Economic Policy Uncertainty and Firm Tax Avoidance

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This version: 3 Dec 2017

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Abstract

We find a strong evidence that firms reduce cash effective tax rate when economic policy uncertainty heightens. Firms also engage in more aggressive forms of tax avoidance including long-term tax planning or shelters. Cash holdings attenuate the negative effect of policy uncertainty on cash effective tax rate, especially for financially constrained firms. The cash tax savings are retained for reinvestments rather than dividend payouts. Our findings suggest that policy uncertainty exacerbates external financing frictions, which in turn induces precautionary motives of tax avoidance.

Key words: Policy uncertainty, tax avoidance, financial constraints

JEL Classification: G18, G31, G32, H26

1. Introduction

Uncertainty surrounding taxes, government spending, regulatory and monetary policies, or "economic policy uncertainty" is referred to as a key reason for the sluggish economic recovery following the Global Financial Crisis 2008-2009 (Baker *et al.*, 2016; Gulen & Ion, 2016). Recent evidence shows the detrimental impact of policy uncertainty on corporate behaviours, such as decrease in capital investment (Gulen & Ion, 2016) or merger and acquisition activity (Bonaime *et al.*, 2017; Nguyen & Phan, 2017) due to an increased value of delaying irreversible deals. Whilst the influence of policy uncertainty on corporate investment has been well documented, there is scant attention on how firms manage their internal funds during the period of heightened policy uncertainty. We address this void by examining the potential effect of policy uncertainty on corporate tax avoiding activity, one important alternative financing source for firms (Edwards *et al.*, 2015; Law & Mills, 2015).

We hypothesize that economic policy uncertainty may impact on corporate tax avoidance due to its impact on firm financial constraints, which we refer to as precautionary motive of tax avoidance. Pástor and Veronesi (2012, 2013) theoretically and empirically show that stock investors require a risk premia for uncertain government policy leading to stock price decline, which implies higher firm financing costs from equity markets. Bordo *et al.* (2016) further document that policy uncertainty hinders bank credit growth at both aggregate- and bank- specific levels, which suggests an increase in firm difficulties in accessing debt markets. When the frictions faced in raising external funds from both debt and equity markets increase, firms may acquire an alternative source of funds through their tax planning by reducing cash taxes paid (Edwards *et al.*, 2015). Similarly, Law and Mills (2015) argue that financially constrained firms pursue more aggressive tax planning to generate additional internal funds for future investment opportunities. One important benefit of employing tax saving as an alternative source of fund is that unlike many other cost-cutting methods (e.g., reducing

advertising, research and development, capital expenditure and staffing), tax saving is less likely to adversely affect the firm's operations (Edwards *et al.*, 2015). Collectively, the *precautionary motive* hypothesis suggests that increased policy uncertainty results in higher financial constraints, which eventually encourages firms to engage in more tax avoiding activities.

We examine the relation between policy uncertainty and corporate tax avoidance from 1987 to 2015 using the Baker et al. (2016)'s (BBD thereafter) policy uncertainty index. This index is a weighted average measure of the frequency of articles containing key terms related to policy uncertainty in 10 leading U.S. newspapers. This index captures uncertainties about future changes in the federal tax code, future fiscal and monetary policies. While election years are also used in the literature as a measure of policy uncertainty, we employ BBD index instead as this index also captures policy uncertainty unrelated to elections or outside of election years. The BBD index also accounts for the effect of elections as well as the extent to which the election outcomes are uncertain (Bonaime *et al.*, 2017; Gulen & Ion, 2016; Nguyen & Phan, 2017).

Our primary measure of tax avoidance is cash effective tax rate (ETR), as computed by cash tax paid over pre-tax book income before special items, which captures both permanent and temporary deferral strategies (Dyreng *et al.*, 2008; Koester *et al.*, 2017).We find a negative association between policy uncertainty and firm's cash effective tax rate. Our estimation suggests that when policy uncertainty doubles, firms on average lower their cash tax effective rates by 1.09%. Further, we find that the positive impact of policy uncertainty on corporate tax avoidance is economically stronger over time when 100% jump in policy uncertainty results in 2.64% and 3.35% declines in cash effective tax rate after one and two years, respectively. The negative impact of current policy uncertainty on cash effective tax rate weakens after three years and disappears after four years when the policy uncertainty is resolved in the long run.

In general, the results suggest policy uncertainty has a positive and prolonged impact on corporate tax avoidance.

The BBD index may inadvertently capture the effects of general macroeconomic shocks (i.e. recessions and financial crises) that potentially confound our main findings. We address this concern by controlling for several proxies for economic uncertainty. These include the election year (Julio & Yook, 2012), the Livingstone survey of uncertainty about future economic growth, cross-sectional standard deviation of firm-level profit growth, the VXO index of implied volatility, cross-sectional dispersion in stock returns, and the Jurado *et al.* (2015)'s aggregate uncertainty index. We also regress the measure of the U.S. BBD index on the Canada BBD index in the presence of all aforementioned U.S. macro-economic uncertainty measures to obtain the regression residuals. Given that many of the shocks that affect economic uncertainty in the U.S. will also affect general economic uncertainty in Canada, the residuals should be free from potential confounding effects of macroeconomic forces common to both countries. We also use a measure of political polarisation in the U.S. as an instrument for policy uncertainty to further alleviate endogeneity concerns. The results of these tests confirm our main findings that policy uncertainty is positively associated with corporate tax avoidance.

To ensure the robustness of our results, we use various alternative measures of corporate tax avoidance. We find that economic policy uncertainty also lowers GAAP effective tax rates (Dyreng *et al.*, 2010), cashflow-based cash effective tax rate and cash tax differential (Cen *et al.*, 2017). Moreover, the main findings hold when we use measures of more aggressive and deliberate tax planning strategies including tax shelter usage (Wilson, 2009) and long-run cash and GAAP effective tax rates (Dyreng *et al.*, 2008).

We next examine whether policy uncertainty increases firm tax avoidance through its impact on firm financial constraints. We perform two separate analyses. First, we provide evidence that the aggregate market credit conditions, as proxied by the spread of commercial

and industrial loan rates (on loans greater than USD 1 million) over the federal funds rates (Harford, 2005; Harford *et al.*, 2014; Officer, 2007), tighten when policy uncertainty increases. Second, we show that cash holdings attenuate the impact of policy uncertainty on cash effective tax rate, and the moderating role of cash holdings is only prevalent for financially constrained firms. Higher cash reserves provide financially constrained firms with more flexibility to deal with external financing frictions (Bates *et al.*, 2009; Opler *et al.*, 1999). Hence, when financial constraints increase as a result of heightened policy uncertainty, firms with more cash in hand will have less precautionary motives to increase tax avoidance. This evidence suggests managers are aware of relatively high indirect costs of tax planning strategies (e.g., reputational costs) (Graham *et al.*, 2014) and hence reluctant to engage in these potentially illegal activities before running short of other financing sources such as external funds or cash reserves.

We then examine how the policy uncertainty-induced cash tax savings have been used. If firms actually engage in higher tax planning as a response to the increased external financing frictions, they should retain the tax savings for reinvestments rather than increasing dividend payouts (Fazzari *et al.*, 1988; Law & Mills, 2015). We find supporting evidence for this prediction that firms that decrease cash effective tax rate during the heightened policy uncertainty do not increase dividend payout ratio. In contrast, firms increase their earnings-per-share and capital expenditure as the result. The immediate net impact of these financial policy changes on excess stock return, however, is negative, which is possibly due to the additional costs associated with the increased tax avoiding behaviours that is not fully offset by a generous dividend payout policy for the investors.

In the final set of analyses, we find the evidence that firms with stronger external monitoring mechanisms, i.e., those that are exposed to more hostile takeover threats (Cain *et al.*, 2017) or product market competitions (Hoberg *et al.*, 2014), experience a weaker effect of policy uncertainty on tax avoidance. The results suggest that firms that are under stricter market

scrutiny will be more transparent, and hence are more likely to bear higher costs of tax avoidance (e.g., reputational damage if being detected by tax authorities) that in turn refrain managers from participating in this potentially illegal activity. We also find that policy uncertainty reduces firm tax risk, as measured by the standard deviation of cash effective tax rates (Guenther *et al.*, 2017), suggesting that firms are able to maintain a low cash effective tax rate over a long run.

Our study contributes to the literature in several ways. First, we extend the emerging literature on the consequences of economic policy uncertainty. The extant research in this field focuses on policy uncertainty's effect on macro-economic growth (Baker *et al.*, 2016) and micro-enterprise investment decisions including investment in fixed assets (Gulen & Ion, 2016; Julio & Yook, 2012), in research and development (Atanassov *et al.*, 2016) and mergers and acquisitions (Bonaime *et al.*, 2017; Nguyen & Phan, 2017; Pástor & Veronesi, 2012, 2013). Even though these studies enhance our understanding of the impact of policy uncertainty on corporate investment, its impact on firm tax strategies is largely overlooked. We provide evidence that policy uncertainty increases firm cash tax savings and that generating this unique source of internal funds does not reduce productive investment yet increasing them. Hence, our study enriches the related literature by shedding light on the consequences through which macro-economic policy uncertainty influences micro-enterprise financing decisions and investment outcome.

Second, we expand the literature on the determinants of corporate tax avoidance. Much of the prior research focuses on cross-sectional variation in tax avoidance and identifies firm-level factors associated with firm tax avoidance, such as financial leverage (Lisowsky, 2010), ownership (Badertscher *et al.*, 2013; Chen *et al.*, 2010; Cheng *et al.*, 2012), executives (Dyreng *et al.*, 2010) and corporate governance (Armstrong *et al.*, 2015; Khan *et al.*, 2017). We contribute to this literature by not only considering the impact of firm-specific characteristics

but also the effect of aggregate uncertainty associated with future economic policy and regulatory outcomes on firms' tax planning. Such investigation is essential because aggregate uncertainty derived from the instability of political and regulatory policies is largely outside of a firm's control and cannot be easily managed.

The remaining of this article proceeds as follows. Section 2 provides details on data and variable description. Section 3 discusses the main findings and implications while Section 4 concludes the paper.

2. Data and sample selection

2.1 *Sample and data sources*

Our data come from several sources. We collect financial statement information for all publicly traded firms with headquarters located in the United States from the Standard and Poor's Compustat database. Our sample period is from 1987, the first year the company cash taxes paid become available in Compustat due to disclosure requirement under the Statement of Financial Accounting Standards (SFAS) 95, to 2015. The monthly economic policy uncertainty index of Baker *et al.* (2016) is sourced from http://www.policyuncertainty.com. Following the prior literature (Cen *et al.*, 2017; Chen *et al.*, 2010; Dyreng *et al.*, 2016), we remove firm-year observations with negative book-value of equity and negative pre-tax income. Firms from the financial services and utilities industries are also excluded. These screening criteria yield a final full sample of 69,493 firm-year observations.

2.2 *Measures of firm tax avoidance*

We define corporate tax avoidance as activities that reduce the firm's tax expenses or tax payments relative to its pre-tax accounting income (Dyreng *et al.*, 2008, 2010; Hasan *et al.*, 2017). Our measure of tax avoidance is the firm's cash effective tax rate (*CETR*) which equals

to the cash taxes paid divided by pre-tax book income before special items. We use *CETR* as a primary measure of tax avoidance for three reasons. First, we are interested in investigating how firms respond to heightened financial constraints when policy uncertainty increases that result in greater cash tax savings. As Edwards *et al.* (2015) suggest that among all measures of tax avoidance, a firm's *CETR* is the most direct measure of a firm's cash tax burden. Tax planning that decreases a firm's financial constraint will have a direct impact on a firm's *CETR*. Second, *CETR* also reflects a firm's tax avoidance behaviour more accurately as it is less subject to accounting practices that are not necessarily related to avoiding taxes (Davis *et al.*, 2016; Dyreng *et al.*, 2008; Hanlon & Heitzman, 2010). Third, the calculation of *CETR* excludes the effect of special items that include one-time charge-offs or impairments due to bad investments. To ensure the robustness of our results, we also use other measures of tax avoidance. Our inferences, which we will show later, remain consistent across all measures of tax avoidance.

For the ease of interpretation, we truncate *CETR* to the range of 0 and 1 and multiply *CETR* by -1. We then denote it as *TA_CETR* as a measure of firm tax avoidance. By definition, higher *TA_CETR* implies greater tax avoidance. Consistent with prior tax avoidance research, we discard observations if *CETR*'s denominator (pre-tax income adjusted for special items) is negative. The definition and detailed calculation of this variable are provided in Appendix A1.

2.3 *Measures of economic policy uncertainty*

The economic policy uncertainty index (*PU*) is developed by Baker *et al.* (2016) which is a weighted average of the three components. The first component quantifies the volume of news-based policy uncertainty every month starting from January 1985. This is done by searching the 10 leading newspapers: USA Today, Miami Herald, Chicago Tribune, Washington Post, Los Angeles Times, Boston Globe, San Francisco Chronicle, Dallas Morning News, New York Times and Wall Street Journal that contain the following key words: "uncertainty" or

"uncertain"; "economic" or "economy"; and one of the following policy terms: "congress", "deficit", "Federal Reserve", "legislation", "regulation" or "White House". To control for the changes in the volume of articles across newspapers and time, total numbers of word counts are scaled by the total numbers of articles in the same newspaper and month, which yields a monthly policy uncertainty series for each newspaper. These monthly newspaper-level uncertainty series are then standardized by unit standard deviation from 1985 to 2015 and then averaged across the ten papers per month. Finally, the series are then normalized to a mean of 100 from 1985 to 2015.

The second component of the PU index measures the level of uncertainty related to future changes in the tax code. It is a transitory measure constructed by the number of temporary federal tax code provisions set to expire in the contemporaneous calendar year and future ten years and reported by the Joint Committee on Taxation. The third and final component is the CPI disagreement and expenditure dispersion. It is measured by the forecasters' disagreement (the interquartile range of forecast) over future outcomes about inflation rates and federal government purchases, respectively.

The overall measure of policy uncertainty is calculated by normalising each of the three components above and then weighted average of the resulting series, using a weight of one-half for the news-based component, one-sixth of the tax component and one-third for the forecaster disagreement component. This measure has been used in the recent literature to investigate the impact of policy uncertainty on investment (Gulen & Ion, 2016), mergers and acquisitions (Bonaime *et al.*, 2017; Nguyen & Phan, 2017) and stock prices (Pástor & Veronesi, 2013).

2.4 *Control variables*

We identify several control variables including firm size (*SIZE*), market-to-book (*MTB*), financial leverage (*LEVERAGE*), cash holdings (*CASH*), profitability (*ROA*), loss carry-forwards (*NOL*), equity income (*EI*), capital investment (*PPE*) asset intangibility (*INTANGIBLE*), foreign income (*FI*) and Delaware firms (*DELAWARE*). We include a size proxy which is the log transformation of the firm's market capitalisation (*SIZE*). Prior studies provide conflicting evidence of the association between tax avoidance and firm size. Consistent with the "political cost" hypothesis, larger firms have greater incentive to engage in tax avoidance activities (Zimmerman, 1983). Large firms are often more sophisticated and better equipped to structure complex tax-reduction transactions (Hanlon *et al.*, 2005). However, some other studies (Jacob, 1996) do not find a significant relationship.

We also use firm's market-to-book ratio, *MTB*, to capture a firm's expected future economic growth. Similar to Edwards *et al.* (2015), we expect that growth firms will face different tax planning incentives and opportunities than mature firms and so we make no directional prediction for *MTB*.

Financial leverage (*LEVERAGE*) is included to capture the effect of the tax shield on debt, which higher corporate tax shields can reduce marginal tax rates the incentives for incremental tax planning (Graham, 1996a, 1996b, 2000). Newberry and Dhaliwal (2001) also argue that multinationals can place debt in high-tax locations to reduce their effective tax rates. They can also structure off-balance sheet financing to maximize interest deductions without decreasing book income (Mills & Newberry, 2004) or can structure debt to use foreign tax credits (Newberry, 1998). Collectively, these studies suggest that increased levels of debt are positively associated with firm tax avoidance.

We also control for cash holdings (*CASH*) to capture the firm tax planning incentives. The association between cash holdings on firm tax avoidance is not determined the priori. On

the one hand, firms with more cash have less incentive to defer taxes (Cen *et al.*, 2017). On the other hand, tax aggressive firms may also hold more cash as a precautionary motive for future settlement with the Internal Revenue Service (IRS) (Hanlon *et al.*, 2017).

ROA is a firm's operating income scaled by lagged total assets. It is used to control for the effect of firm profitability on taxes and we expect a negative association between profitability on both *TA_CETR* following Edwards *et al.* (2015). Firm loss carry-forwards (*NOL*) is also included as loss carry-forward may also cause a firm's tax rate to differ from the statutory rate (Cen *et al.*, 2017).

EI is also included because prior research suggests that economies of scale and firm complexity resulting in greater equity income are positively associated with tax avoidance (Chen *et al.*, 2010; Rego, 2003). We also control for the existence of foreign jurisdictions (*FI*) and asset intangibility (*INTANGIBLE*) because these are likely to affect both firms' likelihood of using debts and firms' possibility of engaging in tax avoiding behaviour. Specifically, firms taking advantage of foreign tax rate differentials should avoid more tax on average and so we expect *FI* to be positively associated with tax avoidance.

Finally, we include a Delaware incorporation indicator (*DELAWARE*) because prior research argues that Delaware is a domestic tax haven (Dyreng *et al.*, 2013). *DELAWARE* is an indicator variable that is equal to one if a firm is incorporated in Delaware, and zero otherwise.

2.5 *Descriptive statistics*

Table 1 reports descriptive statistics of our tax avoidance measures (Panel A), economic policy uncertainty index (Panel B) and control variables (Panel C) used in our baseline regression in Equation 1 below. The mean values of (inverse) cash effective tax rates (*TA_CETR*) are 25.3%. This is broadly consistent with Cen *et al.* (2017) and Davis *et al.* (2016). Firms in our sample

on average have a (logarithmic scale) size of 5.9 and market to book ratio of 2.9. These firm characteristics are consistent with prior studies (Cen *et al.*, 2017; Hasan *et al.*, 2017).

3. Research methodology, results and discussions

3.1 *Policy uncertainty and corporate tax avoidance*

To investigate the relationship between policy uncertainty and corporate tax avoidance, we use the regression model:

$$TA\_CETR_{i,t+l} = \beta_0 + \beta_1 PU_{i,t} + \sum \gamma_k Controls_{k,i,t} + IndustryFE + \epsilon_{i,t+l} \quad (1)$$

Here, i indexes firms, t indexes fiscal years and $l \in [0,1,2,3,4]$ stands for the year lead between the dependent and independent variables. *TA_CETR* is an inverse measure of firm cash effective tax rates or greater tax avoidance for a firm i from year t to $t+l$. For each firm i, the policy uncertainty variable (*PU*) is measured as the log transformation of the arithmetic average of the *PU* index in the twelve months of the firm's fiscal year t. $Controls$ are the vector of all firm-specific control variables described earlier in Section 2.4 above.

Similar to Gulen and Ion (2016), we do not include the time fixed effects in our specification since doing so will automatically absorb all explanatory power of the policy uncertainty variables. In all specifications, we control for industry fixed effects.[1] The inclusion of industry fixed effects is to ensure that our results are not driven by differences in industry characteristics. We use two-digit SICs to classify our industries (Davis *et al.*, 2016; Hasan *et al.*, 2017). As cash effective tax rate of firm is likely to be correlated over time within a firm, we cluster all standard errors at the firm level. To reduce the impact of extreme outliers, all continuous variables are winsorized at the 1st and 99th percentiles.

<Insert Table 2 here>

[1] In the absence of firm fixed effect, we are unable to control for unobservable firm characteristics. Thus, we have re-estimated our baseline regression using first-differenced equation and the results are presented in Appendix A2. Employing a first-differenced specification mitigates the effect of firm-specific characteristics that are relatively constant over time (Gallemore & Labro, 2015).

Table 2 presents the results of the association between policy uncertainty and tax avoidance as measured by -1 time the cash effective tax rate. The first model (Column (1)) contains no control variables aside from policy uncertainty index while in the second to sixth models (in Columns (2) to (6)) include the full set of controls and industry fixed effects. Also, cash tax effective rates in current year (t) is replaced by one-year (t+1), two-year (t+2), three-year (t+3) and four-year (t+4) leads as dependent variables in Columns (2) to (5), respectively. Results in Columns (1) to (6) suggest that an increase in policy uncertainty leads to lower cash tax effective rates or higher firm tax avoidance both in the current year and the following three years. In particular, the coefficient of *PU* of 0.0109 (Column (2)) indicates that when policy uncertainty doubles, firms on average lower their cash tax effective rates by 1.09%. Further, the coefficients of *PU* remain positive and significant in Columns (3) and (4), suggesting that the positive impact of policy uncertainty on tax avoidance persists after two years and the effect is economically stronger when 100% jump in policy uncertainty results in a 3.35% surge in the tax avoidance in two years later. This positive impact, however, moderates in year three and reverses in year four as suggested by the negative and significant coefficient of *PU* in Column (6). Additionally, in relation to the results of the control variables for firm tax avoidance, Table 2 indicates the significant explanatory powers of these proxies on firm tax avoidance and the signs of their coefficient estimates are generally consistent with the literature.

3.2 *Control for confounding effect of economic uncertainty*

The BBD index may be highly likely correlated with other sources of general uncertainty such as recessions, wars, financial crises that potentially confound our findings of a positive relation between policy uncertainty and firm tax avoidance. To control for this possible contamination, we follow Gulen and Ion (2016) to include several proxies for economic uncertainty and separately run time-series regressions of *PU* on a list of macro uncertainty variables. First, we

include the GDP forecast from Livingston survey published by the Philadelphia Federal Reserve. We calculate the coefficient of variation of GDP forecast as a proxy for expected economic growth uncertainty (*GDPDIS*).[2] Second, we compute the annual cross-sectional standard deviation of firm profit growth as a proxy for future profitability variation, where firm profit growth is defined as the ratio of the change in net income to average sales (*SDPROFIT*). Third and fourth, to control for the equity market uncertainty, we calculate the monthly standard deviation of stock returns (*SDRETURN*) and the Chicago Board Options Exchange's VXO index of implied volatility (VXO). Fifth, we use another comprehensive measure of aggregate uncertainty (*JLN*), developed by Jurado et al. (2015) which is based on the co-movement in the unpredictable component of a big number of economic indicators. Finally, we follow Julio and Yook (2012) to construct an election year dummy (*ELECYEAR*) which equals to one on the years of presidential elections. Through our sample period 1987-2015, there were seven U.S. presidential elections happening every four years in 1988, 1992, 1996, 2000, 2004, 2008, and 2012. We take log transformation of all of these economic uncertainty measures (except for the election year dummy) and gradually add each of them and then all of them to Equation (1). The results of this regression analysis are presented in Table 3 below.

<Insert Table 3 here>

The regression results provided in Table 3 show that the positive association between PU and firm tax avoidance remains highly statistically significant in the presence of these six macro-economic uncertainty variables. After all the economic uncertainty controls are introduced as shown in Column (7), the coefficient of *PU* is 0.0225 suggesting that a 100% increase in policy uncertainty, the firm cash tax effective rates is reduced or tax avoidance increases by 2.25%. The statistically significant result also reveals that the explanatory power of policy uncertainty is not fully absorbed by any of these six proxies, which highlight the

[2] Biannual GDP forecasts from the Livingstone survey of the Philadelphia Federal Reserve Bank.

robustness of our baseline results. It also shows that the BBD index comprises macroeconomic uncertainty information that is not captured by any of the other well-known measures adopted in the existing literature.

Another potential issue with using the BBD index as a proxy for policy uncertainty is that it may capture the effects of other non-policy related factors, such as currency uncertainty, which may cause an error-in-measurement concerns that could potentially bias our estimation. To address this error-in-measurement issue, we follow Gulen and Ion (2016) to extract the policy uncertainty components from the original *PU* measure. We do so by using the two-step regression approach. First, we regress the *PU* measure on the Canadian overall policy uncertainty measure together with other six macro-economic variables described above. We then obtain the regression residuals (*RPU*) which are the difference between the actual and the predicted U.S policy uncertainty measure. The Canadian uncertainty index is chosen due to the close relation between the U.S. and Canadian economies and, thus, any aggregate shock to Canada would affect the U.S. as well. Hence, if the BBD index partially captures policy-unrelated economic uncertainty, the inclusion of the Canadian index helps to remove the economic uncertainty in U.S. that is derived from economic and policy uncertainty in Canada. This technique presents an econometric advantage compared to the previous one which just includes the six macroeconomic variables. This is because this approach helps mitigate the concern of multi-collinearity stemming from the inclusion of too many correlated variables such as *PU* and macroeconomic variables into one model.

In particular, we propose the following augmented monthly time-series model:

$$USPU_t = \alpha_0 + \beta_1 CANPU_t + \gamma_j MACRO\_VARIABLES_{j,t} + \epsilon_t \quad (2)$$

Here, $USPU_t$ and $CANPU_t$ are the log transformation of policy uncertainty measures developed by BBD for the U.S. and Canada, respectively. The term $MACRO\_VARIABLES_t$ represents a vector of six direct measures of macroeconomic uncertainty for U.S. as defined

above and γ_j are parameters to be estimated. The residuals obtained from running Equation (2) should represent a "cleaner" policy uncertainty index as it is exempt from the direct and indirect sources of general economic uncertainty. We then aggregate those monthly residuals in Equation (3) to yearly level using arithmetic average, and denote the new and cleaner measure of policy uncertainty for US as *RPU*. We then repeat the baseline analysis in Equation (1) with *PU* being replaced by *RPU* to be the main variable of interest. Specifically, we run the following model:

$$TA\_CETR_{i,t} = \beta_0 + \beta_1 RPU_{i,t} + \sum \gamma_k Controls_{k,i,t} + IndustryFE + \epsilon_{i,t} \quad (3)$$

The regression result using Equation (3) is presented in Column (8) of Table 3. This result confirms our main findings that policy uncertainty is positively associated with firm tax avoidance. The relation remains statistically and economically significant when a "cleaner" policy uncertainty is adopted. In particular, the result indicates that a doubling in the residual policy uncertainty leads to a decrease by 2.82% in the cash tax effective rates. The larger positive coefficient on policy uncertainty suggests that the cleaner measure, i.e. exempt from aggregate economic shocks, even possesses stronger explanatory power over corporate tax avoidance. This evidence strengthens our argument of a positive association between economic policy uncertainty and tax avoidance.

3.3 *Addressing endogeneity concern: Instrumental variable analysis*

Another concern with our regression analysis described above is that despite the inclusion of both firm controls and industry fixed effects, our policy uncertainty and corporate tax avoidance may be jointly correlated with the unobservable factors, such as investment opportunities, which raises an endogeneity concern in our baseline models. We address this by conducting an instrument variable analysis. We use the partisan polarisation measure (*POLAR*) developed by McCarty et al. (1997) as an instrument for policy uncertainty. This measure is

based on the *DW-NOMINATE* scores to track legislators' ideological positions over time. In particular, the measure is calculated as the difference in the first dimension of the *DW-NOMINATE* scores between the Republican (code: 200) and Democratic (code: 100) parties.[3] We measure the polarisations for the members in both the Senate and House of Representatives as alternative instruments. Partisan polarisation makes it more difficult to build legislation, resulting in policy gridlock and greater variation in policy (McCarty, 2004). Thus, partisan polarisation is a suitable instrument for policy uncertainty because it is directly related to policy uncertainty and is unlikely to have a direct impact on firm tax avoidance. In particular, we execute a two-stage regression strategy as follows:

$$PU_t = \alpha_0 + \beta_1 POLAR_t + \gamma_j MACRO\_VARIABLES_{j,t} + \epsilon_t \quad (4)$$

$$TA\_CETR_{i,t+l} = \beta_0 + \beta_1 FPU_{i,t} + \sum \gamma_k Controls_{k,i,t} + IndustryFE + \epsilon_{i,t} \quad (5)$$

Similar to Equation (2), Equation (4) is a monthly time-series regression where a measure of political polarization (*POLAR*) is further added to the model. The fitted values of *PU* estimated from Equation (4) are aggregated to yearly level to be the key variable of interest, $FPU_{i,t}$, in Equation (5). The specification of Equation (5) is the same with Equation (1), except that the original *PU* is replaced by the fitted *PU (FPU).* Firm-level controls, two-digit SIC code industry fixed effects and firm clustering are included in Equation (5) as in Equation (1).

<Insert Table 4 here>

For brevity, we only present the second stage regression results (i.e. Equation (5)) in Table 4. In Columns (2) to (5), we add one more year lead in each model to examine the impact of policy uncertainty on firm tax avoidance over time. The significantly positive coefficients of the fitted *PU* from Columns (1) to (5) confirm our baseline result of the positive association between policy uncertainty and firm tax avoidance. This impact, however, disappears in year

[3] Data are obtained from http://voteview.org/dwnomin_comparison.htm for the period 1998-2014 that is the maximum availability period.

4, suggesting that firms decrease their tax avoidance activities when policy uncertainty is resolved in the future. The coefficient estimates of *PU* also reveal that firms increase their tax avoidance initially when *PU* increases and reduce through time when the uncertainty becomes less severe. Economically, after controlling for potential endogeneity issue between policy uncertainty and tax avoidance, the impact of policy uncertainty on corporate tax avoidance becomes much stronger. In particular, the coefficients of the fitted *PU* in Columns (2) to (4) reports that a doubling in the level of policy uncertainty leads to reduction by as much as 6.28% (Column (3)) in the cash tax effective rates in the following year.

As a robustness check, in Columns (6) and (8) we report results when *CANPU* is included from Equation (5). In Columns (7) and (8) we replace the Senate *DW-NOMINATE* with House *DW-NOMINATE* scores as the instrumental variable. The results on the coefficients of the fitted *PU* consistently further corroborate our findings of a positive association between policy uncertainty and tax avoidance.

3.4 *Alternative measures of tax avoidance*

We also use several alternative measures of tax avoidance to ensure the robustness of our results. These include *TA_ETR, CASH_RATIO, CTD, CURRENT_ETR, TA_CETR5, TA_ETR5* and *SHELTER.* To calculate *TA_ETR*, we first compute GAAP effective tax rates (*ETR)* which is defined as total tax expenses divided by pre-tax book income before special items. Following Hasan *et al.* (2017), we truncate *ETR* to the range of 0 and 1, multiply by -1 and then name the transformed variable as *TA_ETR*. The measure captures firm practices that reduce tax expenses for financial reporting purposes. One drawback of this measure is that it only reflects tax avoidance strategies that generate permanent differences and does not capture the effects of temporary book-tax differences (i.e. deferral strategies). It is also subject to GAAP tax accruals such as the valuation allowance and unrecognised tax benefits.

To capture conforming tax avoidance which occurs when a firm lowers its taxes by reducing both taxable income and pre-tax accounting income, we follow Cen *et al.* (2017) to use *CASH_RATIO* which uses operating cash flows as the denominator. Specifically, the *CASH_RATIO* is defined as cash taxes paid divided by pre-tax operating cash flows adjusted for extraordinary items and discontinued operations. Similar to *TA_ETR* and *TA_CETR*, this variable is also multiplied by -1 with higher value of *CASH_RATIO* indicating a lower cash taxes paid or higher tax avoidance.

We also use a cash tax differential (*CTD*) measure following Cen *et al.* (2017) which is calculated as the difference between cash taxes paid and the product of statutory tax rate and pre-tax income, scaled by lagged total assets. We also estimate effective tax rates using current tax expenses (*CURRENT_ETR*) to capture current taxes owed to the tax authorities (Cen *et al.*, 2017). Both *CTD* and *CURRENT_ETR* are multiplied by -1 suggesting that the higher the values of *CTD* and *CURRENT_ETR*, the higher the firm tax avoidance.

All of the tax avoidance measures discussed so far focus on annual measures of avoidance. Thus, we do not know if the same firms are avoiding taxes over the time or whether tax avoidance is a transitory phenomena based on a particular set of circumstances (i.e. divesting a line of business in a tax-favoured manner). As a result, we follow Dyreng *et al.* (2008) and Cen *et al.* (2017) to calculate *TA_CETR5* which equals to the sum of total cash tax paid over five years (*t* to *t+4*) scaled by net of total special items over the same accumulation period. *TA_ETR5* is also calculated as the sum of total tax expense over five years (*t* to *t+4*) divided by pre-tax income over the same accumulation period. Using an effective tax rate measure over a five-year horizon avoids annual volatility in effective tax rates, and mitigates concerns about earnings management through accruals because accruals are likely to reverse over the long run. A firm that is successful in avoiding paying tax over a long period of time (i.e. 5 years) is considered as an aggressive tax avoider.

To further test the robustness of our results, we employ a tax-shelter prediction score (*SHELTER)* as developed by Wilson (2009). Tax shelters refer to those complex transactions used by corporations to obtain significant tax benefits probably never intended by the tax code (Hanlon & Slemrod, 2009). The tax shelter participation also represents an aggressive form of tax avoidance.

We replace *TA_CETR* in Equation (1) with the abovementioned variables and report their results in Columns (1) to (7). Across all our models, we find that the coefficients on policy uncertainty is positive and significant suggesting that in the period of higher policy uncertainty, firms are likely to pay significant lower GAAP tax rates, engage in more conforming tax avoidance and shelter their taxes more. It also indicates a positive association between long run corporate tax avoidance and policy uncertainty in the U.S.

<Insert Table 5 here>

3.5 *Financial constraints*

In this section, we examine the economic mechanism underlying the relation between policy uncertainty and tax avoidance. Prior literature suggests a negative association between policy uncertainty and bank credit growth at both firm and aggregate levels (Bordo *et al.*, 2016). If policy uncertainty exacerbates financial constraints, we expect that firms will increase their tax avoidance for their precautionary incentives. To test the financial constraints mechanism, we first examine if aggregate bank credit is tightened due to heightened policy uncertainty, and as the results, firms will increase tax avoidance.

3.5.1 Policy uncertainty and credit market conditions

To investigate the effect of policy uncertainty on general credit market conditions, we estimate the following model:

$$CISPREAD_t = \alpha_0 + \beta_1 PU_t + \gamma_j MACRO\_VARIABLES_{j,t} + QuarterFE + \epsilon_t \qquad (6)$$

Equation (6) is quarterly time-series regression of a proxy for credit market condition with *CISPREAD* is run on news-based measure of policy uncertainty, *PU*, together with six macroeconomic variables described above. Following Harford (2005), Officer (2007) and Harford *et al.* (2014), we capture credit market conditions by *CISPREAD* which is the spread of commercial and industrial loan rates (on loans greater than USD 1 million) over the federal funds rate.[4] Larger *CISPREAD* indicates that credit conditions are more tightening. We also include four quarter dummies (*QuarterFE*) to account for the possible seasonality as well as time trend effects on credit supply. The results for this test are displayed in Table 6.

<Insert Table 6 here>

The result shows that commercial and industrial loans become costlier when policy uncertainty is more heightened, manifested by the positive coefficient for *PU*. This makes it harder for firms to access these main sources of external finance. In summary, the results provide evidence that policy uncertainty exacerbates the credit market conditions at aggregate level.

3.5.2 Policy uncertainty, tax avoidance and cash holdings

Our findings so far suggest that firm tax avoidance increases when financial constraints heighten in the period of greater policy uncertainty. In this section, we examine whether cash holdings serve as a moderating channel to alleviate the positive impact of policy uncertainty on firm tax avoidance. Specifically, we argue if firms have a precautionary motive to hold more cash when financial constraints increase (Bates *et al.*, 2009; Opler *et al.*, 1999), the effects of policy uncertainty on firm tax avoidance should be less pronounced for cash-rich firms. Hence, the moderating effect of cash holdings on the relation between policy uncertainty and tax

[4] Following Harford *et al.* (2014), the spread of commercial and industrial loan rates (on loans greater than USD 1 million) over the federal funds rate are collected from the Federal Reserve Senior Loan Office (SLO) survey published in January, 2017.

avoidance is expected to be stronger for more financially constrained firms (or less cash-rich firms).

To test this hypothesis, we estimate the following model:

$$TA\_CETR_{i,t} = \beta_0 + \beta_1 PU_{i,t} \times CASH_{i,t} + \sum \gamma_k Controls_{k,i,t} + IndustryFE + YearFE + \epsilon_{i,t} \quad (7)$$

In this Equation (7), all the variables are the same as in Equation (1) and the variables of interest is the interaction term, *PU*×*CASH*, that captures the impact of cash holdings on the association between policy uncertainty and tax avoidance. If cash holdings weaken the positive impact of policy uncertainty on capital investment, the coefficient of the interaction term should be negative. Note that, in the presence of year fixed effects, we exclude *PU* in Equation (7) as its explanatory power is absorbed by the year fixed effect. The inclusion of year fixed effect has the advantage of controlling for any general economic conditions that may affect the dependent variable.

We further divide the sample into financial constrained firms (*FC*) and unconstrained firms (UC) following Almeida *et al.* (2004) and Denis and Sibilkov (2010) to test if the moderating role of cash holding is more pronounced for more financially constrained firms. Since there is no agreement in the literature regarding the classification of constrained versus unconstrained firms, we rely on the following three categorization schemes, including firm size, debt and paper ratings. According to Almeida *et al*. (2004) and Hadlock and Pierce (2010), financially constrained firms are those that are small and have low both short-term and long-term credit quality and hence are more vulnerable to capital market frictions. We rank firms based on their asset size per year and assign to the financially constrained (unconstrained) group those firms in the bottom (top) three deciles of the annual size distribution. Likewise, we classify financially unconstrained firms are those that have their debt rated by Standard & Poor's (S&P Long-term Senior Debt rating) and their debt not in default (rating of "D"). Firms

that do not have their debt rated but report positive long-term debt are defined as financially constrained. Similarly, firms are classified as financially unconstrained if they have their short-term rated by S&P's and their debt is not in default. Firms are defined as financially constrained if they have positive short-term debt but are not rated by S&P's. We then rerun Equation (7) separately on the two groups for each classification scheme and their results are reported in Table 7 below.

<Insert Table 7 here>

Column (1) of Table 7 shows that the coefficient on the interaction term, *PU*×*CASH*, is negative and statistically significant as expected suggesting the mitigating role of cash holdings on the impact of policy uncertainty on tax avoidance. Columns (2) through (7) of Table 7 present regression results on subgroups of constrained (*FC*) and unconstrained (*UC*) firms using three aforementioned classification schemes. We find that the coefficients of the interaction term, *PU*×*CASH*, are negative and statistically significant for the *FC* subsample while obtaining statistically insignificant coefficient for the interaction term *PU*CASH* for financially unconstrained firms. In other words, the results indicate that the increase in cash reserves is likely to discourage financially constrained firms to engage in tax avoidance activities induced by higher policy uncertainty. The results strongly support our hypothesis that cash holdings serve as a mechanism to mitigate the positive association between policy uncertainty and tax avoidance, and the moderating impact is more pronounced for more financially constrained firms.

3.6 *Outcomes of corporate tax avoidance*

Tax avoidance is inexorably connected with other firm managerial decisions (Graham, 2003). As a result, it is reasonable to investigate the outcome of firm tax avoidance on the firm financing and investment decisions. In particular, we rationale if financial constraints increase

in the period of greater policy uncertainty, firms that avoid paying more tax have greater incentive to pay less dividend, retain more earnings and increase their investment. This is consistent with Fazzari *et al.* (1988)'s view that firms with greater difficulties in obtaining external capital tend to pay lower dividends than their less financially constraint counterparts. The real option theory of investment irreversibility further suggests that policy uncertainty encourages firms to delay their investment because the value of waiting to invest when policy uncertainty is resolved in the future is higher (Bernanke, 1983). As a result, we expect that the accumulation of more internal source of funds (i.e. through generating more retaining earnings by paying lower dividends) will allow those firms to invest more in the value-increasing projects. Their shareholders, however, will temporarily experience negative excess returns as the shareholders are highly likely to interpret a decrease in dividend payment as a negative signal and thus the share price should go down.

To provide evidence on this issue, we regress the interaction term of *PU* and *TA_CETR* on the following variables: dividend payout ratio (*PAYOUT_RATIO*), earnings per share (*EPS*), capital expenditure (*CAPEX*) and annualised excess return (*EXRETURN*). *PAYOUT_RATIO* equals to the sum of dividend payment on preference shares and ordinary shares divided by operating income after depreciation. *EPS* equals to total earnings divided by the number of share outstanding. *CAPEX* equals to capital expenditure divided by lag of total assets. The firm annualised excess return (*EXRETURN*) is equal to the monthly compounded stock return in excess of monthly compounded benchmark return over the 12 trading months in a given year. Their regression results in relation to *PAYOUT_RATIO, EPS, CAPEX* and *EXRETURN* are presented in Table 8, respectively.

<Insert Table 8 here>

Across all models in Table 8, we include both industry and year fixed effects and cluster at the firm level to avoid any potential cross-sectional correlation among all sample firms. The

coefficient of the interaction *PU*TA_CETR* in Column (1) is not statistically significant, suggesting the cash tax savings during the heightened policy uncertainty time is not used to increase dividend payout ratio. Instead, the avoided cash taxes are used to increase retained earnings, manifested by a positive and statistically significant coefficient of *PU*TA_CETR* in Column (2) when *EPS* is a dependent variable. This is in line with the Graham *et al.* (2014) who report evidence from the file that that increasing earnings per share is an important outcome from a tax planning strategy. Consistent with our prediction, we find in Column (3) that firms increase their capital expenditure which is in line with the real option theory of investment irreversibility (Bernanke, 1983). Their shareholders, however, will temporarily experience negative excess returns as manifested by the negative and significant coefficient of *PU*TA_CETR* in Column (4).

3.7 *Additional analyses*

In the next part of the analysis, we investigate if the association between policy uncertainty and corporate tax avoidance varies with firm external corporate governance and whether policy uncertainty impacts on firm tax risk.

3.7.1 External monitoring

Jensen (1986)'s free cash flow hypothesis states that managers have a tendency to invest more than what is optimal for the firm for personal gain at the expense of shareholders. Tax savings are often substantial and represent potential resources that can facilitate empire building. Therefore, in light of the free cash flow hypothesis (1986), tax savings are more likely to be wasted in the absence of effective monitoring devices. This is not only because of the tendency among managers of poorly governed firms to dissipate a larger share of any value–generating activities but also because the complex and obfuscatory tax avoidance activities create a

potential shield for managerial opportunism (Desai & Dharmapala, 2009; Kim *et al.*, 2011). We expect that stronger external monitoring forces will better align the interest between managers and shareholders and reduce the managers' incentive to engage in tax avoidance activities. This is consistent with Desai and Dharmapala (2006) and Kim *et al.* (2011) that shareholders perhaps do not want managers to engage in tax avoidance activities, despite the gains in after-tax firm value, because doing so could create greater opportunities for managerial diversion of rents.

To test this prediction, we investigate two primary sources of firm external monitoring: the hostile takeover threat and product market competition on the association between tax avoidance and policy uncertainty. The takeover index captures the notion that firms are more exposed to external monitoring if they are more likely to be taken over (as indicated by higher takeover index) (Cain *et al.*, 2017). Prior research also emphasizes the importance of increased takeover pressure on reducing corporate tax avoidance (Desai & Dharmapala, 2006; Gompers *et al.*, 2003). Similarly, Shepherd (1970) defines product market power as a firm's ability to determine the price, quality and nature of the product in the market place. Greater product market power implies that firms face fewer competitive threats and maintain more persistent profitability and therefore provides broader opportunities and potentially greater incentives for firms to engage in tax avoidance (Kubick *et al.*, 2015). To proxy for the impact of firm product market power, we use the product market fluidity index of Hoberg *et al.* (2014) as an inverse measure of product market power. This index captures changes in rival firms' products relative to the firm's products. A higher value of product market fluidity index indicates stronger competitive threats or lower product market power and a stronger external monitoring.

To investigate whether the association between policy uncertainty and corporate tax avoidance varies across firms with different degrees of market power and hostile takeover pressure, the following regression models are used:

$$TA\_CETR_{i,t} = \beta_0 + \beta_1 PU_{i,t} \times HOSTILE_{i,t} + \sum \gamma_k Controls_{k,i,t} + IndustryFE + YearFE + \epsilon_{i,t} \quad (8)$$

$$TA\_CETR_{i,t} = \beta_0 + \beta_1 PU_{i,t} \times PROFLUID_{i,t} + \beta_2 PROFLUID_{i,t} + \sum \gamma_k Controls_{k,i,t} + IndustryFE + YearFE + \epsilon_{i,t} \quad (9)$$

In these equations, $HOSTILE_{i,t}$ represents the log transformation of Cain *et al.* (2017)'s firm-based takeover index, $PROFLUID_{i,t}$ denotes the log transformation of Hoberg *et al.* (2014)'s industry-based product market fluidity index. We are interested in the coefficients of the interaction terms of *PU*×*HOSTILE* and *PU*×*PROFLUID* and their negative coefficients will support our conjecture. Note that in Equation (9), we do not include $HOSTILE_{i,t}$ independently in the presence of industry fixed effect due to the "slow-moving" nature of this measure over time (Cain *et al.*, 2017). We present the result of the impact of external governance on the association between policy uncertainty and tax avoidance in Table 9.

<Insert Table 9 here>

The coefficients on both interaction terms are negative and significant, which are consistent with our prediction. Indeed, firms with stricter external monitoring, i.e., those that are more threatened by external forces in financial and product markets, experience a weaker effect of policy uncertainty on tax avoidance.

3.7.2 Persistence of corporate tax avoidance

The analysis so far indicates that an increased policy uncertainty reduces firm cash effective tax rates (i.e. greater corporate tax avoidance). In this section, we investigate whether firms are able to maintain such low cash effective tax rates in the long run. If firm cash effective tax rates can persist over the time, firms are faced with less tax rate volatility. We use the standard deviation of cash effective tax rates as a measure of tax volatility with higher value indicating greater tax risk (Guenther *et al.*, 2017). We argue that policy uncertainty can either increase or

decrease tax risk. On one hand, with an initial increase in policy uncertainty, financial frictions increase and thus firms are more encouraged to reduce their cash effective tax rates. Further increased policy uncertainty, however, may lead to more unexpected changes in government policy, especially those related to tax policies such as statutory tax rates, regulatory scrutiny, depreciation rules or tax credits. Possible regulatory detection, penalties, and fines may also increase and the tax regulators are more likely to investigate potential tax avoidance cases. We expect that if firms anticipate an increase in regulatory oversight in the future, they may need to alter their tax avoidance activities to reduce the likelihood of scrutiny. As a result, in the period of higher policy uncertainty, firm cash effective tax rates do not persist over the time, leading to higher cash tax rate volatility.

On the other hand, even if policy uncertainty is associated with unexpected policy changes, firms might not alter their existing tax avoidance behaviour, resulting in less tax rate volatility. This is because developing a new tax planning is costly for firms (Cen *et al.*, 2017) and we expect that reversing or altering tax planning would cause the firms to incur adjustment costs. If the marginal costs of adjusting and managing the new tax planning outweigh the marginal benefits from modifying their tax avoidance, firms may be reluctant to change their tax avoidance.

To investigate the impact of policy uncertainty on tax risk, we follow Gallemore and Labro (2015) and Guenther *et al.* (2017) to use five-year *TA_CETR* volatility (*TA_CETR_VOL*). *TA_CETR_VOL* is measured by the standard deviation of *TA_CETR* over the five-year period from *t -4* to *t*. Measurement of each control variable is also averaged over the same five-year period to match with the period we use to calculate *TA_CETR_VOL*. Table 10 displays the results of the association between tax risk and policy uncertainty.

<Insert Table 10 here>

The first model (Column (1)) contains no control variables aside from the average five-year value of policy uncertainty index while the second column includes the full set of controls in the presence of both industry and time fixed effects. The results are consistent with our conjecture that increase policy uncertainty reduces firm cash effective rate volatility or tax risk over the time. They are also economically significant. When policy uncertainty doubles, firms on five year average lower their tax risk by 0.93%.

4. Conclusion

In this paper we investigate the impact of economic policy uncertainty on firm tax avoidance. We find a strong and economically meaningful positive association between economic policy uncertainty and firm tax avoidance. This relation is robust to alternative measures of tax avoidance and several tests to address endogeneity concerns that arise from the possibility that the measure of policy uncertainty may inadvertently capture economic uncertainty. In addition, firms use several aggressive strategies to avoid tax including long-term tax planning or shelters. We also shows that the effect of policy uncertainty on tax avoidance is less pronounced for firms with higher level of cash holdings. Further analysis also documents that the impact of policy uncertainty on tax avoidance is weaker for firms with stronger corporate governance and firm tax risk is reduced in the period of heightened policy uncertainty.

Overall, our findings shed more lights on the importance of uncertainty around government policy in determining firm tax avoidance activities, thereby contributing to the emerging literature on the economic effect of policy uncertainty. It also adds to the literature on the role of taxes in managerial decision-making, and also has important implications for tax authorities and shareholders.

References

Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *Journal of Finance, 59*(4), 1777-1804.

Armstrong, C. S., Blouin, J. L., Jagolinzer, A. D., & Larcker, D. F. (2015). Corporate governance, incentives, and tax avoidance. *Journal of Accounting and Economics, 60*(1), 1-17.

Atanassov, J., Julio, B., & Leng, T. (2016). *The bright side of political uncertainty: The case of R&D*. University of Nebraska, University of Oregon, and Sun Yat-sen University.

Badertscher, B. A., Katz, S. P., & Rego, S. O. (2013). The separation of ownership and control and corporate tax avoidance. *Journal of Accounting and Economics, 56*(2–3), 228-250.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *Quarterly Journal of Economics, 131*(4), 1593-1636.

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do U.S. firms hold so much more cash than they used to? *Journal of Finance, 64*(5), 1985-2021.

Bernanke, B. S. (1983). Irreversibility, uncertainty, and cyclical investment. *Quarterly Journal of Economics, 98*(1), 85-106.

Bonaime, A., Gulen, H., & Ion, M. (2017). Does policy uncertainty affect mergers and acquisitions? *Journal of Financial Economics, Forthcoming*.

Bordo, M. D., Duca, J. V., & Koch, C. (2016). Economic policy uncertainty and the credit channel: Aggregate and bank level U.S. evidence over several decades. *Journal of Financial Stability, 26*, 90-106.

Cain, M. D., McKeon, S. B., & Solomon, S. D. (2017). Do takeover laws matter? Evidence from five decades of hostile takeovers. *Journal of Financial Economics, 124*(3), 464-485.

Cen, L., Maydew, E. L., Zhang, L., & Zuo, L. (2017). Customer–supplier relationships and corporate tax avoidance. *Journal of Financial Economics, 123*(2), 377-394.

Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics, 95*(1), 41-61.

Cheng, C. S. A., Huang, H. H., Li, Y., & Stanfield, J. (2012). The effect of hedge fund activism on corporate tax avoidance. *Accounting Review, 87*(5), 1493-1526.

Davis, A. K., Guenther, D. A., Krull, L. K., & Williams, B. M. (2016). Do socially responsible firms pay more taxes? *Accounting Review, 91*(1), 47-68.

Denis, D. J., & Sibilkov, V. (2010). Financial constraints, investment, and the value of cash holdings. *Review of Financial Studies, 23*(1), 247-269.

Desai, M. A., & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics, 79*(1), 145-179.

Desai, M. A., & Dharmapala, D. (2009). Corporate tax avoidance and firm value. *Review of Economics and Statistics, 91*(3), 537-546.

Dyreng, S., Hanlon, M., & Maydew, E. L. (2008). Long-run corporate tax avoidance. *Accounting Review, 83*(1), 61-82.

Dyreng, S., Hanlon, M., & Maydew, E. L. (2010). The effects of executives on corporate tax avoidance. *Accounting Review, 85*(4), 1163-1189.

Dyreng, S., Hoopes, J. L., & Wilde, J. H. (2016). Public pressure and corporate tax behavior. *Journal of Accounting Research, 54*(1), 147-186.

Dyreng, S., Lindsey, B. P., & Thornock, J. R. (2013). Exploring the role Delaware plays as a domestic tax haven. *Journal of Financial Economics, 108*(3), 751-772.

Edwards, A. S., Schwab, C. M., & Shevlin, T. (2015). Financial Constraints and Cash Tax Savings. *Accounting Review, 91*(3), 859-881.

Fazzari, S., Hubbard, R. G., & Petersen, B. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity*(1), 141-195.

Gallemore, J., & Labro, E. (2015). The importance of the internal information environment for tax avoidance. *Journal of Accounting and Economics, 60*(1), 149-167.
Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate governance and equity prices*. *Quarterly Journal of Economics, 118*(1), 107-156.
Graham, J. (1996a). Debt and the marginal tax rate. *Journal of Financial Economics, 41*(1), 41-73.
Graham, J. (1996b). Proxies for the corporate marginal tax rate. *Journal of Financial Economics, 42*(2), 187-221.
Graham, J. (2000). How big are the tax benefits of debt? *Journal of Finance, 55*(5), 1901-1941.
Graham, J. (2003). Taxes and corporate finance: A review. *Review of Financial Studies, 16*(4), 1075-1129.
Graham, J., Hanlon, M., Shevlin, T., & Shroff, N. (2014). Incentives for tax planning and avoidance: Evidence from the Field. *Accounting Review, 89*(3), 991-1023.
Guenther, D. A., Matsunaga, S. R., & Williams, B. M. (2017). Is tax avoidance related to firm risk? *Accounting Review, 92*(1), 115-136.
Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *Review of Financial Studies, 29*(3), 523-564.
Hadlock, C. J., & Pierce, J. R. (2010). New evidence on measuring financial constraints: Moving beyond the KZ index. *Review of Financial Studies, 23*(5), 1909-1940.
Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics, 50*(2), 127-178.
Hanlon, M., Maydew, E. L., & Saavedra, D. (2017). The taxman cometh: Does tax uncertainty affect corporate cash holdings? *Review of Accounting Studies, 22*(3), 1198-1228.
Hanlon, M., Mills, L. F., & Slemrod, J. B. (2005). An empirical examination of corporate tax noncompliance. In A. Auerbach, J. R. Hines, & J. Slemrod (Eds.), *Taxing Corporate Income in the 21st Century* (pp. 171–210): Cambridge, MA: Cambridge University Press.
Hanlon, M., & Slemrod, J. (2009). What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics*(93), 126-141.
Harford, J. (2005). What drives merger waves? *Journal of Financial Economics, 77*(3), 529-560.
Harford, J., Klasa, S., & Maxwell, W. F. (2014). Refinancing risk and cash holdings. *Journal of Finance, 69*(3), 975-1012.
Hasan, I., Hoi, C.-K., Wu, Q., & Zhang, H. A. O. (2017). Does social capital matter in corporate decisions? Evidence from corporate tax avoidance. *Journal of Accounting Research, 55*(3), 629-668.
Hoberg, G., Phillips, G., & Prabhala, N. (2014). Product market threats, payouts, and financial flexibility. *Journal of Finance, 69*(1), 293-324.
Jacob, J. (1996). Taxes and transfer pricing: Income shifting and the volume of intrafirm transfers. *Journal of Accounting Research, 34*(2), 301-312.
Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review, 76*(2), 323-329.
Julio, B., & Yook, Y. (2012). Political uncertainty and corporate investment cycles. *Journal of Finance, 67*(1), 45-83.
Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring uncertainty. *American Economic Review, 105*(3), 1177-1216.
Khan, M., Srinivasan, S., & Tan, L. (2017). Institutional ownership and corporate tax avoidance: New evidence. *Accounting Review, 92*(2), 101-122.
Kim, J.-B., Li, Y., & Zhang, L. (2011). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics, 100*(3), 639-662.

Koester, A., Shevlin, T., & Wangerin, D. (2017). The role of managerial ability in corporate tax avoidance. *Management Science, 63*(10), 3285-3310.
Kubick, T. R., Lynch, D. P., Mayberry, M. A., & Omer, T. C. (2015). Product market power and tax avoidance: Market leaders, mimicking strategies, and stock returns. *Accounting Review, 90*(2), 675-702.
Law, K. K. F., & Mills, L. F. (2015). Taxes and financial constraints: Evidence from linguistic cues. *Journal of Accounting Research, 53*(4), 777-819.
Lisowsky, P. (2010). Seeking shelter: Empirically modeling tax shelters using financial statement information. *Accounting Review, 85*(5), 1693-1720.
McCarty, N. M., Poole, K. T., & Rosenthal, H. (1997). Income redistribution and the realignment of Americanpolitics.Washington, DC: SEI Press., 1-72.
Mills, L. F., & Newberry, K. J. (2004). Do foreign multinationals' tax incentives influence their U.S. income reporting and debt policy? *National Tax Journal, 57*(1), 89-107.
Newberry, K. J. (1998). Foreign tax credit limitations and capital structure decisions. *Journal of Accounting Research, 36*(1), 157-166.
Newberry, K. J., & Dhaliwal, D. S. (2001). Cross-Jurisdictional Income Shifting by U.S. Multinationals: Evidence from International Bond Offerings. *Journal of Accounting Research, 39*(3), 643-662.
Nguyen, N. H., & Phan, H. V. (2017). Policy uncertainty and mergers and acquisitions. *Journal of Financial and Quantitative Analysis 52*(2), 613-644.
Officer, M. S. (2007). The price of corporate liquidity: Acquisition discounts for unlisted targets. *Journal of Financial Economics, 83*(3), 571-598.
Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics, 52*(1), 3-46.
Pástor, Ľ., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *Journal of Finance, 67*(4), 1219-1264.
Pástor, Ľ., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520-545.
Rego, S. O. (2003). Tax-avoidance activities of U.S. multinational corporations*. *Contemporary Accounting Research, 20*(4), 805-833.
Shepherd, W. (1970). *Market power and economic welfare: An introduction*. New York, NY: Random House.
Wilson, R. J. (2009). An examination of corporate tax shelter participants. *Accounting Review, 84*(3), 969-999.
Zimmerman, J. L. (1983). Taxes and firm size. *Journal of Accounting and Economics, 5*, 119-149.

Tables

Table 1 – Descriptive statistics – Period 1987 - 2015

Variable	Obs.	Mean	Std. Dev.	P25	Median	P75
Panel A: Tax Avoidance Variables						
TA_CETR	69,493	-0.253	0.203	-0.355	-0.238	-0.092
TA_ETR	69,493	-0.301	0.168	-0.384	-0.333	-0.217
CASH_RATIO	69,493	-0.194	0.167	-0.279	-0.167	-0.058
CTD	69,475	0.021	0.072	0.000	0.009	0.023
CURRENT_ETR	66,340	-0.281	0.238	-0.379	-0.288	-0.145
TA_ETR5	69,493	-0.282	0.282	-0.384	-0.333	-0.217
TA_CETR5	69,493	-0.266	0.280	-0.355	-0.238	-0.092
SHELTER	36,103	2.462	1.707	1.315	2.188	3.246
Panel B: Firm Control Variables						
SIZE	69,493	5.936	2.239	4.345	5.948	7.466
MTB	69,493	2.948	2.853	1.323	2.096	3.436
LEVERAGE	69,493	0.191	0.228	0.005	0.134	0.289
CASH	69,493	0.209	0.305	0.029	0.099	0.266
NOL	69,493	0.332	0.471	0.000	0.000	1.000
ROA	69,493	0.136	0.131	0.055	0.103	0.173
EI	69,493	0.001	0.005	0.000	0.000	0.000
PPE	69,493	0.353	0.305	0.128	0.266	0.492
INTANGIBLE	69,493	0.151	0.222	0.000	0.049	0.221
FI	69,493	0.014	0.033	0.000	0.000	0.011
DELAWARE	69,493	0.488	0.500	0.000	0.000	1.000

Table 2: Policy Uncertainty and Corporate Tax Avoidance

Dep =	(1) *TA_CETR (t)*	(2) *TA_CETR (t)*	(3) *TA_CETR (t+1)*	(4) *TA_CETR (t+2)*	(5) *TA_CETR (t+3)*	(6) *TA_CETR (t+4)*
PU	**0.0132*****	**0.0109*****	**0.0264*****	**0.0335*****	**0.0147*****	**-0.0192*****
	[4.00]	[3.31]	[6.99]	[7.92]	[3.34]	[-4.07]
SIZE		-0.0071***	-0.0033***	-0.0017*	-0.0009	-0.0003
		[-10.11]	[-4.09]	[-1.89]	[-0.99]	[-0.28]
MTB		0.0071***	0.0098***	0.0069***	0.0059***	0.0049***
		[16.78]	[19.79]	[12.97]	[10.23]	[8.61]
LEVERAGE		0.0059	-0.0034	-0.0001	0.0003	0.0173**
		[0.99]	[-0.46]	[-0.01]	[0.03]	[1.99]
CASH		0.0575***	0.0662***	0.0533***	0.0391***	0.0415***
		[15.02]	[13.48]	[9.64]	[6.42]	[6.63]
NOL		0.0577***	0.0437***	0.0318***	0.0301***	0.0287***
		[23.47]	[15.66]	[10.46]	[9.31]	[8.66]
ROA		-0.0228**	-0.2236***	-0.1602***	-0.1455***	-0.1352***
		[-2.35]	[-18.89]	[-12.64]	[-10.51]	[-9.35]
EI		1.1752***	0.6210**	0.1876	-0.0645	0.0470
		[5.18]	[2.33]	[0.64]	[-0.21]	[0.14]
PPE		0.0636***	0.0736***	0.0642***	0.0623***	0.0517***
		[10.88]	[10.67]	[8.57]	[7.67]	[6.23]
INTANGIBLE		0.0405***	0.0427***	0.0457***	0.0479***	0.0474***
		[6.62]	[5.77]	[5.62]	[5.52]	[5.46]
FI		0.0535	-0.0490	-0.0792	-0.0463	-0.0114
		[1.32]	[-1.06]	[-1.56]	[-0.87]	[-0.21]
DELAWARE		0.0007	0.0015	0.0035	0.0053*	0.0047
		[0.29]	[0.52]	[1.18]	[1.70]	[1.48]
Observations	69,492	69,492	51,281	43,924	38,508	34,241
Adjusted R-squared	0.037	0.075	0.073	0.055	0.051	0.050
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes

In this table, we regress the firm cash effective tax rates on policy uncertainty (log transformation of BBD index) in Column (1) and include firm-level controls including size (*SIZE*), market-to-book ratio (*MB*), cash holdings (*CASH*), loss carry forwards (*NOL*), profitability (*ROA*), equity income (*EI)* capital investment (*PPE*), asset intangibility (*INTANGIBLE*), foreign income (*FI*) and Delaware firms (*DELAWARE*) in Column (2). In Columns (3), (4), (5) and (6), we replace firm cash effective tax rates by one, two, three and four year lead (t+1, t+2, t+3 and t+4), respectively. All continuous variables are winsorised at 1st and 99th percentiles and defined in Appendix A1. In all regressions, we include industry fixed effects (SIC two digit codes). Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 3: Control for Macro-economic Uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Original PU				Cleaner PU
Dep =				*TA_CETR (t)*				*TA_CETR (t)*
PU	**0.0110*** **	**0.0233*** **	**0.0100*** **	**0.0128*** **	**0.0146*** **	**0.0113*** **	**0.0225*** **	**0.0282*** **
	[3.32]	[6.77]	[3.05]	[3.81]	[4.28]	[3.07]	[5.71]	[4.87]
ELECYEAR	-0.0006						0.0120***	
	[-0.39]						[6.21]	
GDPDIS		0.0071***					0.0154***	
		[11.11]					[17.00]	
SDPROFIT			0.0040***				0.0064***	
			[8.03]				[10.43]	
VXO				-0.0093***			-0.1828***	
				[-3.94]			[-11.31]	
SDRETURN					-0.0250***		-0.0408***	
					[-5.59]		[-7.36]	
JLN						-0.0061***	0.1777***	
						[-2.82]	[11.87]	
SIZE	-0.0071***	-0.0073***	-0.0072***	-0.0072***	-0.0075***	-0.0074***	-0.0088***	-0.0072***
	[-10.10]	[-10.39]	[-10.26]	[-10.19]	[-10.47]	[-9.76]	[-11.45]	[-9.39]
MTB	0.0071***	0.0070***	0.0071***	0.0070***	0.0070***	0.0078***	0.0078***	0.0075***
	[16.77]	[16.50]	[16.92]	[16.70]	[16.62]	[16.98]	[17.00]	[16.30]
LEVERAGE	0.0059	0.0066	0.0070	0.0067	0.0072	0.0023	0.0073	0.0050
	[0.99]	[1.10]	[1.17]	[1.11]	[1.20]	[0.37]	[1.18]	[0.79]
CASH	0.0575***	0.0567***	0.0570***	0.0571***	0.0566***	0.0565***	0.0534***	0.0563***
	[15.01]	[14.81]	[14.89]	[14.91]	[14.79]	[14.19]	[13.49]	[14.00]
NOL	0.0577***	0.0575***	0.0572***	0.0574***	0.0566***	0.0593***	0.0554***	0.0543***
	[23.45]	[23.39]	[23.24]	[23.32]	[22.92]	[21.87]	[20.31]	[19.69]
ROA	-0.0228**	-0.0196**	-0.0235**	-0.0219**	-0.0206**	-0.0279***	-0.0233**	-0.0266**
	[-2.34]	[-2.02]	[-2.43]	[-2.25]	[-2.12]	[-2.76]	[-2.32]	[-2.57]
EI	1.1752***	1.1751***	1.1632***	1.1666***	1.1781***	0.9741***	0.9785***	0.9161***
	[5.18]	[5.17]	[5.13]	[5.15]	[5.20]	[4.11]	[4.09]	[3.72]
PPE	0.0636***	0.0639***	0.0635***	0.0635***	0.0639***	0.0620***	0.0641***	0.0610***
	[10.88]	[10.95]	[10.88]	[10.87]	[10.94]	[10.27]	[10.68]	[9.85]
INTANGIBLE	0.0404***	0.0389***	0.0388***	0.0401***	0.0384***	0.0409***	0.0282***	0.0381***
	[6.61]	[6.36]	[6.37]	[6.56]	[6.28]	[6.30]	[4.38]	[5.81]
FI	0.0535	0.0600	0.0475	0.0551	0.0566	0.0539	0.0515	0.0691
	[1.32]	[1.48]	[1.18]	[1.36]	[1.40]	[1.25]	[1.20]	[1.64]
DELAWARE	0.0007	0.0011	0.0008	0.0007	0.0009	0.0013	0.0026	0.0012
	[0.29]	[0.43]	[0.33]	[0.29]	[0.36]	[0.50]	[0.99]	[0.45]
Observations	69,492	69,492	69,492	69,492	69,492	60,429	60,429	56,267
Adjusted R-squared	0.075	0.077	0.076	0.076	0.076	0.078	0.084	0.076
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

In Column (1) through (6), we add each of six proxies for general economic uncertainty, including election year dummy (*ELECYEAR*), GDP forecast dispersion (*GDPDIS*), standard deviation of cross-sectional profit growth (*SDPROFIT*), implied volatility *(VXO*), standard deviation of cross-sectional real returns (*SDRETURN*), and Jurado *et al.* (2015)'s index (*JLN*). Column (7) includes all of these six macro-economic uncertainty measures together. In Column (8), we replace the original policy uncertainty measure by a cleaner measure that is residuals obtained by running monthly time-series regressions of the original index of United States on that of Canada and aforementioned six economic uncertainty proxies. Industry two digits SIC codes fixed effects are included. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 4: 2SLS - Political Polarization IV

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Include Canada PU in the 1st stage regression?							
			No			Yes	No	Yes
Dep =	*TA_CETR (t)*	*TA_CETR (t+1)*	*TA_CETR (t+2)*	*TA_CETR (t+3)*	*TA_CETR (t+4)*	*TA_CETR (t)*	*TA_CETR (t)*	*TA_CETR (t)*
FPU (Senate)	**0.0183*** **	**0.0424*** **	**0.0628*** **	**0.0464*** **	**0.0023**			
	[3.91]	[8.02]	[11.59]	[8.01]	[0.37]			
FPU (Senate)						**0.0238*** **		
						[5.24]		
FPU (House)							**0.0189*** **	
							[4.01]	
FPU (House)								**0.0222*** **
								[4.91]
SIZE	-0.0065***	-0.0032***	-0.0014	-0.0012	-0.0009	-0.0066***	-0.0066***	-0.0066***
	[-7.68]	[-3.30]	[-1.32]	[-1.08]	[-0.83]	[-7.74]	[-7.69]	[-7.73]
MTB	0.0065***	0.0093***	0.0061***	0.0053***	0.0040***	0.0065***	0.0065***	0.0065***
	[12.84]	[15.89]	[9.91]	[8.09]	[6.20]	[12.95]	[12.85]	[12.92]
LEVERAGE	0.0063	0.0021	0.0081	0.0122	0.0287***	0.0067	0.0064	0.0066
	[0.86]	[0.23]	[0.81]	[1.14]	[2.77]	[0.92]	[0.87]	[0.90]
CASH	0.0534***	0.0625***	0.0506***	0.0301***	0.0331***	0.0532***	0.0533***	0.0532***
	[10.48]	[9.18]	[6.72]	[3.64]	[4.05]	[10.45]	[10.47]	[10.46]
NOL	0.0429***	0.0296***	0.0172***	0.0178***	0.0175***	0.0425***	0.0429***	0.0426***
	[13.97]	[8.56]	[4.68]	[4.73]	[4.63]	[13.86]	[13.96]	[13.88]
ROA	-0.0092	-0.2340***	-0.1617***	-0.1458***	-0.1272***	-0.0089	-0.0092	-0.0090
	[-0.75]	[-14.72]	[-9.75]	[-8.12]	[-6.81]	[-0.72]	[-0.74]	[-0.73]
EI	0.6341**	0.3590	0.2556	-0.0958	-0.2753	0.6356**	0.6340**	0.6349**
	[2.27]	[1.12]	[0.73]	[-0.26]	[-0.66]	[2.28]	[2.27]	[2.28]
PPE	0.0664***	0.0800***	0.0727***	0.0636***	0.0499***	0.0666***	0.0664***	0.0665***
	[8.99]	[8.97]	[7.52]	[6.23]	[4.81]	[9.03]	[9.00]	[9.02]
INTANGIBLE	0.0269***	0.0270***	0.0230**	0.0266***	0.0346***	0.0265***	0.0267***	0.0266***
	[3.72]	[3.06]	[2.35]	[2.64]	[3.62]	[3.68]	[3.71]	[3.69]
FI	0.0082	-0.1322**	-0.1729***	-0.0819	-0.0486	0.0060	0.0078	0.0065
	[0.18]	[-2.43]	[-2.89]	[-1.34]	[-0.79]	[0.13]	[0.17]	[0.14]
DELAWARE	0.0010	0.0031	0.0063*	0.0048	0.0042	0.0010	0.0010	0.0010
	[0.32]	[0.91]	[1.71]	[1.26]	[1.09]	[0.34]	[0.31]	[0.33]
Observations	38,902	29,573	26,003	23,689	21,950	38,902	38,902	38,902
Adjusted R-squared	0.068	0.067	0.053	0.050	0.044	0.069	0.068	0.069
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table reports the second-stage regression of the firm cash effective tax rates over the fitted values of policy uncertainty (log transformation of BBD index) and firm-level control variables. The fitted values are obtained from running first-stage monthly time-series regressions of original news-based policy uncertainty measure on *DW-NOMINATE* scores as an instrumental variable and six other macro-economic uncertainty measures. In Columns (1)-(6), the Senate *DW-NOMINATE* scores are used, while from Columns (7) - (8), the House *DW-NOMINATE* scores are employed as instrumental variables. In Columns (6) and (8), the Canadian policy uncertainty measure is included in the first-stage regressions, while in the other Columns, the measure is excluded from the list of macro-economic uncertainty. In Columns (2) to (5), we replace firm cash effective tax rates by one, two, three and four year lead (t+1, t+2, t+3 and t+4), respectively. All continuous variables are winsorized at 1% levels and defined in Appendix A1. In all regressions, we include industry fixed effects. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5: Alternative Measures of Tax Avoidance

Dep =	(1) *TA_ETR (t)*	(2) *CASH_ RATIO (t)*	(3) *CTD (t)*	(4) *CURRENT_ ETR (t)*	(5) *TA_CETR5 (t)*	(6) *TA_ETR5 (t)*	(7) *SHELTER (t)*
PU	**0.0232*****	**0.0319*****	**0.0042*****	**0.0291*****	**0.0095****	**0.0288*****	**0.3102*****
	[7.82]	[12.78]	[4.06]	[7.07]	[2.15]	[5.59]	[8.34]
SIZE	-0.0033***	-0.0061***	-0.0012***	-0.0058***	-0.0043***	-0.0079***	0.4088***
	[-5.12]	[-12.39]	[-7.29]	[-7.18]	[-4.96]	[-9.06]	[38.24]
MTB	0.0050***	0.0057***	0.0008***	0.0032***	0.0067***	0.0076***	-0.0088
	[12.95]	[17.82]	[4.73]	[6.26]	[12.34]	[12.47]	[-1.36]
LEVERAGE	-0.0139**	-0.0081*	0.0103***	0.0226***	0.0034	-0.0218**	-0.4738***
	[-2.52]	[-1.74]	[4.10]	[3.18]	[0.44]	[-2.50]	[-6.17]
CASH	0.0752***	0.0906***	0.0234***	0.0240***	0.0457***	0.1115***	0.4052***
	[20.34]	[25.27]	[11.71]	[4.55]	[9.76]	[17.82]	[6.87]
NOL	0.0295***	0.0504***	0.0075***	0.0542***	0.0604***	0.0468***	1.0524***
	[13.86]	[27.50]	[11.63]	[18.55]	[19.60]	[14.29]	[33.04]
ROA	-0.1789***	-0.3767***	0.1252***	-0.0820***	0.0740***	-0.2843***	1.0763***
	[-18.67]	[-40.06]	[20.93]	[-6.13]	[5.71]	[-18.32]	[7.19]
EI	1.2959***	0.0983	0.2514***	1.4494***	1.2460***	1.3359***	9.2431***
	[6.15]	[0.51]	[3.13]	[5.44]	[4.67]	[4.49]	[4.03]
PPE	0.0153***	0.1141***	0.0176***	0.0754***	0.0673***	0.0216***	-0.0701
	[2.94]	[25.22]	[7.62]	[11.09]	[9.42]	[2.79]	[-0.87]
INTANGIBLE	0.0299***	0.0448***	0.0097***	0.0346***	0.0439***	0.0524***	0.1195
	[5.44]	[9.30]	[4.16]	[4.71]	[5.86]	[6.21]	[1.47]
FI	0.1761***	0.0107	0.0041	0.0324	0.0618	0.0561	2.2159***
	[5.07]	[0.33]	[0.33]	[0.73]	[1.36]	[1.25]	[5.70]
DELAWARE	-0.0145***	-0.0012	-0.0026***	-0.0087***	0.0013	-0.0103***	-0.0038
	[-6.76]	[-0.60]	[-4.13]	[-3.06]	[0.42]	[-3.42]	[-0.14]
Observations	69,492	69,492	69,474	66,339	69,492	69,492	36,101
Adjusted R-squared	0.069	0.171	0.105	0.049	0.043	0.044	0.436
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table reports the regression results of alternative measures of firm tax avoidance on policy uncertainty (log transformation of BBD index) and firm-level control variables. The alternative measures of firm tax avoidance are *TA_ETR* which is a GAAP effective tax rates which equals to total tax expenses divided by pre-tax book income before special items. *CASH_RATIO* is included following Cen et al. (2017) which is defined as cash taxes paid divided by pre-tax operating cash flows adjusted for extraordinary items and discontinued operations. *CTD* is cash tax differential which is the difference between cash taxes paid and the product of statutory tax rate and pre-tax income, scaled by lagged total assets. *CURRENT_ETR* equals to total tax expense minus deferred tax expense adjusted for special items. *TA_ETR5* is -1 times the sum of total tax paid over five years (t to t+4) scaled by pre-tax income net of total special items over the same accumulation period. A tax-shelter prediction score (*SHELTER)* as computed in Wilson (2009) refers to those complex transactions used by corporations to obtain significant tax benefits probably never intended by the tax code. All continuous variables are winsorized at 1% levels and defined in Appendix A1. In all regressions, we include industry fixed effects. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 6: Policy Uncertainty and Credit Market Conditions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep =					*CISPREAD (t)*			
PU	**0.5771*** **	**0.5816*** **	**0.3714*** **	**0.5999*** **	**0.6137*** **	**0.5106*** **	**0.5811*** **	**0.2559*** **
	[7.78]	[7.79]	[5.41]	[8.26]	[9.09]	[8.18]	[6.83]	[3.73]
ELECYEAR		-0.0387						0.0659
		[-1.00]						[1.57]
GDPDIS			0.2433***					0.4137***
			[6.80]					[9.03]
SDPROFIT				0.0403*				-0.1345***
				[1.91]				[-6.07]
VXO					-0.1871***			0.5501**
					[-3.44]			[2.43]
SDRETURN						-1.0642***		-0.1860
						[-6.14]		[-0.96]
JLN							-0.1083**	-0.6099***
							[-2.19]	[-3.04]
Observations	116	116	116	116	116	112	100	100
Adjusted R-squared	0.341	0.339	0.529	0.354	0.402	0.492	0.350	0.671
Quarter-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table reports quarterly time-series regressions of a proxy for credit market conditions (*CISPREAD*) on overall policy uncertainty measure (*PU*) and macro-economic uncertainty measures as controls. All variables are defined in Appendix A1. In all regressions, we include year-quarter fixed effects. T-statistics based on robust standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7: Financial Constraints Channel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep =	*TA_CETR (t)*						
FC Criteria	Full	Size		Debt Rating		Paper Rating	
Sample		FC	UC	FC	UC	FC	UC
PU*CASH	**-0.0290*** **	**-0.0423** **	**0.0260**	**-0.0405** **	**-0.0500**	**-0.0454*** **	**0.0806**
	[-2.68]	[-1.99]	[1.21]	[-2.46]	[-1.06]	[-2.93]	[1.12]
SIZE	-0.0099***	-0.0252***	-0.0087***	-0.0119***	-0.0067***	-0.0090***	0.0003
	[-13.43]	[-11.92]	[-3.90]	[-11.94]	[-3.39]	[-10.23]	[0.08]
MTB	0.0071***	0.0102***	0.0045***	0.0092***	0.0032***	0.0071***	0.0033***
	[16.58]	[10.97]	[7.58]	[15.38]	[4.62]	[13.93]	[3.06]
LEVERAGE	0.0209***	-0.0023	0.0253**	0.0189**	0.0316**	0.0266***	0.0250
	[3.52]	[-0.21]	[2.43]	[2.16]	[2.54]	[3.80]	[1.00]
CASH	0.1825***	0.2197**	-0.0575	0.2576***	0.2667	0.2762***	-0.3750
	[3.71]	[2.26]	[-0.59]	[3.43]	[1.22]	[3.92]	[-1.13]
NOL	0.0489***	0.0848***	0.0083**	0.0546***	0.0186***	0.0490***	0.0080
	[19.03]	[17.68]	[1.99]	[16.15]	[4.28]	[16.63]	[1.25]
ROA	-0.0066	0.1038***	-0.0390**	-0.0069	0.0207	0.0011	-0.0283
	[-0.68]	[6.49]	[-2.02]	[-0.53]	[0.71]	[0.09]	[-0.54]
EI	1.1218***	1.4164***	0.8083**	1.3398***	0.5736	1.1633***	0.9157*
	[4.85]	[3.39]	[2.44]	[4.35]	[1.53]	[4.35]	[1.74]
PPE	0.0675***	0.0468***	0.0920***	0.0701***	0.0926***	0.0722***	0.0883***
	[11.67]	[4.61]	[8.93]	[8.65]	[7.49]	[10.02]	[4.06]
INTANGIBLE	0.0125**	0.0127	0.0233**	0.0330***	-0.0063	0.0173**	0.0407**
	[2.05]	[1.05]	[2.37]	[3.83]	[-0.54]	[2.35]	[1.97]
FI	0.0536	-0.2209**	0.1820***	0.0798	0.1227*	0.0404	0.2129**
	[1.34]	[-2.33]	[3.29]	[1.51]	[1.72]	[0.85]	[2.34]
DELAWARE	0.0041	0.0073	0.0089**	0.0028	0.0113**	0.0054*	0.0079
	[1.62]	[1.53]	[2.15]	[0.89]	[2.51]	[1.87]	[1.20]
Observations	69,492	20,591	21,194	40,050	18,035	51,381	6,704
Adjusted R-squared	0.091	0.091	0.117	0.099	0.100	0.092	0.128
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Test of Coeff. Diff.							
Chi-square (p-value)		**5.14 (0.02**)**		**0.04 (0.85)**		**2.97 (0.08*)**	

In this table, we regress the firm cash effective tax rates (TA_CETR) on the policy uncertainty index (PU) and cash holdings (*CASH*), the interaction term (*PU_NEWS*CASH*), and other controls. Column (1) reports regression result for full sample. Columns (2) to (7) report the results for subsamples of financially constrained (FC) and unconstrained (UC) firms using three classification schemes, including firm size, debt rating and paper rating. In all regressions, we include industry and year fixed effects . All continuous variables are winsorized at 1% levels and defined in Appendix A1. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8: Tax Avoidance Outcomes

Dep =	(1) *PAYOUT_RATIO (t)*	(2) *EPS (t)*	(3) *CAPEX (t)*	(4) *EXRETURN (t)*
PU*TA_CETR	**-0.0955**	**0.3161*** **	**0.0091** **	**-0.0994** **
	[-1.64]	[3.15]	[2.12]	[-2.33]
TA_CETR	0.2617	-1.3318***	-0.0446**	0.7093***
	[0.98]	[-2.88]	[-2.24]	[3.60]
SIZE	0.0256***	0.3264***	-0.0004**	-0.0046***
	[15.12]	[45.51]	[-2.12]	[-3.93]
MTB	0.0022*	-0.0783***	0.0019***	0.0424***
	[1.68]	[-20.10]	[17.13]	[26.28]
LEVERAGE	-0.0419**	0.0258	-0.0507***	-0.0342***
	[-2.56]	[0.67]	[-27.24]	[-2.94]
CASH	-0.0480***	-0.8914***	-0.0185***	0.0385***
	[-6.15]	[-28.98]	[-18.52]	[3.45]
ROA	-0.4031***	3.3803***	0.0100***	0.3202***
	[-16.14]	[37.09]	[3.71]	[11.17]
PPE	0.0545***	-0.3510***	0.1581***	0.0001
	[3.48]	[-8.08]	[67.67]	[0.01]
Observations	68,573	69,041	68,916	60,193
Adjusted R-squared	0.092	0.359	0.550	0.154
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm Cluster	Yes	Yes	Yes	Yes

In this table, we regress the interaction term of policy uncertainty (*PU*) and firm cash effective tax rates on the following measures: firm dividend payout ratio (*PAYOUT_RATIO*), earnings per share (*EPS*), capital expenditure (*CAPEX*) and annualized excess return (*EXRETURN*). In all regressions, we include industry and year fixed effects. All continuous variables are winsorized at 1% levels and defined in Appendix A1. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 9: Policy Uncertainty, Tax Avoidance and External Governance

	(1)	(2)
Dep =	*TA_CETR (t)*	*TA_CETR (t)*
PU*HOSTILE	**-0.0166*****	
	[-4.84]	
PU*PROFLUID		**-0.0028****
		[-2.14]
PROFLUID		0.0177***
		[2.95]
SIZE	-0.0082***	-0.0041***
	[-9.99]	[-4.24]
MTB	0.0073***	0.0053***
	[15.59]	[10.24]
LEVERAGE	0.0214***	0.0310***
	[3.23]	[3.95]
CASH	0.0509***	0.0525***
	[12.06]	[9.29]
NOL	0.0605***	0.0437***
	[21.07]	[14.20]
ROA	-0.0406***	-0.0311**
	[-3.75]	[-2.13]
EI	0.8811***	0.4533
	[3.14]	[1.37]
PPE	0.0671***	0.0772***
	[10.01]	[9.30]
INTANGIBLE	0.0029	0.0038
	[0.41]	[0.51]
FI	0.0466	0.0469
	[0.98]	[1.00]
DELAWARE	0.0107***	0.0065**
	[3.92]	[2.07]
Observations	53,540	34,507
Adjusted R-squared	0.097	0.087
Industry FE	Yes	Yes
Year FE	Yes	Yes
Firm Cluster	Yes	Yes

In this table, we regress firm cash effective tax rates (*TA_CETR*) on policy uncertainty measure (*PU*), the interaction between policy uncertainty and two measures of external governance. These include *HOSTILE* that is log transformation of firm-based hostile takeover index as developed by Cain et al. (2017), and *PROFLUID* that is log transformation of industry-based product market competition index as constructed by Hoberg et al. (2014). All continuous variables are winsorized at 1% levels and defined in Appendix A1. In all regressions, we include industry and year fixed effects. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 10: Policy Uncertainty and Cash Effective Tax Rate Volatility

	(1)	(2)
Dep =	*TA_CETR_VOL* (t)	*TA_CETR_VOL* (t)
PU5	**-0.0184*** **	**-0.0093*** **
	[-5.21]	[-2.59]
SIZE5		-0.0086***
		[-18.25]
MTB5		-0.0027***
		[-9.15]
LEVERAGE5		0.0123***
		[4.34]
CASH5		0.0116***
		[4.96]
NOL5		-0.0035*
		[-1.69]
ROA5		-0.0496***
		[-10.37]
EI5		-0.0308
		[-0.19]
PPE5		0.0018
		[0.77]
INTANGIBLE5		0.0066*
		[1.74]
FI5		-0.0256
		[-0.99]
DELAWARE5		0.0041**
		[2.38]
Observations	63,065	63,065
Adjusted R-squared	0.011	0.055
Industry FE	Yes	Yes
Year FE	No	No
Firm Cluster	Yes	Yes

In this table, we regress firm cash ETR Volatility on the average value of policy uncertainty over the five year period. Each of the control variables is defined in Appendix A1 and is also averaged over the five-year period ending in year t. All continuous variables are winsorized at 1% levels and defined in Appendix A1. In all regressions, we include industry fixed effects. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Appendix

Appendix A1 Variable definitions		
Panel A: Tax avoidance measures		
Variables	**Measures**	**Definition**
TA_CETR	Cash effective tax rate	Cash tax paid (txpd) divided by pre-tax book income (pi) less special items (spi). When the denominator is zero or negative, CETR is set as missing. CETR is truncated to the range [0,1]. TA_CETR is defined as -1 times CETR.
TA_ETR	Effective tax rate	Total tax expense (txt) divided by pre-tax income, which is the difference between pre-tax book income (pi) and special items (spi). If the denominator is zero or negative, ETR is set as missing. ETR is truncated to the range [0,1]. TA_ETR is defined as -1 times ETR.
DTAX	Discretionary permanent book-tax difference	DTAX is the residuals (ε) of the following regression estimated by two-digit SIC code and fiscal year where all variables (including the intercept (α_0)) are scaled by beginning-of-year total assets (at) following Frank et al. (2009): $PERMDIFF_{i,t} = \alpha_0 + \alpha_1 INTANG_{it} + \alpha_2 UNCON_{it} + \alpha_3 MI_{it} + \alpha_4 CSTE_{it} + \alpha_5 \Delta NOL_{it} + \alpha_6 LAGPERM_{it} + \varepsilon_{it}$ Where: BI_{it} = pre-tax book income (pi) for firm i in year t; $CFTE_{it}$=current deferral tax expenses (txfed) for firm i in year t; $CFOR_{it}$ =current foreign tax expense (txfo) for firm i in year t; DTE_{it}= deferred tax expense (txdi) for firm i in year t; STR_{it}= statutory tax rate in year t (35%); $INTANG_{it}$= goodwill and other intangibles (intan) for firm i in year t; $UNCON_{it}$= income (loss) reported under the equity method (esub) for firm i in year t; MI_{it}= income (loss) attributable to minority interest (mii) for firm i in year t; $CSTE_{it}$= current state income tax expense (txs) for firm i in year t; ΔNOL_{it}=change in the net operating loss carryforwards (tlcf) for firm i in year t; $LAGPERM_{it}$= one-year lagged PERMDIFF for firm i in year t; and ε_{it} = discretionary permanent difference ($DTAX_{it}$) for firm i in year t. Following Frank et al. (2009) and Hassan et al. (2017), missing values of these variables are handled as follows: If minority interest (mii), current foreign tax expense (txs), income from unconsolidated entities (esub) or current state tax expense (txs) is missing on Compustat, we set *MI, CFOR, UNCON* or *CSTE* to zero. If current deferral tax expense (*TXFED*) is missing on Compustat, we set the value of *CFTE* to: total tax expense (txt) less current foreign tax expense (txfo) less current state tax expense (txs) less deferred tax expense (txdi). If information for goodwill and other intangibles (*INTANG*) is missing on Compustat, we set the value for *INTANG* to zero. If *INTANG*=C, then we set the value of *INTANG* to that for goodwill (*GDWL*).
DEFERRAL		The ratio of deferred tax expense to pre-tax income adjusted for special items (txdfed+txdfo)/(pi-spi); if missing (txdfed+txdfo) then txdi/(pi-spi)
TA_ETR5	Long term effective tax rates	-1 times five-year effective tax rate: txt/(pi-spi). Both txt and pi-spi are cumulated over five years before calculation.
TA_CETR5	Long term cash effective tax rates	-1 times five-year cash ETR: txpd/(pi-spi). Both txpd and pi-spi are cumulated over five years before calculation.
LOW_ETR	Bottom quintile of the ETR distribution for all firms	A dummy variable which equals to 1 if a firm's ETR belongs to the bottom quintile of the ETR distribution for all firms with the same two-digit SIC code in a given year and zero otherwise.

LOW_CETR	Bottom quintile of the CETR distribution for all firms	A dummy variable which equals to 1 if a firm's CETR belongs to the bottom quintile of the CETR distribution for all firms with the same two-digit SIC code in a given year and zero otherwise.
ETR_DODGER	Tax dodgers	A dummy variable which equals to 1 if a firm has a positive pre-tax profit and a zero ETR in a given year and zero otherwise.
CETR_DODGER	Tax dodgers	A dummy variable which equals to 1 if a firm has a positive pre-tax profit and a zero CETR in a given year and zero otherwise.
SHELTER	Shelter prediction score	Following Wilson (2009), our shelter prediction score is defined as: *SHELTER=-4.30+6.63BTD -1.72LEV + 0.66SIZE + 2.26ROA + 1.62FI + 1.56RD* Where: *BTD* is book income less taxable income scaled by lagged total assets. Taxable income is calculated by grossing up the sum of the current federal tax expense and the current foreign tax expense subtracting the change in NOL carryforward. If the current federal tax expense is missing, then total current tax expense is calculated by subtracting deferred taxes, state income taxes and other income taxes from total income taxes; *LEV* is long-term debt divided by total assets; *SIZE* is the log transformation of total assets; *ROA* is pre-tax earnings divided by total assets; *FI* is pretax foreign income divided by lagged total assets *RD* is R&D expenses divided by lagged total assets.
CASH_RATIO	Firm cash ratio	Cash tax paid divided by pre-tax operating cash flows adjusted for extraordinary items and discontinued operations. This is txpd/(oancf+txpd-xidoc). *CASH_RATIO* is also multiplied with – 1 with higher value indicating higher tax avoidance.
CTD	Cash tax differential	Cash tax differential of Henry and Sansing (2014) which is estimated as the difference between cash taxes paid and the product of statutory tax rate and pre-tax income, scaled by lagged total assets. (txpd-0.35*(pi-spi)). *CTD* is also multiplied -1 with higher value indicating higher tax avoidance
CURRENT_ETR	Current effective tax rate	-1 times (txt-txdi)/(pi-spi)
Panel B: *Economic Policy Uncertainty*		
PU	Economic policy uncertainty	Log transformation of Baker et al. (2016)'s total policy uncertainty index.
Panel C: Control Variables and other firm-level characteristics		
SIZE	Firm Size	Log transformation of the market value of equity (prcc_f * csho) for a firm at the beginning of the year.
MTB	Market to book ratio	Market value of equity (prcc_f * csho), scaled by book value of equity.
LEVERAGE	Leverage	Long term debt (dltt) scaled by lagged assets (at)
CASH	Cash holding	Firm cash holding defined as cash and marketable securities (che) divided by lagged assets (at)
NOL	Net loss carry forward	A dummy variable that equals to one if loss carry forward (tlcf) for a firm is positive and zero otherwise
ROA	Return on assets	It is measured as operating income (pi-xi) scaled by lagged assets (at)
EI	Equity income	Equity income in earnings (esub) for a firm in a given year, scaled by lagged assets (at)
PPE	Property, plant and equipment	Property, plant and equipment (ppent) for a firm in a given year, scaled by lagged assets (at)
INTANGIBLE	Intangible assets	Intangible assets (intan) for a firm in a given year, scaled by lagged assets (at)
FI	Foreign income	Foreign income (pifo) for a firm in a given year, scaled by lagged assets (at). Missing values in pifo are set to zero.
DELAWARE	Delaware state	A dummy variable which equals to 1 if a firm is incorporated in Delaware state and a zero otherwise.
HOSTILE	Hostile takeover index	Log transformation of hostile takeover index that is developed by Cain *et al.* (2017).

AR	Asset Redeployability	The cross-industry redeployability of a given asset by computing the proportion of industries in which the asset is used. The industry-level redeployability index is the value-weighted average of each asset's redeployability score.
SUNK	Cost Sunkness Index	Using firms' rent expense, their depreciation expense, and their sales of PPE in the past 12 quarters to normalize by PPE at the beginning of the current quarter. We then aggregate these three proxies up to the three-digit SIC level by taking the industry-level means of the firm-level values and then combine the three proxies into one sunk-cost index, which, at any time t, takes a value of 0, 1, or 2, where 0 is for industries with all three proxies above their cross-sectional medians at time t; 2 is for industries with all proxies below these medians; and 1 is for the remaining industries.
AD	Asset Durability Dummy	Calculating the correlation between each firm's quarterly sales and GNP (over our entire sample period) and then aggregate these correlations at the three-digit SIC level by taking averages of the firm-level correlations and then creating an indicator variable that equals one for industries with correlations above the sample median, and zero for the rest of the industries.
Panel D: Industry-level characteristics		
PROFLUID	Inverse measure of product market power	Log transformation of Hoberg *et al.* (2014)'s industry-based product market fluidity index.
Panel E: Country-level characteristics		
RPU	Residual Policy Uncertainty	Residuals obtained by running monthly time-series regressions of U.S. PU on Canadian PU and U.S. macro variables.
FPU	Fitted Policy Uncertainty	Estimated value obtained by running monthly time-series regressions of U.S. PU on a measure of political polarization (POLAR), Canadian PU and U.S. macro variables.
POLAR	Political Polarization	Difference in the first dimension of the DW-NOMINATE scores between the Republican (code: 200) and Democratic (code: 100) parties for either Senate and House of Representatives members.
DW-NOMINATE	DW-Nominate Score	The DW-NOMINATE scores as developed by McCarty *et al.* (1997)
ELECYEAR	Election Year Dummy	Dummy variable indicating the U.S. presidential election years.
GDPDIS	GDP Dispersion	Log transformation of GDP Dispersion.
SDPROFIT	Profit Volatility	Log transformation of profit growth.
VXO	Implied Volatility	Log transformation of VXO index.
SDRETURN	Return Volatility	Log transformation of standard deviation of real return.
JLN	Jurado, Ludvigson & Ng (2015)'s Index	Log transformation of JLN aggregate uncertainty index.
Δ***GDP***	GDP Growth	Yearly change in GDP, divided by lagged GDP.
CISPREAD	Credit Market Condition	Log transformation of quarterly spread of commercial and industrial loan rates (on loans greater than US$ 1 million) over the federal funds rate.

Table A2: Changes in policy uncertainty and corporate tax avoidance

Dep	(1) *D.TA_CETR (t)*	(2) *D.TA_CETR (t+1)*	(3) *D.TA_CETR (t+2)*	(4) *D.TA_CETR (t+3)*	(5) *D.TA_CETR (t+4)*
D.PU	**0.0123****	**0.0224*****	**0.0304*****	**0.0167****	**-0.0304*****
	[2.54]	[4.15]	[4.69]	[2.37]	[-3.96]
D.SIZE	0.0178***	-0.0189***	-0.0118***	-0.0115***	-0.0010
	[6.46]	[-5.42]	[-3.21]	[-2.93]	[-0.23]
D.MTB	0.0003	0.0071***	-0.0020**	0.0008	0.0002
	[0.45]	[9.75]	[-2.46]	[0.88]	[0.23]
D.LEVERAGE	-0.0050	-0.0064	0.0025	0.0045	0.0199
	[-0.71]	[-0.73]	[0.23]	[0.39]	[1.53]
D.CASH	-0.0154**	0.0308***	0.0125	-0.0162*	-0.0011
	[-2.51]	[4.26]	[1.42]	[-1.72]	[-0.11]
D.NOL	0.0102***	0.0191***	-0.0041	0.0085	-0.0046
	[2.77]	[4.28]	[-0.84]	[1.57]	[-0.87]
D.ROA	0.2774***	-0.2851***	0.0493***	0.0399**	-0.0031
	[17.79]	[-16.25]	[2.64]	[2.16]	[-0.15]
D.EI	1.4581***	0.1165	-0.4418	0.1356	-0.0631
	[3.88]	[0.29]	[-0.89]	[0.31]	[-0.13]
D.PPE	-0.0217**	0.0699***	-0.0110	-0.0212*	-0.0008
	[-2.44]	[6.46]	[-0.89]	[-1.67]	[-0.05]
D.INTANGIBLE	-0.0135	-0.0003	-0.0006	-0.0082	-0.0223
	[-1.60]	[-0.03]	[-0.05]	[-0.64]	[-1.49]
D.FI	0.7413***	-0.2678***	-0.2595***	0.1251*	0.1278
	[12.23]	[-4.09]	[-3.47]	[1.68]	[1.62]
Observations	50,841	41,816	34,418	29,976	26,629
R-squared	0.031	0.021	0.004	0.002	0.002
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes	Yes

This table presents the results of estimating a first-differenced version of Equation (1) with D.TA_ETR as the dependent variable, where D.*TA_ETR* is measured as the change in the ETR in the current year minus the ETR in the previous year. Each column employs a change in a different of *PU, SIZE, MTB, LEVERAGE, CASH, NOL, ROA, ROA, EI, PPE, INTANGILE* and *FI* measured as the change in value from year $t-1$ to t. In all regressions, we include industry fixed effects and firm clustering effects. All other variables are defined in Appendix A1, and are also measured as the change in the variable from the year $t-1$ to t. Coefficients are presented with firm-clustered standard errors in parenthesis. ***, **, and * denote significance at a 1, 5, and 10%, respectively.

Table A3: Policy uncertainty and tax avoidance during the GFC period

Dep	(1) *TA_CETR(t)*	(2) *TA_CETR(t)*
PU	0.0218***	0.0191***
	[6.65]	[4.70]
GFC	-0.5094**	-1.6788***
	[-2.32]	[-5.05]
PU*GFC	**0.1035****	**0.3393****
	[2.32]	[5.02]
ELECYEAR		0.0158***
		[7.68]
GDPDIS		0.0157***
		[17.31]
SDPROFIT		0.0072***
		[10.79]
VXO		-0.2362***
		[-12.42]
SDRETURN		-0.0421***
		[-7.57]
JLN		0.2329***
		[12.73]
SIZE		-0.0088***
		[-11.49]
MTB		0.0078***
		[16.96]
LEVERAGE		0.0072
		[1.16]
CASH		0.0533***
		[13.45]
NOL		0.0553***
		[20.20]
ROA		-0.0233**
		[-2.32]
EI		0.9726***
		[4.07]
PPE		0.0641***
		[10.69]
INTANGIBLE		0.0279***
		[4.33]
FI		0.0520
		[1.21]
DELAWARE		0.0027
		[1.01]
Observations	87,631	60,429
Adjusted R-squared	0.032	0.084
Industry FE	Yes	Yes
Year FE	No	No
Firm Cluster	Yes	Yes

In this table, we run regressions of cash effective tax rate (TA_CETR) on news-based policy uncertainty measure, firm-level controls, and one GFC dummy (Column 1), and both GFC dummy and the interaction term, *PU*GFC* (Column 2). The GFC dummy indicates the period 2007-2009 when the Global Financial Crisis occurred. All variables are defined in Appendix A1. In all regressions, we include industry fixed effects and firm clustering effects. Robust t-statistics based on firm clustered standard errors are reported in the brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.