Pain at the pump: excise tax and real activities manipulation

Abstract

This study investigates the use of earnings management in response to the threat of political costs exploiting the excise taxes setting. Using oil firms' quarterly data in the 2002-2007 period, we investigate whether companies engage in manipulation in response to the political threat of an increase in the fuel excise tax. By focusing on the political debate surrounding the financial sustainability of the Highway Trust Fund, our research design identifies a setting in which the threat of political costs is not necessarily mitigated by the standard strategy of orchestrating the appearance of lower profits. We find that, while posing a threat to the firm's value, political costs related to the excise tax do not immediately affect the profits and can be mitigated *per se* only through real activities manipulation. This paper contributes to prior political cost hypothesis by focusing on an economic setting previously unexplored. Moreover, it shows that lowering profits is not always the best strategy and companies' response depend on different incentives. Furthermore, our shock is random and exogenous because oil companies cannot influence the financial need of the Highway Trust Fund. Our results are robust to multiple placebo tests and different populations.

Keywords: earnings management, excise tax, political cost

JEL codes : M41**,** M48, L92

1. Introduction

Political costs are government-imposed transfers of wealth from the private sector (Watts, 1978). The prediction of the political cost hypothesis is that firms exploit discretion in accounting choices to show lower profits in response in response to an increase in the threat of political costs, such as adverse regulatory or antitrust actions, tightened surveillance, taxes, tariffs, or subsidies (Watts and Zimmerman, 1978, 1986).

Prior research investigates how firms respond to an increase in the political cost providing empirical evidence supporting the political cost hypothesis. This research aims at extending the political cost hypothesis literature to the excise tax collecting firms setting by examining whether firms use earnings management to avoid excise tax related political costs. We exploit the discussion in 2005 in the US regarding the increase of the federal fuel tax excise[1] to financially sustain the Highway Trust Fund. There is an earmarking on the fuel excise tax, making it the primary source of revenues dedicated to the Highway Trust Fund (JCX-92-15).

The US Congressional Research Service estimates that excise tax gathered between 2000 and 2019 in the US is about to 1.7 trillion $, with an average 85 billion $ per year, providing on average about the 3.5% of the total federal tax receipts every year (CSR Report, 2021). On the one hand, for tax collecting firms, excise taxes provide a strong political connection with the government, which often depends on the tax collected for essential public spending[2]. On the other hand, excise taxes entail a significant political cost for tax collecting firms. Excises are taxes on the consumption of specific goods (e.g., fuel, alcohol, tobacco, airline tickets), usually levied as a fixed amount per unit or quantity of product sold. Although increases in excise taxes may not immediately affect profits, they may reduce the firm's value, especially in the medium-long term, e.g., by discouraging consumption and/or by increasing the purchase of substitute products[3]. The above considerations suggest that excise taxes provide a rich and complex setting to examine the political cost hypothesis.

The investigation of excise tax collecting firms is important for multiple reasons. Firstly, previous studies focused mainly on the use of income-decreasing accruals to reduce the threat of political costs (e.g., Jones, 1991; Han & Wang, 1998; Ramanna & Roychowdbury, 2010, Hsiao et al., 2016). Since the measurement of the income does not affect the excise tax, it is unclear whether this strategy would work to reduce the threat of excise tax-related political

[1] We refer to fuel excise tax to both gasoline excise tax and diesel excise tax.
[2] The fuel excise tax is e.g., often addressed to as "cash cow" for the governments (Tax Foundation, 2010).
[3] See, e.g., the excise tax on cigarettes. Through the decades, governments have been using the tax to fund healthcare expenses, but also to reduce consumption and push for alternative healthier products (DeCicca et al., 2013).

costs. Secondly, previous studies show that companies having business transactions with the government are more tax compliant to protect revenues from federal contracts (Mills et al., 2013). If such companies pay more taxes, they are unlikely to engage in income-decreasing accruals, as this would lower the taxable income. It is thus interesting to see what happens in the case of firms with tax collection related transactions with the government. Thirdly, the amount of excise taxes collected *per se* can only be affected by real activities manipulation (i.e., discounts, channel stuffing, any activity increasing or decreasing the quantities/units produced and sold overall). Hence, this study delves deeper into the use of real activities manipulation: (a) in a tax setting, (b) to target accounting items which do not immediately affect earnings but affect the firm's value. Finally, the excise tax revenues are transferred to a general trust or specific trust to finance the public spending on social programs. During the Covid-19 pandemic the financing methods gained relevance because to accelerate the economic upturn, most of the developed countries implemented expenditure plans such as the recovery plan or the Build Back Better. Moreover, energy prices soared after the beginning of Ukraine war opening the debate for the suspension of excise tax to reduce the prices and help consumers[4]. The financial sustainability of social programs is still an open issue and a challenge for the government. For example, the estimates project a total deficit of 140 $ billion by 2030, or by 54 $ billion even with an extension of expiring trust funds taxes (Congressional Budget Office, 2021)[5]. Thus, our investigation can help regulators and policymakers in assessing the companies' responses during the political discussion around the increase of excise tax.

To investigate the threat of political costs from the possible increase of the excise tax, we use 9356 firm-observation of oil and gas producers during the period 2002-2007. Following Han and Wang (1998) we add the relevant quarters (Q1 2005, Q2 2005, Q3 2005) in well-established earnings management models. The paper shows that, while oil producers did not engage in accruals earnings management during the relevant period, they did engage in real activities manipulation by increasing the production to generate more revenues from the fuel excise tax. The results display a reduction in cash flow from operation, suggesting the use of discounts and favorable payment condition to increase the selling. Prior literature largely focuses on accrual earnings management, but our empirical evidence highlights the relevance of companies' incentives. In our setting, reducing the reported profits does not reduce the

[4] For example, "Some States Suspend Their Gas Taxes, Looking to Ease Pain at the Pump", New York Times, 27 March 2022; "Gasoline Tax Breaks Are a Low Octane Boost for Drivers", Wall Street Journal, 28 March 2022; "Yes, gas prices are up. But cutting the gas tax is not the answer" Washington Post, 10 February 2022.
[5] Details About Baseline Projections for Selected Programs | Congressional Budget Office (cbo.gov)

political threat because the economic sustainability of the Highway Trust Fund remains an open issue for regulators. Thus, instead of focusing on the public perception about the profitability of the sector, companies focused on increasing the quantity of barrels sold, to generate more revenues to project the idea that an increase of the excise tax was not needed. The results are robust both in the addition of non-relevant quarters in the models and to multiple models.

We conduct two placebo tests appropriate for the empirical setting. First, by using a different group of excise tax collectors (tobacco and alcohol), we show no earnings management activities in the relevant period. Second, we find that the discussion at the national level (Massachusetts) does not represent a political threat. We also investigate if oil firms run their operations considering the amount of excise collected, after the issuance of the 2005 SAFETEA-LU act which guaranteed more funding to the Highway Trust Fund without an increase of excise tax. Although a limited amount of observations available, the results suggest that tax collection might be an incentive to smooth production levels. We focus on the effective tax rates to control for possible tax planning activities around the introduction of the 2005 act and we find no evidence for that. Finally, we investigate real activities manipulation in a different sector where the excise tax exists, namely the cigarettes industry. Our findings suggest the use of real earnings management to mitigate the political cost related to the increase of the excise tax. Thus, the paper shows a focus on real earnings management manipulations by excise tax collectors as a response to political threat from the possible increase of the excise tax.

The investigation provides multiple contributions to the literature that analyses earnings management and the political cost hypothesis. First, we focus on excise tax instead of the corporate income tax. Second, to the best of our knowledge, this is the first study where companies do not use accruals earnings management because it is not helpful in reducing the threat of political cost. Thus, the research shows that the incentives define which earnings management strategy is most suited. In our economic setting, there are no incentives to engage in accruals manipulation to reduce political sensitive profits because it does not provide any benefit to the companies. Third, we expand the literature focusing on the relation between government and companies by examining the excise tax collectors. Fourth, we identify a typology of shock which is exogenous and does not imply empirical issue (Boland et al. 2020). With lobbying activities, the companies can influence the outcome, but they cannot control the probability of getting the treatment (i.e., the excise tax) because it is dependent on the amount of work required by the transport infrastructure.

The remainder of the paper is organized as follows. Section 2 provides the literature review. The hypothesis development is in section 3. Section 4 focuses on the Highway Trust

Fund and the economic setting of the research. The description of the sample and the methodology is in section 5. Section 6 describes the results of the main analysis. Section 7 provides the results of the placebo tests. Section 8 reports the findings of the SAFETEA-LU Act. The evidence on the cigarette industry is in section 9. Section 10 concludes.

2. Literature review

A stream of literature finds evidence consistent with the hypothesis. Some studies find evidence that firms engage in income-decreasing accruals management during import relief investigations or after an antidumping complaint (Jones, 1991; Magnan et al., 1999; Godsell et al., 2017). Key (1997) finds that US cable television firms use income-decreasing discretionary accruals during a period of Congressional scrutiny on the TV industry. Monem (2003) studies the introduction of the Australian Gold Tax and find that gold firms used downward earnings management to mitigate political costs. Ramanna & Roychowdbury (2010) studies outsourcing firms during the U.S. 2004 elections, in which outsourcing was a relevant campaign issue. The Authors find evidence of income-decreasing accruals in the period. Similarly, Baloria & Klassen (2018) find evidence that politically connected firms managed quarterly effective tax rates up (decreasing the income) during the 2012 elections, when the corporate tax rate was a relevant campaign issue.

Several studies examined earnings management by oil firms in response to political costs threats, related to potential adverse regulation or windfall profit tax (Han & Wang, 1998; Byard et al., 2007; Hsiao et al., 2016). These studies find evidence that oil firms manage downward their accruals, to avoid reporting high profit in periods of oil price spikes, produced by politically sensitive events like wars (the Gulf War in Han & Wang, 1998), natural disasters (the hurricanes Katrina and Rita in Byard et al., 2007) or social uprisings (the Arab Spring in Hsiao et al., 2016). Boland & Godsell (2020) find evidence that US defense firms use income-decreasing discretionary accruals to mitigate the political costs of soldiers' fatalities during the Afghanistan and Iraq war.

The abovementioned research uses mainly shock-based variation in the threat of political costs, to which firms react with income-decreasing accruals earnings management. To the best of our knowledge, the only study analyzing real actions manipulation in a political cost setting is Boland & Godsell (2020). The Authors find that firms incur higher production costs, SGA, advertising, and R&D expenses in years with higher soldier fatalities and interpret this as income-decreasing real earning management. In our opinion, the latter effect could be related

to strong demand by the US government engaged in years-long wars in Iraq and Afghanistan in the same period and does not necessarily imply lower profits, because they could be matched to higher sales[6]. Higher revenues and costs could have produced the profits, lowered with income-decreasing accruals earnings management.

3. Hypothesis development

Excise taxes are selective taxes on specific consumption or behavior multiple purposes including the generation of government revenues, discouraging consumption, the correction of negative externalities (McCarten and Stotsky, 1995; Cnossen, 2005; Ulbrich, 2013). Economic theory predicts unambiguously the outcome of an excise tax: it decreases the product demand, and it increases the product market price (Acemoglu, 2017). There are two factors to be considered: the price elasticity of demand and the tax pass-through rate.

The effect of the fuel excise tax depends on the price elasticity of gasoline demand. A large body of literature find that the demand in the short run is price inelastic, but it is price elastic in the long run (Goodwin, 1992; Johansson and Schipper, 1997; Hughes et al., 2008; Ulbrich, 2013). Johansson and Schipper (1997) find e.g., that the long run demand of cars has a negative association with the fuel price (after controlling for car ownership taxes). Recent research revisited previous data and find evidence that price elasticity of gasoline demand is more elastic than previously thought even in the short term (Coglianese et al., 2017; Levin et al., 2017). Given the price elasticity of demand, an increase in the excise tax reduces the demand of fuel.

In addition to a reduction of the product demand, an increase in the excise tax increases the consumer price and can also erode the producers' profitability. Tax pass-through studies argue that increases in consumption taxes like the VAT and the excise tax are not always entirely paid by the consumers, but also in some cases partially by the producers, because an increase in the tax could not be fully shifted to the selling price to avoid falls in the demand (Carbonnier, 2013; Bonnet & Requillart, 2013; Ardalan & Kessing, 2019).

The consumer price can be expressed by the following equation:

$P = (q(t, \tau)+t)(1+\tau)$,

[6] For example, during the period 2003-2012 examined by the authors, President Bush ordered the famous 2007 "Surge" in the troops and assets deployment.

where t is the excise tax, τ indicates the value added tax rate (usually 0 in case of fuels), and $q = q(t, \tau)$ is the producer price, which itself is a function of both tax rates.

The tax pass-through rate can depend on the product and on the market. For example, Shresta and Markowitz (2016) find that a 10-cent increase in state beer taxes in the U.S. raises retail prices by about 17 cents, which means that there is over-shifting of excise tax to consumers. By contrast, excise tax on cigarettes is not fully passed to smokers and there are different tax pass-through rates across brands (Lillard and Skefas, 2013; Xu et al., 2014).

Studies on fuel tax pass-through rates produce mixed evidence. Chouinard and Perloff (2004) investigates the gasoline state tax changes between the 1989 and the 1997 and the 1993 increase in the federal gasoline tax. The Authors find that "an increase in the federal tax by 1¢ raises the retail price by 0.47¢ and decreases the wholesale price by 0.56¢. Thus, consumers and wholesalers each pay roughly half of the federal specific tax." By contrast, the state tax burden falls primarily on consumers with differences between bigger and smaller states (e.g., A 1¢ increase in a state tax raises the retail price by 0.97¢ in Vermont but by only 0.75¢ in California). By contrast, Marion and Muehlegger (2011) find that a one cent increase in the state tax rate increases the retail price by 1.22 cents, and every one cent increase in federal taxes is estimated to increase the consumer price by 1.1 cents.

Both cases imply risks for producer firms. If the tax-pass through rate is less than one, then the supply chain bear part of the excise tax burden, sacrificing margins to maintain the product demand. If it is higher than one, it could increase the risk of long-term falling demand for the producer, as firms attempt to keep margins sacrificing the demand (Johansson and Schipper, 1997; Ulbrich, 2013; Xu et al., 2014).

The political cost hypothesis predicts that oil firms will orchestrate the appearance of lower profits in response to the threat of an increase in the fuel excise tax (Watts and Zimmerman, 1978, 1986; Jones, 1991; Han & Wang, 1998; Godsell et al., 2017). Indeed, the government may be dissuaded from imposing further taxation in an industry with low profitability and/or in negative conjuncture, especially if the industry produces a large contribution to the GDP and to job creation[7]. An income-decreasing earnings management could provide motivations to avoid an increase in the excise tax harming the industry. We formulate the following hypothesis.

[7] It is noteworthy that the oil industry provides a substantial contribution to many Countries' GDP. In 2015, for example, the US oil industry contributed about 8% of the country's gross domestic product, provided 5.6% of American jobs and held a substantial stake in the total S&P 1500 Composite Index market capitalization (API-PwC, 2017).

HP1: oil firms engage in income-decreasing earnings management to avoid increases in the fuel excise tax

Another way to reduce the political threat related to an increase in the excise tax, could be the use of real activities manipulation. Excise tax collecting firms may boost production and sales to increase the excise tax gathered and transferred to the government to avoid tax increases. Given the role of fuels in the economy, the primary objective of the government is collecting revenues, rather than discouraging consumption (Ulbrich, 2013)[8]. Excise tax collecting firms may thus boost collection to ease the pressure for funds by politicians. This choice would assume that the amount of excise tax collected is more politically sensitive than the earnings level, as boosting revenues can increase the profits. We formulate the following hypothesis.

HP2: oil firms use real activities manipulation to avoid increases in the fuel excise tax

4. The Highway Trust Fund and the fuel excise tax empirical setting

The U.S. fuel excise tax has two components: the federal excise tax and the state excise tax. Firstly, introduced in 1932, the federal fuel excise tax was increased several times until the current rate was set in 1993 at 18.4 cents per gallon gasoline (24.4 per gallon diesel) and never changed afterwards. Between the years 1993 and 2019, 42 states and the District of Columbia (D.C.) have increased their per gallon tax rate, with several states raising rates of less than 10 cents per gallon in more than thirty years (Auxier, 2014, Tax Foundation, 2021). Meanwhile, in the same period the gasoline price grew from 1.065 dollar per gallon at the beginning of the year 1993 to 2.488 dollar per gallon in December 2019 (EIA, 2022).

The political process related to the Highway Trust Fund provides the empirical setting for this study. The resources generated by the gasoline federal excise tax are destinated to finance the Highway Trust Fund, which provides federal funding for highways and mass transit. Since 1998, the Highway Trust Fund is at the center of a heated political debate, due to increasing financial needs and insolvency risks.

In 1998, the Federal Highway Trust fund spending reached an unsustainable level, caused by factors like aging infrastructures, some bad management, political state, and local lobbying to increase public spending and create jobs (CBO, 2014; Davis, 2018). Instead of aligning the

[8] Indeed, the excise tax is suspended in periods of extraordinarily high fuel prices. E.g., some US states suspended the state excise on fuels in early 2022 cbsnews.com/news/connecticut-georgia-maryland-gas-tax-holiday/

Trust spending levels to the fuel excise tax receipts levels, the Congress approved the Transportation and Equity Act in the spring of 1998[9] and allowed the Trust to increase its spending, by considering the estimated future tax receipt levels (the new process was called RABA, "revenue alignment budget authority").

In 2002, lobbyists for the road builders sounded the alarm about "insufficient" Highway Trust Fund resources and several governors sent a letter to the federal government urging further resources for the Fund (Davies, 2018). Multiple subjects - including state and local authorities, construction industry, labor unions, the US Chamber of Commerce and the members of the Congress listening to the above businesses (either Republican or Democratic) - lobbied for higher spending by the Highway Trust Fund, supporting legislation to increase the gasoline tax increase in the period 2002-2004, with several attempts to propose bills (Davies, 2018). On the 9th of February 2005, the H.R.3 SAFETEA-LU was introduced in the House. The proposed law included several provisions related to safe and efficient transportation (investments on roads, airports, highways, bridges, etc.), including a proposal to increase the federal fuel excise tax[10].

After a heated political debate in the House and in the Senate across Q1 and especially Q2 2005, the SAFETEA-LU Act (Safe, Accountable, Flexible, Efficient Transportation Equity Act) was approved and signed by President Bush in July 2005[11]. The Act approved a 375 billion $ spending dedicated to safe and efficient transportation, including additional extraordinary resources for the Highway Trust Fund. It also allowed transferring funds from the General Fund to the Highway Trust Fund. In the following years, several administrations used resources from the General Fund to cope with the Highway Trust Fund recurring problems of financial needs, even avoiding at time its insolvency, amid an ongoing debate on the excessively low fuel excise tax in the U.S. (CBO, 2015; New York Times, 2015)[12].

The Highway Trust Fund and the fuel excise tax empirical is a suitable setting for a study on real activities manipulation motivated by the fear of political costs. The Highway Trust Fund is a source of the variation in the threat of political costs for the U.S. oil industry, related to the potential increase of the fuel excise tax. This source includes random factors related to (among other factors): the negotiations of investment projects and the maintenance operations among the Trust, the state and local authorities; the consumption of roads; the obsolescence of mass

[9] Available at: https://www.fhwa.dot.gov/tea21/pl105178.pdf
[10] Available at: https://www.congress.gov/bill/109th-congress/house-bill/3
[11] Available at: https://www.govinfo.gov/content/pkg/PLAW-109publ59/pdf/PLAW-109publ59.pdfs
[12] Available at: https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50297-transportationtestimony-senate.pdf

transit infrastructures; the federal government choices about investments and funding; the pressure from labor unions. Due to its complexity and the number of subjects involved, oil firms can hardly influence the Highway Trust Fund management and investments' decisions, along with its financial needs.

The political process around the Trust has not been initiated by oil firms and its outcome can hardly be anticipated. Also, the political process around the Highway Trust Fund does not affect the oil price and does not contemporaneously affect the oil firms' performance[13]. We acknowledge that oil firms may lobby the Congress to avoid the fuel excise tax increase. Lobbying is a routinely made activity, dealing with several issues, but does not affect the source of the variation in the threat of political costs provided by the Highway Trust Fund. In other words, lobbying can influence the outcome of the treatment, but not the probability of the treatment. Oil and gas industry expenses on lobbying activities surged in 2005 when, after a slight constant decrease in the period 2002-2004, the amount spent reported an increase of 28.5%[14]. The political threat of the excise tax depends on the maintenance needs of the Highway Trust Fund which are outside of the influence of oil firms. Taken together, the abovementioned conditions provide a robust test of the political cost hypothesis.

5. Methodology

5.1 Sample selection

This paper uses quarterly data from the Compustat North America database. For our main analysis, we use the quarterly data of companies included in the SIC (Standard Industrial Classification) Code 13 (Oil & Gas Extraction) and the SIC Code 29 (Petroleum Refining). These industries represent the fuel production chain and are likely to be affected by increases in the fuel excise tax[15].

The main analysis used the period spanning from Q1 2002 to Q4 2007. This period is featured by stable growth in the US GDP, increasing in each quarter with an annual mean +2.77%[16]. The WTI oil price averaged 48.9 $ per barrel with a steady growth, without shocks

[13] Prior research on political costs in the oil industry focused on events like wars, social uprisings and earthquakes producing oil price spikes, which affect the firms' performance (Han & Wang, 1998; Hsiao et al., 2016). It is thus unclear whether the income-decreasing accruals is related to the political costs threat or to income smoothing (Boland & Godsell, 2020), or to both.

[14] Data are available at opensecrets.org

[15] Some SIC 29 firms engaged in oil & gas extraction through subsidiaries and SIC 13 firms manufacturing oil related products.

[16] See also: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2008&locations=US&start=2002

(EIA, 2022)[17]. The gasoline price averaged 2.032 $ per gallon, steadily growing without shocks (EIA, 2022)[18]. A period without shocks on the oil price (and thus on the fuel price) is suitable to ascertain the effect of excise on earnings management. Also, the government is more likely to consider an increase in the excise tax in periods of stable growth, rather than in periods of recession or high fuel prices related to external shocks, like wars or the COVID crisis.

The final sample is composed of 9,356 firm-observation from 731 individual firms. 8,473 firm-observations are in the SIC Code 13, with 660 unique firms. 883 firm-observation are included in the SIC Code 29 from 71 unique firms.

5.2 Research design

We test our hypothesis following the research design by Han and Wang (1998) to identify specific quarters where we expect earnings management strategies. As Han and Wang (1998), we add dummies for quarters and years to the modifies Jones model (Dechow et al. 1995), and then add interaction terms for quarters Q1, Q2 an Q3 of year 2005. We control the robustness of the results using other well-established accruals earnings management models to reduce the subjectivity in the variables selection (McNichols and Stubben, 2018).

We also add dummies for quarters and years, to real earnings management models from Roychowdbury (2006), related to cash flows from operations, production costs and discretionary expenses, and then add interaction terms for politically sensitive specific quarters to ascertain the effect of the political cost threat (Q1, Q2 and Q3 of the 2005). To further analyze the production activity, we decompose the production costs into cost of goods sold and change in inventory. This allows understanding whether the increased production is related to the sales or to increasing the inventory. We expect real activities manipulation from oil firms aimed at inflating sales - through discounts, distribution channel stuffing and boosting production -, to gather increased fuel excise tax and support the idea that there is no need to rise the excise tax rate to finance the Highway Trust Fund.

Our research design uses a single equation approach, following the recommendations by Chen et al. (2018) to include the explanatory variable in single equation earnings management models and avoid using residuals (i.e., discretionary/abnormal accruals/real) as dependent variables[19].

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[17] The WTI oil time series available at: http://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm.

[18] US fuel price time series available at: https://www.eia.gov/petroleum/gasdiesel/

[19] As noted by Chen et al. (2018), two step procedures using residuals as dependent variable may result in a misspecification in the first step equation, since the explanatory variable usually affects the regressors of the first regression. For example, estimating discretionary accruals and then regressing them on the auditor tenure would

This research uses the following models:

1) Total accrual model

$$\frac{TACC_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{\Delta Revenue_{it}}{ASSETS_{it-1}} + \beta_3\frac{PPE_{it}}{ASSETS_{it-1}} + \beta_4 Q1 + \beta_5 Q2 + \beta_6 Q3 + \beta_7 Y02 + \beta_7 Y02 + \beta_8 Y03 + \beta_9 Y04 + \beta_{10} Y05 + \beta_{11} Y06 + \beta_{12} Y07 + \beta_{13} Q105 + \beta_{14} Q205 + \beta_{15} Q305 + \varepsilon_{it}$$

2) Cash flow model

$$\frac{CFO_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{SALES_{it}}{ASSETS_{it-1}} + \beta_3\frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \beta_4 Q1 + \beta_5 Q2 + \beta_6 Q3 + \beta_7 Y02 + \beta_8 Y03 + \beta_9 Y04 + \beta_{10} Y05 + \beta_{11} Y06 + \beta_{12} Y07 + \beta_{13} Q105 + \beta_{14} Q205 + \beta_{15} Q305 + \varepsilon_{it}$$

3) Production costs model

$$\frac{PROD_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{SALES_{it}}{ASSETS_{it-1}} + \beta_3\frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \beta_4\frac{(\Delta SALES_{it-1})}{ASSETS_{it-1}} + \beta_5 Q1 + \beta_6 Q2 + \beta_7 Q3 + \beta_8 Y02 + \beta_9 Y03 + \beta_{10} Y04 + \beta_{11} Y05 + \beta_{12} Y06 + \beta_{13} Y07 + \beta_{14} Q105 + \beta_{15} Q205 + \beta_{16} Q305 + \varepsilon_{it}$$

4) Cost of goods sold:

$$\frac{COGS_{it}}{AST_{it-1}} = \beta_0 + \beta_1\frac{1}{ASSETS_{it-1}} + \beta_2\frac{SALES_t}{ASSEST_{it-1}} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 Y02 + \beta_7 Y03 + \beta_8 Y04 + \beta_9 Y05 + \beta_{10} Y06 + \beta_{11} Y07 + \beta_{12} Q105 + \beta_{13} Q205 + \beta_{14} Q305 + \varepsilon_{it}$$

5) Discretionary expenses model

$$\frac{DISEXP_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{SALES_{it}}{ASSETS_{it-1}} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 Y02 + \beta_7 Y03 + \beta_8 Y04 + \beta_9 Y05 + \beta_{10} Y06 + \beta_{11} Y07 + \beta_{12} Q105 + \beta_{13} Q205 + \beta_{14} Q305 + \varepsilon_{it}$$

6) Change in inventory:

$$\frac{\Delta INV_{it}}{AST_{it-1}} = \beta_0 + \beta_1\frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \beta_2\frac{\Delta SALES_{it-1}}{ASSETS_{it-1}} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 Y02 + \beta_7 Y03 + \beta_8 Y04 + \beta_9 Y05 + \beta_{10} Y06 + \beta_{11} Y07 + \beta_{12} Q105 + \beta_{13} Q205 + \beta_{14} Q305 + \varepsilon_{it}$$

Q1, Q2 and Q3 are indicator variables respectively for the first, second and third quarter of each year. Y02 to Y07 are indicator variables for each year considered. The year quarter indicator variables account for time fixed effect related to e.g., seasonality, oil price, economic growth, fuel demand. Q105, Q205, Q305 indicate the specific quarters of the year 2005. ASSETS represent the total assets of firm *i* in the quarter *t-1*. To avoid the influence of outliers we winsorize all the variables at 1%.

neglect the fact that the tenure already affects the total accruals in the first regression, as well as other regressors. Hence, the best and most simple solution is to use single equations to study earnings management (Chen et al., 2018, p. 34).

Because the sample of the empirical estimation is an unbalanced panel data, it is likely that the error terms over the cross-sectional units differ from the error process over time. Thus, the estimation could be biased by heteroscedasticity and serial correlation (AR(1)) of the error term and there could be a violation of the ordinary least square (OLS) assumptions (Baltagi and Wu, 1999; Collins and Dent, 1984). Hansen (2007) identifies as an unbiased estimation method the general least square (GLS) to solve for the issues involved in the OLS estimation. Therefore, to control for both serial correlation and heteroskedasticity we estimate the earnings management models with the feasible general least square (FGLS) (Baltagi and Wu, 1999; Hansen, 2007b; Romano and Wolf, 2017). To obtain more reliable results, we use a feasible generalized least squares specification because error variances are unknown, and we cannot use the weighted least squares (Hansen, 2007b). We consider this methodology the most suitable to investigate the effect on oil firms of a political threat represented by the fuel excise tax. It should ensure unbiased results and provide more consistent estimations than the OLS regression if there are unobservable characteristics.

6. Main Analysis

Table 4 reports the results of the main empirical analysis using the models presented in the research design. The variables of interest are the interaction between quarters and year 2005 (Q105, Q205, Q305).

Table 4 Column 1 shows that Q1, Q2 and Q3 in 2005 are not significantly associated with total accruals, signaling no specific differences in total accruals compared to other quarters. There is no evidence of income-decreasing accrual earnings management in the specific quarters. The findings suggest that oil firms do not orchestrate the appearance of low profits in politically sensitive quarters. There is no empirical support for HP1.

In column 2 the dependent variable is cash flow from operations (CFO). The control variables are all significant (p-value<0.01) and show the expected coefficients. Q205 and Q305 show a negative and statistically significant coefficient (respectively p-value<0.05 and p-value<0.1), while Q105 has a negative coefficient which is not significant. The results show that, during the relevant quarters, oil firms display cash flows from operations lower than quarters in previous year. This suggests that companies boosted sales through discounts, channel stuffing or favorable payment conditions to increase the total sales.

Table 4, Column 3, shows that there is no evidence of increase or decrease discretionary expenses in the politically sensitive quarters, as the interaction terms are not significant. Table

4, Columns 4, 5 and 6 analyzes the productions costs, the cost of goods sold and the change in inventory

In Column 3, the dummies for the Q2 and Q3 have positive and statistically significant coefficients (p-value<0.01), while the dummy for Q1 has a positive coefficient significant at the 10% level. The results show that, compared with other periods, in Q2 and Q3 in 2005 especially production costs are much higher. To ascertain whether the higher production costs are related to goods sold or to an increase in the inventory, we separately analyze the cost of goods sold and the change in inventory. Table 4 Column 4, show that Q2 and Q3 in 2005 have positive coefficients significant at the 1% and the 5% level with the cost of goods sold, and that Q1 has a positive coefficient significant at the 10% level. Table 4, Column 6, shows that the relevant quarters have no association with the change in inventory. The results provide evidence that oil firms boosted production and sales and rules out the idea that companies, anticipating the possible increase in excise tax, fill the inventory to pay a lower excise and profit in the short-term by selling the reserves once the excise is higher with the price increased.

Overall, the findings provide support for HP2 with evidence of the use of real earnings management in response to the threat of an excise tax increase. Instead of projecting the idea of an industry with dwindling profits, oil and gas companies focused on increasing production levels and pushing sales to generate more revenues for the Highway Trust Fund. The real activities manipulation is useful to provide signals of robust demand by consumers and to increase the excise tax collected and transferred to the government, supporting the notion that the industry provides funds without the need for an increase in the excise tax. The goal was to show the financial sustainability of the Fund without the intervention on excise tax levels.

7. Robustness Check

7.1 Placebo population tests: other excise tax firms

The first test is a placebo population test on whether the political process around the Highway Trust Fund influences the behavior of other excise tax collecting firms i.e., alcohol and tobacco producers. On the one hand, an increase in the most important excise tax could pave the way for increases in other excises taxes. On the other hand, excise taxes on alcohol and tobacco are not dedicated to specific federal programs, as of 2008 (CSR, 2021). Hence, we expect that alcohol and tobacco producers are unaffected by the political process around the Highway Trust Fund. We run the regression of Equation (1) to (6) on a sample of firms including alcoholic beverages firms belonging to the SIC codes 2100–2199 and tobacco firms

corresponding to the SIC codes 2080–2085 (Wang et al., 2021), in the period 2002-2007. We obtain a total population of 397 firm-observations from 47 unique firms.

Table 5 reports the results of the placebo population test. We examined the firms using the previous models augmenting, including a dummy to control for the industry specific characteristics (tobacco or alcohol). Table 5, columns 1 to 6, show that the interaction terms for Q1, Q2 and Q3 have no significant association with total accruals, productions costs and discretionary expenses. The control variable displays significant associations in the expected direction. The findings show that the political process around the Highway Trust Fund in 2005 is not a relevant political event for the tobacco and alcohol industry.

The findings confirm that the Highway Trust Fund political process in 2005 specifically affected the oil & gas industry and was not perceived as a political threat by other excise tax collecting firms.

7.2 Placebo treatment test: Massachusetts Automatic Gas Tax

In September 2013, Massachusetts policymakers approved the Massachusetts Automatic Gas Tax, the most notable attempt to automatically link the excise tax to the inflation (Tax Foundation, 2014). Massachusetts policymakers increased the fuel excise tax rate by 3 cents to 24 cents per gallon (the new minimum threshold) and determined an annual adjustment corresponding to the percentage change of the US Consumer Price Index (CPI), starting from 2014. A repeal initiative activated collecting signatures in the first half 2014 to set a ballot in November 2014. The ballot rejected the Automatic Gas Tax with 52.7% votes.

We exploit the event as alternative treatment, to test whether oil firms engage in earnings management through the Massachusetts Automatic Gas Tax political process in the first three quarters of 2014. On the one hand, the Automatic Gas Tax could have set an extremely dangerous precedent for an automatic increase. Legislators are not inclined to increase tax rates very often and very much, so an automatic increase would solve the problem for them (Auxier, 2014). On the other hand, the initiative was limited to a single state and a widespread extension to other states would not have been easy, also considering the possible repeal initiatives. Hence, we expect that oil producers are unaffected by the political process around the Massachusetts Automatic Gas Tax.

We consider the period 2012-2015, in which we have 9,143 firm-observation from 701 unique firms. We identify the first, the second and the third quarters of 2014 as the quarters of

interest, and we augment earnings management models with dummy variables to investigate the use of earnings management in specific quarters.

Table 6, column 1, does not provide evidence of income-decreasing accrual earnings management in Q1, Q2 and Q3 2014. Table 6, column 2 and 3, do not provide evidence of inflated sales or use of discretionary expenses in Q1, Q2 and Q3 2014 as well.

Table 6, Column 4 show that the interaction terms for have a negative significant association with production costs. The decrease in the production costs is related to over-production, as shown by Table 6, Columns 5 and 6 in which we see reduce cost of cost of goods sold and an increase in the change in inventory. The production operations follow a pattern which is opposite to that observed in 2005. While in 2005, oil firms boosted sales and production, in 2014 the produce for the inventory (eventually an income increasing earnings management). Rather than real activities manipulation the findings are consistent with the 2014 global oil glut. The oil glut is a significant production surplus which started in 2014, when oil firms stepped up production to meet a forecasted high demand related to economic growth. When economic growth disappointed, oil prices fell by nearly 50% between the end of 2014 and through 2015 (Arezki and Blanchard, 2014)[20].

Overall, the findings do not support the political cost hypothesis. US oil and gas firms did not consider the Automatic Gas Tax as a political threat and did not engage in earnings management.

Column 3 (PROD) is particularly interesting because it shows the opposite response by oil and gas producers. Q1, Q2 and Q3 are consistent with the results obtained previously and display a negative and significant coefficient suggesting an increase of production in the last quarters. Conversely with the relevant quarters of 2005 in which coefficients changed sign, the quarters of interest (Q114, Q214 and Q314) have a negative and significant coefficient. Contrary to the previous results, DINV (column 5) has positive and statistically significant coefficients (p-value < 0.01) in both the general quarters and the relevant quarters. It is consistent with anecdotal evidence suggesting that firms increase inventories during periods of low prices. Column 4 (COGS) has negative and statistically significant coefficients in both the general and relevant quarters. Column 6 shows the same pattern of previous results with positive and statistically significant coefficients (P-value < 0.01) for Q1, Q2 and Q3. Q314 has a positive coefficient with a relevant statistical association (p-value < 0.01) suggesting a

[20] Other factors that caused the fall were possibly geopolitical competition between OPEC and non-OPEC, political debate that followed a rise in climate change awareness (Arezki and Blanchard, 2014)

possible income-increasing accrual strategy as a response to the sharp decline in oil prices. Column 1 and 2 (ACFO and DISEXP) do not show any relevant statistical association.

8. Further investigation

8.1: oil firms' behavior after the 2005 SAFETEA-LU Act

The SAFETEA-LU act guaranteed funding for highways, highway safety, and public transportation totaling $244.1 billion (Federal Highway Administration, 2005), without the increase of the excise tax. In this section, we analyze whether, after the issuance of the 2005 act, oil firms run their operations considering the excise tax levels collected. To perform the investigation, we augment the real earnings management models with the amount of excise tax collected in the quarter t-1 and t-2 ($Excise_{t-1}$and $Excise_{t-2}$). The Compustat North America database reports the quarterly excise tax data for some oil firms (the item is txwq from the footnotes). Data for this item starts from 2005, with a few data in 2003 and 2004. Overall, we found 449 firm-year observations in Compustat from 15 unique firms. We add year and quarter fixed effects to control the level of demand and for the seasonality.

Results are tabulated in Table 7. The results provide evidence of a negative association between the production costs (column 2) and the amount of excise tax collected in the previous quarter t-1, while there is no association with the excise tax collected at t-2. The coefficient is statistically significant with p-value<0.05. Table 7, column 3, show that there is also a significant negative association (p-value < 0.05) between the cost of goods sold and the excise tax collected in the previous quarter ($Excise_{t-1}$), while there is no association with the excise tax collected at t-2. The results concerning the change in inventory do not provide significant results (Table 7, column 4). The lagged excise tax has a positive and statistically significant relationship with the cash flow of operations, with p-value < 0.01 (Table 7, column 1). This means that when the lagged excise tax is low the current quarter cash flow is also low. Taken together, the findings may suggest that oil firms increase production and sales after quarters with low excise tax collected (and vice versa). Interestingly, IRS data on all the federal excise tax collected reports quarterly collection for the years 2006, 2007 and 2008 (IRS, 2022). We see stable excise gasoline tax and diesel excise tax per quarter. For example, the diesel excise tax collected in Q1 2006 is 6.416 billion $, in Q2 2006 is 6.131 billion $, in Q2 2006 is 6.480 billion $, in Q4 2006 is 6.489 billion $. The findings may suggest that the production is "smoothed." However, they should be cautiously considered due to the limited number of observations available.

8.2 Tax planning around the 2005 SAFETEA-LU Act issuance

This section analyzes the tax planning behavior of oil firms around the 2005 SAFETEA-LU Act issuance. Previous research suggest that U.S. federal contractors display higher effective income tax rates, than non-federal contractor peers, as they fear the political costs of tax avoidance and wish to preserve their contract revenues (Mills et al., 2013). We analyze here whether oil firms engage or not in tax planning activities around the 2005 SAFETEA-LU Act issuance. More specifically, we check whether oil firms pay higher/lower effective tax rates in the first three quarters of 2005, compared to other quarters in the period, after controlling for a set of well-established determinants of tax avoidance (Hanlon & Heitzman, 2010). Specifically, we use as measure of tax avoidance: a) the GAAP ETR, calculated as income tax expense (*txt*) on pre-tax accounting income (*pi*); b) Hanlon's (2005) GAAP ETR, calculated as total income tax expense on total pre-tax income less minority interest; c) CASHETR3, calculated as total income taxes paid on the sum of income tax paid and operating activities.

Table 8, columns 1 and 2, do not provide evidence of differences in the GAAP ETR in Q1, Q2 and Q3 2005 compared to other quarters. Several control variables are significant and in the expected direction, like e.g., the ROA, the leverage, the intangibility (Mills et al., 2013). The findings suggest that oil firms do not attempt to use tax avoidance to reduce the tax burden related to higher profits in the politically sensitive quarters. Instead, they may be interested in appearing as solid contributors to the public finance, either with the excise tax collected and with the income taxes.

9. Further investigations on the excise tax in cigarettes

We check whether the relationship between excise tax and real activities manipulation also exists in industries other than oil and gas.

We investigate an industry with significantly lower lobbying capability than the oil industry. In the period 1998-2021 the oil and gas industry spent more than 2.5 billion $ on lobbying activities, the tobacco industry 647 million $ and the alcoholic beverages industry 486 million $[21]. Indeed, as sin firms, tobacco & cigarette producers can hardly exert a significant pressure on the government, despite lobbying (Wang et al., 2022).

[21] We elaborated the data are available at opensecrets.gov. Except for 1998, the oil and gas industry spent more than the tobacco and alcoholic beverages industries combined.

We study different excise tax. Fuel excise tax is the payment for a service, which is a usage charge for the use of federal highways. Tobacco & cigarette excise tax is a sumptuary or "sin" tax "imposed for moral reasons, but are currently rationalized, in part, to discourage a specific activity that is thought to have negative spillover effects (or externalities) on the consumer and society" (CRS, 2021, p. 1). Moreover, the gasoline excise tax is earmarked, and the revenues are directed towards the Highway Trust Funds while the revenues generated from the "sin tax" have a general purpose. The cigarette excise tax is economically relevant, providing the U.S. Federal Government about 200 billion $ between the 1999 and the 2018[22]. In 1997, the federal government decided to introduce a gradual tax increase, bringing the excise tax from 24 cents per pack to 34 cents per pack on January 1 200, and 39 cents per pack on 1 January 2002, to discourage consumption.

We identify the tobacco producers with the same identification strategy described in section 7.1. We investigate the period 1990-2002 and we augment the models with a dummy variable that identifies the year 1997 in which the increase was decided (Table 8). We also re-run the analyses with dummies for each year. The population has 801 firm-observation from 55 unique firms.

Table 9, column 1, shows that the total accruals have a positive significant association with the dummy identifying the post cigarette tax increase period (p-value 0.05). The cash flows (Table 8, Column 2) display a negative significant correlation sign with the post cigarette tax increase period (p-value 0.05). The change in inventory has a positive significant association with the post cigarette tax increase period (p-value 0.05). The results suggest that tobacco producers engage in aggressive sales, using discounts in particular, to promote consumption, mitigate the price increase and avoid discouraging consumption (abandoning the smoke habit). Table 9 provides even stronger evidence. The dummies for the years 1998, 1999, 2000, 2001 and 2001 provide evidence that tobacco producers boost sales, production, and fill inventories to flood the market with cigarettes. The aggressive retail-level discounting is also documented by practitioners (e.g., Boon, 2021). It also appears in the cigarette company marketing expenditure mandatory disclosure to the Federal Trade Commission (Federal Trade Commission, 2013). The aggregated data show that in the period 1998-2002 the cigarettes companies increase the price discounts by an average 25% per year bringing them from 3.5

[22] Available at: *https://www.irs.gov* › pub › irs-soi › histab20

billion $ in 1997 to 9.485 billion $ in 2002, with price discounts being about the 80% of the total market expenditures.

The findings suggest that cigarettes firms acted to mitigate the political cost related to the increase in the excise tax in the attempt to avoid an overall loss in the companies' value. The other effects of the real activities manipulation were (a) the increase in the profits, shown by the increase in the total accruals; b) the increase in the excise tax collected. Both may benefit the tobacco firms, as higher profits signal the firms' capability to cope with the excise tax rate increase and the increase in the excise tax collected may be useful for lobbying purposes[23].

10. Conclusion

Using a sample of oil firms data from the period 2002-2007, we test the political cost hypothesis in the excise tax economic setting. The excise tax generates revenues to sustain the highway trust fund and it represents a suitable test because it is a source of random variation in the threat of the political cost (Boland et al. 2020). The political discussion over the increase of the fuel excise tax occurred around the first, second and third quarters of 2005 and we identify them as the relevant quarters. Following Han and Wang (1998) we augment accruals and real earnings management models with dummies to investigate the effect during the political debate. Our results provide robust evidence suggesting that, during the relevant quarters, oil firms engage in real activities manipulation to increase the quantity sold (and the revenues from the excise tax) but do not use accrual manipulation. Our results are robust to the introduction of other quarters in the models and to different specification of accruals earnings management models. We conduct placebo tests appropriate for our setting because we control for a different population (other excise tax collector) in the same relevant period, and we test oil firms in a different political sensitive period. We then investigate the behavior around and after the introduction of the SAFETEA-LU Act showing no tax planning activities by the oil firms. We finally investigate the cigarettes companies showing the use of real earnings management to increase the sales and collect more revenues from the excise tax. Overall, our findings support the political cost hypothesis and show that the strategy used by the firms depends on the incentives. Our evidence advances the political cost literature and increases the knowledge on excise tax collectors and their behavior.

[23] It appears that the strategy was successful as according to the CDC consumption did not decrease significantly and President Obama in 2009 tripled the cigarette excise tax to discourage consumption and fund public health (CDC, 2009).

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Table 1: Summary of the variables and their sources

Measures of financial data			
Name	**Label**	**Description**	**Source**
Total accruals	TACC	Change in non-cash current assets minus the change in current liabilities excluding the current portion of long-term debt, minus depreciation and amortization from quarter t to quarter t-1, scaled by lagged total assets in quarter t-1 in firm i	Compustat
Total Assets	ASSETS	The total assets reported in quarter t in firm i	Compustat
Property Plant and Equipment	PPE	Gross property, plant, and equipment in quarter t in firm i	Compustat
Sales	$SALES_t$	Sales in quarter t in firm i	Compustat
Changes in Sales	$\Delta SALE_t$	Change in sales from quarter t to quarter t-1 in firm i	Compustat
Changes in Sales Adjusted	ΔS_t-ΔR_t	Change in Sales adjusted for the change in account receivables from quarter t to quarter t-1 in firm i	Compustat
ROA	ROA	Return on assets in quarter *t*-1 in firm *i*	Compustat
Cost of goods sold	COGS	Cash flow from operations in quarter t in firm i	Compustat
Production cost	PROD	Sum of the cost of goods sold and change in the inventory in quarter t in firm i	Compustat
Discretionary expenditure	DISEXP	Sum of R&D, advertising, selling and general and administrative expenses in quarter t in firm i	Compustat
Inventory	INV	Total Inventory in quarter t in firm i	Compustat
Size	SIZE	The logarithmic transformation of total assets reported in quarter t in firm i	Compustat
Leverage	LEVERAGE	Total liabilities reported in quarter t in firm i	Compustat
Excise collected	EXCISE	The amount of excise tax collected in the quarter t by firm i	Compustat
Intangibles	INTANGIBILITY	Total intangible assets reported in quarter t in firm i	Compustat
Foreign income	FORINCOME	Total Foreign Exchange Income (Loss) reported in quarter t in firm i	Compustat
Smoothness	SMOOTH	Standard deviation of the ratio between pretax income and cash flow from operation in the previous five year in firm i	Compustat
Taxes expenses	GAAPETR	Income tax expense (*txt*) on pre-tax accounting income *(pi)* reported in quarter t in firm i	Compustat
Taxes expenses	GAAPETRHanlon	Total income tax expense on total pre-tax income less minority interests reported in quarter t in firm i	Compustat
Tax expenses	CASHETR3	Income taxes paid on the sum of income tax paid and operating activities	Compustat

Table 2: Accruals and Real Earnings Management models

Name with key reference in parentheses	Equation
Jones discretionary total accruals model (Jones, 1991)	$\frac{TACC_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{\Delta SALES_{it}}{ASSEST_{it-1}} + \beta_3\frac{PPE_{it}}{ASSETS_{it-1}} + \beta_4 Q1 + \beta_5 Q2 + \beta_6 Q3 + \beta_7 Y02 + \beta_7 Y02 + \beta_8 Y03 + \beta_9 Y04 + \beta_{10} Y05 + \beta_{11} Y06 + \beta_{12} Y07 + \beta_{13} Q105 + \beta_{14} Q205 + \beta_{15} Q305 + \varepsilon_{it}$
Modified Jones discretionary total accruals model (Dechow et al., 1995)	$\frac{TACC_{it}}{ASSETS_{it-1}} = \beta_0/ASSETS_{it-1} + \beta_1(\Delta SALES_{it} - \Delta ARit)/ASSETS_{it-1} + \beta_2 PPE_{it}/ASSETS_{it-1} + \varepsilon_{it}$
Jones discretionary total accruals model adjusted using ROA (Kothari et al., 2005)	$\frac{TACC_{it}}{ASSETS_{it-1}} = \beta_0/AST_{it-1} + \beta_1\Delta SALES_{it}/AST_{it-1} + \beta_2 PPE_{it}/AST_{it-1} + \beta_3 ROA_{it-1}/AST_{it-1} + \varepsilon_{it}$
Modified Jones discretionary total accruals model using ROA (Kothari et al., 2005)	$\frac{TACC_{it}}{ASSETS_{it-1}} = \beta_0/AST_{it-1} + \beta_1\mathbb{[}(\Delta SALES\mathbb{]}_{it} - \Delta ARit)/AST_{it-1} + \beta_2 PPE_{it}/AST_{it-1} + \beta_3 ROA_{it-1}/AST_{it-1} + \varepsilon_{it}$
Cost of goods sold model (Roychowdbury, 2006)	$\frac{COGS_{it}}{AST_{it-1}} = \beta_0 + \beta_1\frac{1}{AST_{it-1}} + \beta_2\frac{SALES_t}{AST_{it-1}} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 Y02 + \beta_7 Y03 + \beta_8 Y04 + \beta_9 Y05 + \beta_{10} Y06 + \beta_{11} Y07 + \beta_{12} Q105 + \beta_{13} Q205 + \beta_{14} Q305 + \varepsilon_{it}$
Production costs model (Roychowdbury, 2006)	$\frac{PROD_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{SALES_{it}}{ASSETS_{it-1}} + \beta_3\frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \beta_4\frac{(\Delta SALES_{it-1})}{ASSETS_{it-1}} + \beta_5 Q1 + \beta_6 Q2 + \beta_7 Q3 + \beta_8 Y02 + \beta_9 Y03 + \beta_{10} Y04 + \beta_{11} Y05 + \beta_{12} Y06 + \beta_{13} Y07 + \beta_{14} Q105 + \beta_{15} Q205 + \beta_{16} Q305 + \varepsilon_{it}$
Abnormal Cash Flow from Operations (Roychowdbury, 2006)	$\frac{CFO_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{SALES_{it}}{ASSETS_{it-1}} + \beta_3\frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \beta_4 Q1 + \beta_5 Q2 + \beta_6 Q3 + \beta_7 Y02 + \beta_8 Y03 + \beta_9 Y04 + \beta_{10} Y05 + \beta_{11} Y06 + \beta_{12} Y07 + \beta_{13} Q105 + \beta_{14} Q205 + \beta_{15} Q305 + \varepsilon_{it}$
Discretionary expenses model (Roychowdbury, 2006)	$\frac{DISEXP_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_2\frac{SALES_{it}}{ASSETS_{it-1}} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 Y02 + \beta_7 Y03 + \beta_8 Y04 + \beta_9 Y05 + \beta_{10} Y06 + \beta_{11} Y07 + \beta_{12} Q105 + \beta_{13} Q205 + \beta_{14} Q305 + \varepsilon_{it}$
Change in Inventory model (Roychowdbury, 2006)	$\frac{\Delta INV_{it}}{AST_{it-1}} = \beta_0 + \beta_1\frac{\Delta SALES_{it}}{AST_{it-1}} + \beta_2\frac{\Delta SALES_{it-1}}{AST_{it-1}} + \beta_3 Q1 + \beta_4 Q2 + \beta_5 Q3 + \beta_6 Y02 + \beta_7 Y03 + \beta_8 Y04 + \beta_9 Y05 + \beta_{10} Y06 + \beta_{11} Y07 + \beta_{12} Q105 + \beta_{13} Q205 + \beta_{14} Q305 + \varepsilon_{it}$

Table 3: Descriptive statistics of earnings management measures in oil firms sample

This table shows the distribution of the variables used to measure earnings management. It shows the mean (Mean), the median (Median), skewness (Skewness), kurtosis (Kurtosis), standard deviation (SD) and the number of quarters available (N). All variables are scaled by total assets of the same quarter. The sample period ranges from 2002 Q1 to 2007 Q4.

	(1) Mean	(2) Median	(3) Skewness	(4) Kurtosis	(5) SD	(6) N
TACC	0.003	-0.054	1.209	7.667	0.436	285
1/ASSETS	1.780	0.001	4.404	21.703	6.348	285
PPE	0.751	0.654	1.617	7.369	0.573	285
ΔS_t-ΔR_t	0.006	0.000	1.525	15.291	0.085	285
$SALES_t$	0.166	0.150	2.013	10.454	0.175	285
$\Delta SALE_t$	0.003	0.000	0.474	17.206	0.056	285
$\Delta SALE_{t-1}$	0.005	0.000	-0.514	26.996	0.045	285
CFO	-0.246	0.034	-2.822	10.643	0.757	285
PROD	0.122	0.098	3.066	18.087	0.154	285
DISEXP	0.282	0.038	3.142	12.045	0.639	285
DINV	1.566	0.000	0.057	5.518	53.946	285
ROA	-0.255	0.006	-3.762	17.137	0.729	285

Table 4: Main analysis

This table reports the estimated coefficients obtained by running an FGLS estimation using the Modified Jones model (Column 1) and the Roychowdhury's models (columns 2 to 6) The dependent variable in column 1 is total accruals (TACC), in column 2 is cash flow from operations (CFO), in column 3 is discretionary expenses (DISEXP), in column 4 is production costs (PROD), in column 5 is cost of goods sold (COGS), and in column 6 is inventory level (INV). The models are augmented with the variables of interest Q105, Q205, Q305, the dummy variables for the quarters characterized by an increased political threat. The analysis is on the full sample. Robust standard errors are contained in parentheses. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	TACC	CFO	DISEXP	PROD	COGS	INV
1/ASSETS	0.0101***	-0.0640***	0.0692***	0.00488***	0.00392***	5.99e-06
	(0.00135)	(0.00116)	(0.00607)	(0.000436)	(0.000367)	(3.53e-05)
$SALES_t$		0.276***		0.774***	0.696***	0.0126***
		(0.0389)		(0.0153)	(0.0102)	(0.000844)
$\Delta SALES_t$		-0.175***		-0.168***		
		(0.0537)		(0.0237)		
$SALES_{t-1}$			-0.484**			
			(0.198)			
$\Delta SALES_{t-1}$				-0.0612***		-0.0109***
				(0.0213)		(0.00299)
Q1	0.0630***	-0.0224	0.219**	-0.0190***	-0.0103**	-0.000463
	(0.00674)	(0.0163)	(0.0898)	(0.00587)	(0.00481)	(0.000403)
Q2	0.0401***	-0.00198	0.142	-0.0192***	-0.0106**	-0.000802**
	(0.00705)	(0.0161)	(0.0866)	(0.00575)	(0.00474)	(0.000400)
Q3	0.0308***	0.0215	0.0849	-0.0198***	-0.0118**	-0.000927**
	(0.00615)	(0.0157)	(0.0892)	(0.00565)	(0.00465)	(0.000400)
Q105	-0.0151	-0.00790	-0.207	0.0176*	0.0160*	-4.25e-05
	(0.0201)	(0.0257)	(0.160)	(0.00957)	(0.00832)	(0.00111)
Q205	0.0230	-0.0547**	-0.169	0.0244***	0.0207***	-0.00101
	(0.0191)	(0.0227)	(0.145)	(0.00837)	(0.00743)	(0.00108)
Q305	0.000481	-0.0301*	-0.0270	0.0179***	0.0142**	-4.78e-05
	(0.0161)	(0.0174)	(0.130)	(0.00652)	(0.00580)	(0.00106)
PPE	-0.0602***					
	(0.00470)					
ΔS_t-ΔR_t	0.236***					
	(0.0405)					
Observations	9,356	9,356	9,356	9,356	9,356	9,356
Number of gvkey	731	731	731	731	731	731
Wald-test	507.4	3189	192.8	4687	6327	310.6
Year Effect	YES	YES	YES	YES	YES	YES

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5: Placebo population test - other excise firms

This table reports the estimated coefficients obtained by running an FGLS estimation using the Modified Jones model (Column 1) and the Roychowdhury's models (columns 2 to 6) The dependent variable in column 1 is total accruals (TACC), in column 2 is cash flow from operations (CFO), in column 3 is discretionary expenses (DISEXP), in column 4 is production costs (PROD), in column 5 is cost of goods sold (COGS), and in column 6 is inventory level (INV). The models are augmented with the variables of interest Q105, Q205, Q305, the dummy variables for the quarters characterized by an increased political threat. The analysis is on the placebo population containing tobacco and alcohol producers. Robust standard errors are contained in parentheses. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	TACC	CFO	DISEXP	PROD	COGS	INV
1/ASSETS	-0.0392***	-0.0641***	0.0589***	0.00298***	0.00280***	0.000450**
	(0.00643)	(0.00424)	(0.0118)	(0.000570)	(0.000548)	(0.000197)
$SALES_t$		-0.697***		0.997***	0.791***	0.0516***
		(0.195)		(0.0292)	(0.0190)	(0.0124)
$\Delta SALES_t$		0.909**		-0.287***		
		(0.428)		(0.0621)		
$SALES_{t-1}$			-1.270			
			(1.082)			
$\Delta SALES_{t-1}$				-0.108*		0.00563
				(0.0564)		(0.0393)
Q1	0.0437	0.170	0.890**	-0.0643***	-0.0602***	-0.00721
	(0.0382)	(0.121)	(0.377)	(0.0183)	(0.0185)	(0.00527)
Q2	-0.0147	0.168	0.273	-0.0711***	-0.0648***	-0.0111**
	(0.0422)	(0.117)	(0.345)	(0.0178)	(0.0183)	(0.00549)
Q3	0.0201	0.266**	-0.423	-0.0667***	-0.0602***	-0.00776
	(0.0368)	(0.115)	(0.360)	(0.0175)	(0.0179)	(0.00528)
Q105	0.0229	0.00199	0	0.00116	0.0391**	0.00274
	(0.0831)	(0.176)	(0)	(0.0201)	(0.0196)	(0.0113)
Q205	0.0112	0.0415	0.131	-0.000705	0.0110	-0.00988
	(0.0909)	(0.164)	(0.537)	(0.0173)	(0.0177)	(0.0107)
Q305	-0.0372	-0.0715	0	0.00567	-0.0152	0.00324
	(0.0853)	(0.134)	(0)	(0.0135)	(0.0136)	(0.0101)
PPE	-0.167**					
	(0.0663)					
ΔS_t-ΔR_t	-0.0905					
	(0.229)					
TOBACCO	0.125*	0.00645	0.347	-0.0222	0.0202	-0.00336
	(0.0675)	(0.102)	(0.222)	(0.0164)	(0.0167)	(0.00439)
Observations	397	397	397	397	397	397
Number of gvkey	47	47	47	47	47	47
Wald-test	57.30	274	593.7	2863	2516	34.92
Year Effect	YES	YES	YES	YES	YES	YES

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 6: Placebo treatment test – Massachusetts Automatic Gas Tax

This table reports the estimated coefficients obtained by running an FGLS estimation using the Modified Jones model (Column 1) and the Roychowdhury's models (columns 2 to 6) The dependent variable in column 1 is total accruals (TACC), in column 2 is cash flow from operations (CFO), in column 3 is discretionary expenses (DISEXP), in column 4 is production costs (PROD), in column 5 is cost of goods sold (COGS), and in column 6 is inventory level (INV). The models are augmented with the variables of interest Q114, Q214, Q3, the dummy variables for the quarters characterized by an increased political threat. The analysis is on the full sample. Robust standard errors are contained in parentheses. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

VARIABLES	(1) TACC	(2) CFO	(3) DISEXP	(4) PROD	(5) COGS	(6) INV
1/ASSETS	0.0158***	-0.0771***	0.0895***	0.00177***	0.00108***	-3.10e-05
	(0.00230)	(0.00107)	(0.00380)	(0.000420)	(0.000407)	(2.84e-05)
$SALES_t$		0.117***		0.827***	0.776***	0.00268***
		(0.0297)		(0.0112)	(0.00982)	(0.000653)
$\Delta SALES_t$		-0.157***		-0.171***		
		(0.0402)		(0.0238)		
$SALES_{t-1}$			-0.216***			
			(0.0667)			
$\Delta SALES_{t-1}$				-0.0625***		-0.00346
				(0.0225)		(0.00236)
Q1	0.0705***	-0.0210***	0.0319	-0.0248***	-0.0246***	0.00130***
	(0.0104)	(0.00613)	(0.0214)	(0.00302)	(0.00280)	(0.000333)
Q2	0.0656***	-0.0108*	-0.000302	-0.0207***	-0.0211***	0.00138***
	(0.00904)	(0.00588)	(0.0216)	(0.00305)	(0.00282)	(0.000326)
Q3	0.0357***	-0.00453	-0.00551	-0.0136***	-0.0155***	0.000693**
	(0.00665)	(0.00480)	(0.0186)	(0.00262)	(0.00242)	(0.000338)
Q114	-0.00453	-0.0150	-0.00257	-0.0171**	-0.0194***	0.00178***
	(0.0206)	(0.0163)	(0.0464)	(0.00747)	(0.00713)	(0.000687)
Q214	-0.0134	-0.00837	-0.00267	-0.0270***	-0.0249***	0.000913
	(0.0177)	(0.0140)	(0.0443)	(0.00682)	(0.00643)	(0.000695)
Q314	0.0274**	-0.000650	-0.0369	-0.0272***	-0.0293***	0.00301***
	(0.0135)	(0.0107)	(0.0410)	(0.00566)	(0.00528)	(0.000721)
PPE	0.0656***					
	(0.00890)					
ΔS_t-ΔR_t	0.0587					
	(0.0404)					
TOBACCO	0.125*	0.00645	0.347	-0.0222	0.0202	-0.00336
	(0.0675)	(0.102)	(0.222)	(0.0164)	(0.0167)	(0.00439)
Observations	9,143	9,143	9,143	9,143	9,143	9,143
Number of gvkey	701	701	701	701	701	701
Wald-test	5318	656.1	9068	9031	90.99	315.5
Year Effect	YES	YES	YES	YES	YES	YES

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 7: Tax planning activities after the SAFETEA-LU Act

This table reports the estimated coefficients obtained by running an FGLS estimation using the Roychowdhury's models. The dependent variable in column 1 is cash flow from operations (CFO), in column 2 is production costs (PROD), in column 3 is cost of goods sold (COGS), and in column 4 is inventory level (INV). The models are augmented with the variables of interest $EXCISE_{t-1}$ and $EXCISE_{t-2}$,which represent the amount of excise collected in the quarter t-1 and t-2, respectively. The analysis is on the full sample. Robust standard errors are contained in parentheses. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

VARIABLES	(1) ACFO	(2) PROD	(3) COGS	(4) DINV
1/ASSETS	34.89*	-27.14***	-21.31*	1.133
	(19.07)	(10.37)	(11.01)	(4.404)
$EXCISE_{t-1}$	0.161***	-0.0886**	-0.0814**	-0.00481
	(0.0603)	(0.0448)	(0.0384)	(0.0269)
$EXCISE_{t-2}$	0.00338	-0.00630	-0.0137	0.00239
	(0.0445)	(0.0378)	(0.0298)	(0.0246)
$SALES_t$	0.0194	1.001***	0.983***	0.00551
	(0.0147)	(0.00845)	(0.00794)	(0.00354)
$\Delta SALES_t$	0.0182	0.00281		
	(0.0223)	(0.0185)		
$\Delta SALES_{t-1}$		-0.0159		-0.00908
		(0.0190)		(0.0122)
Observations	449	449	449	449
Number of gvkey	15	15	15	15
Year FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES
Wald-test	1565	104169	86248	96.48

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Tax planning activities around the SAFETEA-LU Act

This table reports the estimated coefficients obtained by running an FGLS estimation using well-established models to investigate tax planning activities. The dependent variables are different measures of tax expenses, in column 1 GAAPETR, in column 2 GAAPETRHanlon, in column 3 CASHETR3. The models are augmented with the variables of interest are Q105, Q205, Q305, dummy variables for the quarters characterized by an increased political threat. The analysis is on the full sample. Robust standard errors are contained in parentheses. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

VARIABLES	(1) GAAPETR	(2) GAAPETRHanlon	(3) CASHETR3
SIZE	0.0303***	0.0302***	-0.0173***
	(0.00315)	(0.00332)	(0.00553)
LEVERAGE	0.0121**	0.0111**	0.00618
	(0.00530)	(0.00558)	(0.0185)
INTANGIBILITY	-0.434***	-0.393***	0.184
	(0.0889)	(0.0928)	(0.162)
ROA	-2.922***	-3.147***	0.137
	(0.257)	(0.266)	(0.637)
PPE	0.0170	0.0287**	-0.0415
	(0.0132)	(0.0138)	(0.0267)
FOREIGN INCOME	-2.797	-5.628	-7.789
	(4.387)	(4.566)	(12.37)
SMOOTH	0.00402**	0.00427**	-0.00705
	(0.00175)	(0.00182)	(0.00521)
Q1	0.0295*	0.0194	-0.707***
	(0.0153)	(0.0160)	(0.0458)
Q2	0.0162	0.00858	-0.0280
	(0.0158)	(0.0164)	(0.0445)
Q3	0.0305**	0.0248*	-0.0892**
	(0.0141)	(0.0147)	(0.0449)
Q105	-0.0148	-0.0246	0.317***
	(0.0438)	(0.0453)	(0.116)
Q205	-0.0292	-0.0456	0.0822
	(0.0407)	(0.0420)	(0.112)
Q305	-0.0248	-0.0322	0.125
	(0.0345)	(0.0357)	(0.112)
Observations	9,356	9,356	9,356
Number of gvkey	731	731	731
Year FE	YES	YES	YES
Wald-test	1014	991.4	395.4

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Further investigation on the excise tax in cigarettes

This table reports the estimated coefficients obtained by running an FGLS estimation using the Modified Jones model (Column 1) and the Roychowdhury's models (columns 2 to 6) The dependent variable in column 1 is total accruals (TACC), in column 2 is cash flow from operations (CFO), in column 3 is discretionary expenses (DISEXP), in column 4 is production costs (PROD), in column 5 is cost of goods sold (COGS), and in column 6 is inventory level (INV). The models are augmented with the variable of interest TAXINCREASE, the dummy variable represents the period where the excise tax increased. The analysis is on the cigarette firms. Robust standard errors are contained in parentheses. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	TACC	CFO	PROD	COGS	DINV	DISEXP
1/ASSETS	-0.00809**	-0.0788***	0.0162***	0.00619***	-0.000165	0.0522***
	(0.00372)	(0.00222)	(0.00141)	(0.00111)	(0.000424)	(0.00473)
$SALES_t$		0.129***	0.690***	0.662***	0.00292	
		(0.0395)	(0.0245)	(0.0205)	(0.00553)	
$\Delta SALES_t$		-0.0456	-0.0419			
		(0.0654)	(0.0436)			
$\Delta SALES_{t-1}$			0.00513		-0.00476	
			(0.0404)		(0.0165)	
TAXINCREASE	0.0324**	-0.0291**	0.00260	0.00940	0.00492**	0.0213
	(0.0142)	(0.0146)	(0.00877)	(0.00776)	(0.00212)	(0.0781)
$SALES_{t-1}$						0.382***
						(0.133)
ΔS_t-ΔR_t	0.0117					
	(0.0704)					
PPE	-0.0760***					
	(0.0136)					
Observations	803	803	803	803	803	803
Number of gvkey	55	55	55	55	55	55
Wald-test	40.54	1346	1603	1240	12.78	180.3

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1