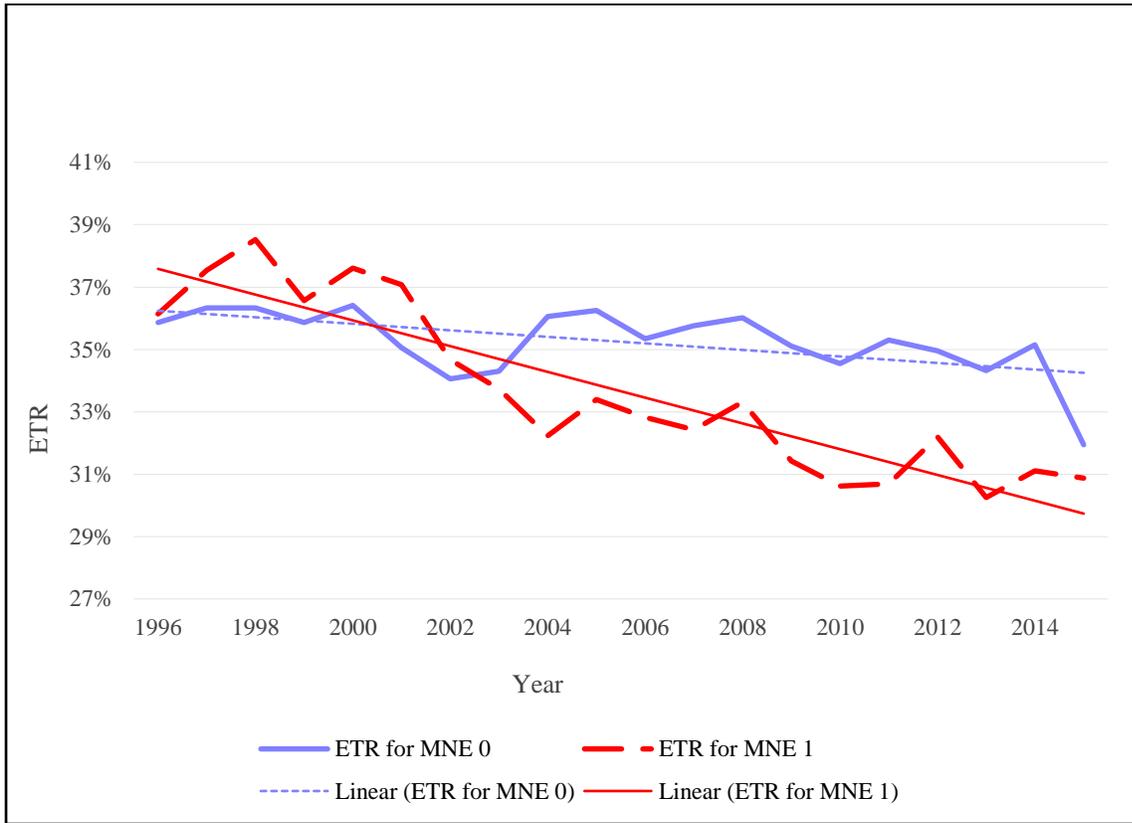
**Notes:** Figure 6 plots the mean ETR excluding the effect of International Operations (International\_Effect) and State income taxes (State\_Effect) by year over the sample period (1996 – 2015) for MNE firms. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We include a linear trend line. We outline our sample selection criteria in Table 1.

**Figure 7 – Partitioning the International ETR Effect into Foreign Tax Rate Differences and Percentage of International Income Differences – MNE Firms**



**Notes:** Figure 7 plots the annual means of foreign ETRs and percentage foreign income for our MNE sample by year over the sample period (1996 – 2015). We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We measure FIncPerc as the ratio of foreign income to total income ( $PIFO/PI$ ) and FETR as foreign tax expense divided by foreign pretax income. We include a linear trend line for each plot. We outline our sample selection criteria in Table 1.

**Figure 8 - Excluding VA Effects for Both MNE and Domestic Firms**



**Notes:** Figure 8 plots the mean ETR excluding the effect of VA ETR effect by year over the sample period (1996 – 2015) for our both domestic and MNE firms. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We include a linear trend line for each plot. We outline our sample selection criteria in Table 1.

**Table 1 – Sample Selection**

<b>Criteria</b>	<b>Observations</b>
All Compustat Observations from 1996 to 2015	195,223
Less: Observations with AT < \$10 million	(29,869)
Less: Observations with a current year loss (PI < \$0)	(56,515)
<u>Less: Utilities and Financials (SIC = 4800-4999; 6000-6999)</u>	<u>(45,261)</u>
Sample for Perl extraction (Appendix B)	63,578
Less: Unable to extract rate reconciliation table	(26,220)
<u>Less: Unable to verify rate reconciliation ETR with Compustat</u>	<u>(13,879)</u>
Full Sample	23,479
Less: MNE observations (PIFO > 0, or  TXFO  > 0, following Dyreng et al. (2017).	12,367
Domestic sample	11,112

**Notes:** Table 1 outlines our sample selection criteria. See Appendix B for details of the Perl Extraction technique.

**Table 2 – Descriptive Statistics Domestic Observations n = 11,112**

	ETR_Effect			Dollar_Effect (\$ millions)	
	Mean	% ≠ 0	Mean, ≠ 0 obs.	Mean	Mean, ≠ 0 obs.
ETR	32.728				
State_Effect	3.0536	86.03%	3.5494	2.8065	3.2621
VA_Effect	-4.1041	19.61%	-20.929	-0.9710	-4.9515
Miscellaneous_Effect	-0.2540	22.23%	-1.1429	-0.3439	-1.5470
MuniInterest_Effect	-0.7388	16.35%	-4.5183	-0.1241	-0.7592
ResearchCredit_Effect	-0.3067	5.80%	-5.2912	-0.1201	-2.0728
International_Effect	-0.1869	8.47%	-2.2070	-0.2969	-3.5059
StockOption_Effect	0.2198	7.23%	3.0422	-0.0311	-0.4303
Other_Effect	0.2391	80.28%	0.2979	-0.0814	-0.1014
UncertTaxPositions_Effect	-0.0664	4.48%	-1.4819	-0.0658	-1.4680
ManufDeduction_Effect	-0.1307	5.19%	-2.5167	-0.1751	-3.3721
PermDiff_Effect	0.2467	10.48%	2.3552	0.0005	0.0050
PYandAudit_Effect	-0.1829	6.97%	-2.6221	-0.2210	-3.1681
OtherCredits_Effect	-0.8204	12.87%	-6.3750	-0.2530	-1.9660
MinorityInt_Effect	-0.0601	1.66%	-3.6074	-0.1293	-7.7666
InProcesR&D_Effect	-0.0249	0.39%	-6.4307	-0.1683	-43.482
LifeIns_Effect	-0.1106	3.90%	-2.8370	-0.0184	-0.4725
Meals&Ent_Effect	0.0893	3.77%	2.3689	0.0389	1.0303
DivReceivedDec_Effect	-0.0679	1.81%	-3.7517	-0.0071	-0.3952
NOL_Effect	-0.4996	3.19%	-15.681	-0.0566	-1.7770
Depletion_Effect	-0.2176	2.49%	-8.7295	-0.0954	-3.8274
NonDedExp_Effect	0.2481	7.71%	3.2167	0.0326	0.4229
M&A_Effect	0.0442	1.75%	2.5175	-0.0148	-0.8413
Intang&GW_Effect	0.5383	9.12%	5.9050	0.2029	2.2254

**Notes:** Table 2 presents descriptive statistics. We present the mean ETR effect, the percentage of non-zero observations, and the mean ETR effect of non-zero observations, and the mean dollars (in \$ millions), and the mean dollars of the non-zero observations for our sample of domestic observations. We measure the dollar effect using the ETR rate effect \* PI. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 3 – ETR Time Trends Domestic and MNE Samples**

	Pred.	(i) Domestic		(ii) MNE	
		Coeff.	t-stat	Coeff.	t-stat
Intercept	+	34.907	(152.50)***	35.038	(166.09)***
Time	-	-0.2879	(-11.82)***	-0.3599	(-14.04)***
N		11,112		12,367	
Adj. R squared		0.012		0.016	

$\chi^2: \text{Time}_{\text{MNE}} \neq \text{Time}_{\text{Domestic}} = 4.15^{**}$

**Notes:** Table 3 presents the results of estimating Equation (1) for domestic firms in column (i), and MNE firms in column (ii). We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero (PIFO > 0), or if the absolute value of foreign tax expense is greater than zero ( $|\text{TXFO}| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 4 – ETR Time Trends in ETR Components – Domestic Sample**

	Domestic (n=11,112)			
	Coeff. Intercept	t-stat	Coeff. Time	t-stat
State_Effect	3.1076	(34.62)***	-0.0071	(-0.62)
VA_Effect	-1.9070	(-7.84)***	-0.2902	(-8.69)***
Miscellaneous_Effect	-0.0337	(-0.27)	-0.0291	(-1.75)*
MuniInterest_Effect	-1.2044	(-18.70)***	0.0615	(11.48)***
ResearchCredit_Effect	-0.0285	(-0.57)	-0.0368	(-5.04)***
International_Effect	-0.1313	(-1.93)*	-0.0073	(-0.91)
StockOption_Effect	-0.1053	(-2.05)**	0.0430	(5.88)***
Other_Effect	0.1938	(2.15)**	0.0060	(0.64)
UncertTaxPositions_Effect	-0.0162	(-0.47)	-0.0066	(-0.92)
ManufDeduction_Effect	0.1147	(6.36)***	-0.0324	(-7.69)***
PermDiff_Effect	0.0872	(1.69)*	0.0211	(2.48)**
PYandAudit_Effect	-0.2112	(-3.02)***	0.0037	(0.39)
OtherCredits_Effect	-0.4177	(-5.31)***	-0.0532	(-4.68)***

**Notes:** Table 4 presents the results of estimating Equation (2) examining time trends in various ETR reconciliation components on our sample of domestic observations. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 5 –Time Trend of ETR Less VA\_Effect – Domestic Sample**

	Pred.	Coeff.	t-stat
Intercept	+	36.815	(161.22)***
Time	-	0.0023	(0.08)
N		11,112	
Adj. R squared		-0.0001	

**Notes:** Table 5 presents the results of estimating Equation (1) using ETR excluding VA\_Effect reconciling items as the dependent variable. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero (PIFO > 0), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 6 – Examining the Source of VA ETR Effect – Domestic Sample****Panel A**

	N	Total Dollar Effect (millions)	Mean dollar effect (millions)
VA Increases	603	\$1,947	\$3.22
VA Decreases	1,576	\$12,737	\$8.08

**Panel B**

Number of loss years in t-4 to t-1	N	% of Total	Mean ETR	Mean VA_Effect
0	4,222	66.30%	35.4668	-0.5842
1	1,080	16.96%	32.5009	-4.3388
2	594	9.33%	26.5544	-13.4171
3	304	4.77%	18.9188	-26.7012
4	168	2.64%	10.3376	-28.9689

**Notes:** Table 6 Panel A presents number of observations, the total and the mean of the VA increases and releases for our sample of domestic observations. Only observations with at least five -years of consecutive data are included, thus the full sample is 15,721 observations, of which 6,368 firm-year observations are domestic. Of those 6,368 firm-year observations, 2,179 include a ETR reconciling item related to VA. In Panel B we present the number of observations with losses in the prior years (one, through four), the ETR and VA ETR effect. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

## Table 7 Non-VA Domestic Observations

### Panel A - Time Trend of Non-VA Domestic Observations

	Pred.	Coeff.	t-stat
Intercept	+	36.1478	(199.09)***
Time	-	-0.0981	(-4.44)***
<hr/>			
N		8,933	
Adj. R squared		0.0024	

### Panel B – Time Trend of Non-VA Domestic Observations Excluding DPAD and Research Credit Effects

	Pred.	Coeff.	t-stat
Intercept	+	36.0678	(196.96)***
Time	-	-0.0334	(-1.43)
<hr/>			
N		8,933	
Adj. R squared		0.0002	

**Notes:** Table 7 presents the results of estimating Equation (1) on a sample of domestic observations that do not report a VA ETR reconciling item. In Panel A we present the main results, and in Panel B we present the results excluding the ETR effects of DPAD and research credits. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 8 – Descriptive Statistics MNE Observations n = 12,367**

	ETR_Effect			Dollar_Effect (\$ millions)	
	Mean	% ≠ 0	Mean, ≠ 0 obs.	Mean	Mean, ≠ 0 obs.
ETR	31.815				
State_Effect	1.9824	90.45%	2.1917	31.815	6.5077
VA_Effect	-2.2909	35.14%	-6.5191	1.9824	-3.0672
Miscellaneous_Effect	0.0154	31.72%	0.0485	-2.2909	-9.0472
MuniInterest_Effect	-0.2073	6.58%	-3.1496	0.0154	-6.8247
ResearchCredit_Effect	-0.7868	17.60%	-4.4697	-0.2073	-4.4684
International_Effect	-2.9790	76.83%	-3.8772	-0.7868	-25.456
StockOption_Effect	0.6407	13.71%	4.6750	-2.9790	3.0413
Other_Effect	0.2482	85.76%	0.2894	0.6407	-2.8677
UncertTaxPositions_Effect	-0.2674	15.95%	-1.6769	0.2482	0.2912
ManufDeduction_Effect	-0.2934	12.69%	-2.3122	-0.2674	-11.987
PermDiff_Effect	0.3481	12.36%	2.8159	-0.2934	1.2094
PYandAudit_Effect	-0.3587	15.62%	-2.2963	0.3481	-7.5563
OtherCredits_Effect	-0.9678	17.32%	-5.5879	-0.3587	-10.088
MinorityInt_Effect	-0.0738	3.01%	-2.4545	-0.9678	-31.270
InProcesR&D_Effect	0.1515	1.16%	13.009	-0.0738	-6.0524
LifeIns_Effect	-0.0191	1.63%	-1.1682	0.1515	-1.0948
Meals&Ent_Effect	0.1126	3.15%	3.5692	-0.0191	0.5832
DivReceivedDec_Effect	0.0034	0.71%	0.4731	0.1126	-56.481
NOL_Effect	-0.1442	3.55%	-4.061	0.0034	-2.9887
Depletion_Effect	-0.1313	1.29%	-10.216	-0.1442	-26.890
NonDedExp_Effect	0.2951	8.36%	3.5296	-0.1313	2.1540
M&A_Effect	0.1897	3.91%	4.8470	0.2951	-7.3089
Intang&GW_Effect	0.7049	9.56%	7.3749	0.1897	12.714

**Notes:** Table 8 presents descriptive statistics for our MNE sample of firms. We present the mean ETR effect, the percentage of non-zero observations, and the mean ETR effect of non-zero observations, and the mean dollars (in \$ millions), and the mean dollars of the non-zero observations. We measure the dollar effect using the ETR rate effect \* PI. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero (PIFO > 0), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 9 – ETR Time Trends in ETR Components – MNE Sample**

	MNE: n=12,367			
	Coeff. Intercept	t-stat	Coeff. Time	t-stat
State_Effect	2.4888	(20.48)***	-0.0481	(-4.33)***
VA_Effect	-2.3750	(-8.16)***	0.0080	(0.29)
Miscellaneous_Effect	-0.0306	(-0.15)	0.0044	(0.24)
MuniInterest_Effect	-0.3855	(-6.79)***	0.0169	(4.06)***
ResearchCredit_Effect	-0.3086	(-3.36)***	-0.0454	(-5.35)***
International_Effect	-0.1227	(-0.54)	-0.2714	(-12.47)***
StockOption_Effect	-0.0931	(-1.59)	0.0697	(9.98)***
Other_Effect	0.5359	(4.89)***	-0.0273	(-2.86)***
UncertTaxPositions_Effect	0.0134	(0.19)	-0.0267	(-2.75)***
ManufDeduction_Effect	0.1957	(10.91)***	-0.0465	(-14.82)***
PermDiff_Effect	0.1454	(1.89)*	0.0193	(2.30)**
PYandAudit_Effect	-0.3963	(-3.76)***	0.0036	(0.36)
OtherCredits_Effect	-0.3831	(-4.20)***	-0.0556	(-6.00)***

**Notes:** Table 9 presents the results of estimating Equation (2) examining time trends in various ETR reconciliation components on the sample of MNE firms. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero (PIFO > 0), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 10 –Time Trends in ETR Less International\_Effect and State\_Effect – MNE Sample**

	Pred.	MNE	
		Coeff.	t-stat
Intercept	+	33.236	(100.10)***
Time	-	-0.040	(-1.36)
N		12,367	
Adj. R squared		0.0001	

**Notes:** Table 10 presents the results of estimating Equation (1) using ETR excluding the International\_Effect and State\_Effect reconciling items as the dependent variable on our sample of MNE observations. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 11 – Time trends of Percent Foreign Income and Foreign ETR Components**

Dependent Variable = ETR

	Pred.	Coeff.	t-stat
Intercept	+	0.4529	(0.75)
Time	-	-0.1720	(-2.83)***
FIncPerc		-2.8447	(-1.90)*
FETR		1.1678	(2.30)***
FIncPerc*Time		-0.2314	(-1.67)*
FETR*Time		0.0932	(1.72)
<hr/>			
N		8,927	
Adj. R squared		0.0926	

**Notes:** Table 11 presents the results of estimating Equation (1) on the sample of MNE firms, interacting a firm's foreign income percent and foreign effective tax rate with the *Time* variable. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero ( $PIFO > 0$ ), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We measure FIncPerc as the ratio of foreign income to total income ( $PIFO/PI$ ) and FETR as foreign tax expense divided by foreign pretax income. We outline our sample selection criteria in Table 1.

**Table 12 Time Trend of ETR Less VA\_Effect**

	Pred.	(ii) MNE=1	
		Coeff.	t-stat
Intercept	+	37.978	(121.00)***
Time	-	-0.3679	(-12.76)***
N		12,367	
Adj. R squared		0.0115	

**Notes:** Table 12 presents the results of estimating Equation (1) testing time trend regressions using ETR excluding VA\_Effect reconciling items as the dependent variable on our sample of MNE firms. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero (PIFO > 0), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.

**Table 13 – ETR Time trends – Cross-sectional Analysis**

**Panel A: ETR Component Time Trends for Large and Small Firms – Domestic and MNE**

	<b>(i) Large Domestic (n=1,414)</b>				<b>(ii) Small Domestic (n=4,055)</b>			
	<b>Coeff. Intercept</b>	<b>t-stat</b>	<b>Coeff. Time</b>	<b>t-stat</b>	<b>Coeff. Intercept</b>	<b>t-stat</b>	<b>Coeff. Time</b>	<b>t-stat</b>
State_Effect	2.1420	(7.27)***	0.0117	(0.37)	3.5441	(20.91)***	0.0057	(0.26)
VA_Effect	0.2818	(0.75)	-0.2230	(-3.58)***	-4.0185	(-7.95)***	-0.5398	(-7.42)***
Miscellaneous_Effect	0.4278	(1.47)	-0.0897	(-2.39)**	-0.061	(-0.25)	-0.0175	(-0.54)
MuniInterest_Effect	-1.5489	(-8.87)***	0.0962	(8.41)***	-0.3735	(-4.09)***	0.0172	(2.17)**
ResearchCredit_Effect	-0.0215	(-0.69)	-0.0082	(-1.14)	-0.0877	(-0.77)	-0.0620	(-3.97)***
International_Effect	0.3844	(1.53)	-0.0766	(-2.65)***	-0.1637	(-1.48)	-0.0069	(-0.57)
StockOption_Effect	-0.0265	(-0.36)	0.0188	(1.26)	-0.1592	(-1.72)*	0.0658	(4.91)***
Other_Effect	-0.4174	(-1.64)	0.0530	(2.20)**	0.3744	(2.09)**	0.0095	(0.46)
UncertTaxPositions_Effect	0.0939	(1.19)	-0.0323	(-1.97)**	-0.0872	(-1.31)	0.0085	(0.58)
ManufDeduction_Effect	0.1027	(4.48)***	-0.0296	(-4.75)***	0.0483	(2.19)**	-0.0157	(-2.99)***
PermDiff_Effect	0.0383	(1.39)	-0.0100	(-1.09)	0.1592	(1.50)	0.0603	(3.55)***
PYandAudit_Effect	-0.5485	(-2.53)**	0.0194	(1.39)	-0.2366	(-1.60)	0.0084	(0.41)
OtherCredits_Effect	-1.2049	(-3.44)***	0.0499	(1.90)*	-0.239	(-2.09)**	-0.0811	(-3.93)***

**Table 13 – ETR Time trends – Cross-sectional Analysis (continued)**  
**Panel A: ETR Component Time Trends for Large and Small Firms – Domestic and MNE (continued)**

	<b>(iii) Large MNE (n=4,455)</b>				<b>(iv) Small MNE (n=1,815)</b>			
	<b>Coeff. Intercept</b>	<b>t-stat</b>	<b>Coeff. Time</b>	<b>t-stat</b>	<b>Coeff. Intercept</b>	<b>t-stat</b>	<b>Coeff. Time</b>	<b>t-stat</b>
State_Effect	1.9060	(10.81)***	-0.0334	(-2.17)**	2.8512	(11.98)***	-0.0673	(-1.95)*
VA_Effect	0.0218	(0.06)	-0.0040	(-0.13)	-4.4519	(-4.93)***	-0.4685	(-3.77)***
Miscellaneous_Effect	0.3926	(1.15)	-0.0479	(-1.78)*	-0.5669	(-1.21)	0.1181	(1.97)**
MuniInterest_Effect	-0.3029	(-4.05)***	0.0132	(2.18)**	-0.3450	(-3.32)***	0.0045	(0.37)
ResearchCredit_Effect	0.0126	(0.07)	-0.0296	(-2.44)**	-0.8007	(-2.95)***	-0.0510	(-1.56)
International_Effect	-0.6461	(-1.59)	-0.3380	(-10.16)***	0.0945	(0.18)	-0.1922	(-2.82)***
StockOption_Effect	-0.0693	(-0.89)	0.0389	(5.51)***	0.0359	(0.19)	0.0871	(3.08)***
Other_Effect	-0.0635	(-0.50)	0.0003	(0.02)	1.1856	(3.62)***	-0.0159	(-0.46)
UncertTaxPositions_Effect	0.2332	(2.12)**	-0.0404	(-2.86)***	0.1293	(0.62)	-0.0776	(-1.96)**
ManufDeduction_Effect	0.2355	(5.53)***	-0.0498	(-8.14)***	0.0506	(4.74)***	-0.0166	(-6.80)***
PermDiff_Effect	0.0249	(0.49)	0.0099	(1.64)	0.2880	(1.17)	0.0459	(1.56)
PYandAudit_Effect	-0.8956	(-4.12)***	0.0386	(2.38)**	-0.0682	(-0.25)	0.0258	(0.70)
OtherCredits_Effect	-0.2750	(-1.82)*	-0.0529	(-3.60)***	-0.4549	(-2.54)***	-0.0542	(-2.22)**

**Table 13 – ETR Time trends – Cross-sectional Analysis (continued)**

**Panel B: ETR Component Time Trends for High and Low Growth Firms – Domestic and MNE**

	<b>(i) High growth Domestic (n=2,166)</b>				<b>(ii) Low growth Domestic (n=4,414)</b>			
	<b>Coeff. Intercept</b>	<b>t-stat</b>	<b>Coeff. Time</b>	<b>t-stat</b>	<b>Coeff. Intercept</b>	<b>t-stat</b>	<b>Coeff. Time</b>	<b>t-stat</b>
State_Effect	3.2181	(11.61)***	-0.0188	(-0.73)	2.9090	(22.15)***	0.0258	(1.15)
VA_Effect	-5.0379	(-7.03)***	-0.1469	(-1.94)*	-0.8320	(-2.51)**	-0.3085	(-5.27)***
Miscellaneous_Effect	-0.0959	(-0.29)	-0.0201	(-0.55)	0.0373	(0.19)	-0.0066	(-0.21)
MuniInterest_Effect	-0.2049	(-2.99)***	0.0085	(1.59)	-2.0017	(-15.58)***	0.0758	(5.26)***
ResearchCredit_Effect	-0.3158	(-1.26)	-0.0341	(-1.47)	0.0302	(0.80)	-0.0243	(-2.60)***
International_Effect	-0.0028	(-0.01)	0.0110	(0.55)	-0.0508	(-0.59)	-0.0294	(-1.94)*
StockOption_Effect	-0.4633	(-2.70)***	0.0865	(4.14)***	-0.0252	(-0.30)	0.0461	(2.98)***
Other_Effect	-0.0194	(-0.06)	0.0215	(0.81)	0.1763	(1.36)	0.0317	(1.68)*
UncertTaxPositions_Effect	-0.0680	(-0.92)	0.0159	(1.15)	0.0872	(1.70)*	-0.0288	(-2.08)**
ManufDeduction_Effect	0.0898	(2.27)**	-0.0271	(-3.93)***	0.0850	(4.60)***	-0.0236	(-4.67)***
PermDiff_Effect	0.0969	(0.62)	0.0224	(1.21)	-0.0007	(-0.01)	0.0423	(3.56)***
PYandAudit_Effect	0.0958	(0.74)	-0.0274	(-1.68)*	-0.1187	(-1.36)	-0.0064	(-0.49)
OtherCredits_Effect	-0.2494	(-1.09)	-0.0503	(-1.73)*	-0.5546	(-4.22)***	-0.0554	(-2.57)**

**Table 13 – ETR Time trends – Cross-sectional Analysis (continued)**

**Panel B: ETR Component Time Trends for High and Low Growth Firms – Domestic and MNE (continued)**

	(iii) High growth MNE (n=3,509)				(iv) Low growth MNE (n=2,040)			
	Coeff. Intercept	t-stat	Coeff. Time	t-stat	Coeff. Intercept	t-stat	Coeff. Time	t-stat
State_Effect	2.3770	(10.60)***	-0.0368	(-1.90)*	2.6248	(6.89)***	-0.0439	(-1.21)
VA_Effect	-3.5445	(-6.81)***	0.0045	(0.10)	-1.6529	(-1.90)*	0.0183	(0.20)
Miscellaneous_Effect	-0.3728	(-1.04)	0.0246	(0.82)	0.2962	(0.45)	0.0036	(0.06)
MuniInterest_Effect	-0.6134	(-4.94)***	0.0333	(3.98)***	-0.1780	(-1.08)	-0.0029	(-0.23)
ResearchCredit_Effect	-0.5344	(-2.43)**	-0.0540	(-2.68)***	-0.3765	(-1.86)	-0.0257	(-1.28)
International_Effect	-0.2992	(-0.85)	-0.2859	(-8.59)***	-0.3038	(-0.42)	-0.1658	(-2.45)**
StockOption_Effect	0.0890	(0.57)	0.0783	(4.95)***	-0.1440	(-3.01)***	0.0566	(5.77)***
Other_Effect	0.5633	(3.87)***	-0.0243	(-2.12)**	0.7874	(2.26)**	-0.0271	(-0.89)
UncertTaxPositions_Effect	-0.0348	(-0.50)	-0.0046	(-0.41)	0.0446	(0.23)	-0.0416	(-1.24)
ManufDeduction_Effect	0.1621	(8.88)***	-0.0426	(-17.85)***	0.2180	(3.98)***	-0.0504	(-4.71)
PermDiff_Effect	0.0281	(0.31)	0.0188	(1.48)	0.4484	(1.57)	0.0163	(0.55)
PYandAudit_Effect	-0.2654	(-2.39)**	0.0065	(0.51)	-0.4853	(-1.24)	0.0113	(0.31)
OtherCredits_Effect	-0.3971	(-2.17)**	-0.0565	(-2.99)***	-0.2088	(-0.97)	-0.0952	(-3.81)

**Notes:** Table 13 presents the results of estimating Equation (2) for two groups of 2x2 subsamples: Big/Small x MNE/Domestic and High Growth/Low Growth x MNE/Domestic. Panel A presents the results of estimating Equation (2) with the sample partitioned on size, column (i) includes large domestic firms, column (ii) includes small domestic firms, column (iii) includes large MNEs, and column (iv) includes small MNEs. Panel C presents the results of estimating Equation (2) with the sample partitioned on growth, column (i) includes high growth domestic firms, column (ii) includes low growth domestic firms, column (iii) includes high growth MNEs, and column (iv) includes low growth MNEs. We define MNE following Dyreng et al. (2017) as current year pretax foreign income greater than zero (PIFO > 0), or if the absolute value of foreign tax expense is greater than zero ( $|TXFO| > 0$ ), firm-year observations not meeting the definition of MNE are considered to be domestic. We outline our sample selection criteria in Table 1.