Firm Inflexibility and Corporate Tax Avoidance [1]

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Operationally inflexible firms will seek for ways to increase their financial flexibility. Avoiding taxes is one of the ways firms achieve financial flexibility through internal resources. We examine whether a firm's inflexibility influences its corporate tax avoidance behavior. We find that inflexibility is positively associated with corporate tax avoidance. We control for endogeneity concerns and show that the positive association between firm inflexibility and tax avoidance is greater for firms with volatile cash flows, greater financial constraints, more competitive product markets, and for firms that are in contraction.

JEL Classification: G32; H26
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1. Introduction

Firms try to achieve both financial flexibility and operational flexibility to increase their value. Financial flexibility allows a firm to access and restructure its financing at a low cost, especially when random growth opportunities arrive. Greater operational flexibility lowers firms' operation adjustment costs enabling them to respond better to business cycles. The prior literature shows that financial flexibility and operational flexibility are, to some extent, substitutes and that marginal value of achieving financial flexibility will increase as operational flexibility decreases (Mauer and Triantis 1994; Gamba and Triantis, 2008; Hackbarth and Johnson, 2015; Reinartz and Schmid, 2016; Gu, Hackbarth, and Johnson, 2018).

In a theoretical model, Gamba and Triantis (2008) show that corporate income tax structure is a key determinant for the value of financial flexibility. One of the ways firms achieve greater financial flexibility is to avoid taxes especially when external financing becomes more costly (Edwards et al. 2013 and Graham et al. 2014). In this paper, we examine corporate tax behavior of

firms with lower operational flexibility. We show that operationally inflexible firms avoid taxes more to achieve greater financial flexibility.

Operationally flexible firms can shut down and reopen their production facilities in response to macroeconomic conditions. Operational flexibility acts as a close substitute to holding cash. In contrast, inflexible firms incur greater operational adjustment costs losing growth opportunities during economic booms and not contracting quickly during recessions. These firms may adopt a more dynamic financing policy and issue debt and equity as needed. Mauer and Triantis (1994) model optimal financing policy for inflexible firms as a trade-off between the tax advantage of debt financing and recapitalization and financial distress costs. They find that production flexibility has a positive effect on the value of interest tax shields. As operating adjustment costs increase, the average leverage ratio decreases. However, Gu et al. (2019) show empirically that inflexible firms adopt a lower level of financial leverage. Greater flotation costs can decrease a firm's ability to achieve financial flexibility through equity issuances. Facing market frictions associated with external financing, inflexible firms will resort to achieving financial flexibility through internal resources.

Riddick and Whited (2009) show that precautionary motives to holding cash reserves increase with the fixed cost of adjustment to production. However, they also show that the trade-offs between income taxation and external financing determine optimal level of cash holdings. How do inflexible firms obtain financial flexibility if raising external funds is not optimal? Gamba and Triantis (2008) show that the value of financial flexibility depends on a firm's corporate tax behavior among other factors, especially when income tax structure creates a disincentive to holding cash. High statutory corporate tax rates lowers the value of financial flexibility. We argue that operationally inflexible firms will pursue various corporate tax avoidance practices to increase

cash tax savings and improve their financial flexibility.

We use inflexibility measure developed by Hackbarth and Johnson (2015) and Gu, Hackbarth, and Johnson (2018). The inflexibility measure is a time-varying proxy of a firm's inflexibility level and indicates the range of operating costs given the volatility of a firm's sales. To measure a firm's level of tax avoidance, we use three Cash effective tax rate (Cash ETR) variables following Dyreng et al. (2008) who show that cash tax payment scaled by pretax income is a better proxy of a firm's tax avoidance practices. Lower values of Cash ETRs indicate greater tax avoidance. We multiply these measures by -100 for ease of interpretation. Our final sample includes over 40,000 firm-year observations from 1987 to 2019.

We begin our analysis with the baseline regression model that examines the relationship between firm inflexibility and corporate tax avoidance. We show that after controlling for firm characteristics, inflexibility has a positive and statistically significant effect on corporate tax avoidance. Firms with greater operational inflexibility are likely to engage more in tax avoidance. This finding is consistent with the prior literature showing that firms achieving financial flexibility through avoiding taxes to mitigate the lack of operational flexibility (Mauer and Triantis 1994, Hackbarth and Johnson 2015; Edwards et al. 2013, and Gamba and Triantis 2008).

We recognize that a firm's decision to avoid taxes and invest in inflexible assets may be jointly determined. Similar factors can affect both the fundamental elements of the inflexibility measure and a firm's tax avoidance behavior. We use the adoption of the Interstate Banking and Branching Efficiency Act (IBBEA) as a positive credit supply shock that relaxed banking branching regulations across the states. Several studies have found that this banking deregulation is associated with an increase in the supply of credit and results in a decrease in the cost of capital for firms (Rice and Strahan 2010; Gu, Hackbarth, and Li 2021). Because inflexible firms suffer

from higher credit constraints, we expect that operationally inflexible firms would benefit more from the passage of this Act. Following Rice and Strahan (2010) we construct IBBEA index from 1994 to 2005 and examine the effect of firm inflexibility on corporate tax avoidance around the deregulation of bank operations using a staggered difference-in-difference estimation model. Our findings confirm the baseline results that inflexible firms are less likely to engage in tax avoidance after the bank deregulation. An exogenous increase in credit access decreases external financing constraints of inflexible firms and decreases their motivation to avoid taxes.

We conduct several cross-sectional analyses to explore the possible mechanisms through which inflexibility affects corporate tax avoidance. We focus on both firm-specific and industry characteristics, namely cash flow volatility, product market competition, financial constraints, and growth stage of a firm. We find that firms with volatile cash flows and with greater financial constraints may rely more on tax savings as an internal source of financial flexibility. Similarly, firms facing greater market competition and lack of growth opportunities may suffer more from operational inflexibility. Our cross sectional analysis shows that inflexible firms with greater cash flow volatility, greater financial constraints, higher market competition, and firms in contraction phase avoid more cash taxes.

We conduct several robustness checks to confirm the validity of our results. First, we confirm that our results hold when accounting for the parallel trend assumption of difference-in-difference estimation method following Bertrand and Mullainathan (2003). Second, we conduct placebo regression analysis for falsification tests following Slusky (2017). We randomly select a year that is not three years before and after the banking deregulation for each state other than states that did not lift the restrictions. After thousand simulations, we confirm that randomly assigned banking deregulation cases have no significant effect on corporate tax avoidance behavior. We

conclude that the positive association between inflexibility and tax avoidance is likely to be causal.

Third, following Chen et al. (2019) and Pierce and Schott (2016) we use China's joining the World Trade Organization (WTO) as an alternative exogenous shock that relaxes the burden of inflexible firms. After China joined the WTO, manufacturing firms switched from labor-intensive equipment to capital-intensive production technologies. Similar to the findings for banking deregulation, we find that after China joins the WTO, inflexibility are likely to reduce the extent of their tax avoidance.

Our study contributes to the prior literature in several ways. First, we contribute to corporate tax avoidance literature that examines fundamental economic tradeoffs between a firm's tax behavior, investment policies and operational flexibility. These tradeoffs are discussed by Scholes and Wolfson (1992) and emphasized in the review of tax research by Hanlon and Heitzman (2010). Gamba and Triantis (2008) and Edwards et al. (2013) document the significance of income tax structure for financial flexibility. We show that a firm's tax planning behavior plays a significant role in relaxing operational inflexibility. Inflexible firms are likely to adjust their investment policies to accumulate tax-favored assets.

Second, our paper extends the literature on the role of inflexibility in corporate finance decisions. Several papers investigate the relationship between various flexibility measures and capital structure decisions (Mauer and Triantis 1994; MacKay 2003; Serfling 2016; D'Acunto et al. 2018; Gu et al. 2019). These studies generally find that inflexible firms adopt a lower level of financial leverage. One implication of these studies is that inflexible firms may also suffer from lack of external financial flexibility. We argue that because inflexible firms face greater external financing constraints, they resort to obtain internal funds through lowering tax payments. To the best of our knowledge, our study is the first to examine the relationship between a firm's

operational flexibility and tax avoidance behavior.

Our paper offers several practical implications for corporate executives and policymakers. First, because for inflexible firms higher levels of financial leverage may led to greater distress costs, employing tax planning strategies may become a significant source of cash and help firms avoid bankruptcy costs. Second, our results offer important insights for policymakers such that adopting necessary policies to mitigate the sources of operational inflexibility, such as lowering start up and shut down costs, readjustment costs of operations in various industries. These policies may have a significant effect on increasing tax revenues some of which may go uncollected because of tax avoidance practices of inflexible firms.

The rest of the paper proceeds as follows. Section 2 reports data, sample, and research design. Section 3 discusses the empirical results between inflexibility and tax avoidance. In this section, we also present the identification strategy that mitigates endogeneity concerns. Section 4 presents cross sectional tests and the key firm and industry specific factors playing a significant role for the relationship between inflexibility and tax avoidance. Section 5 presents robustness tests and finally, section 6 concludes.

2. Data, Sample, and Research Design

2.1. Data and Sample

We construct our sample based on Compustat North America Annual Database from 1987 to 2019. Following the prior literature, we exclude the financial firms (with SIC codes of 6000 to 6999) and the utility firms (with SIC codes 4900 to 4999). After excluding observations with missing values, our final sample includes 42,309 firm-year observations.

2.2. Measuring Inflexibility

We construct the inflexibility measure following Hackbarth & Johnson (2015) and Gu, Hackbarth, and Johnson (2018). The inflexibility measure is a time-varying proxy of a firm's inflexibility level and indicates the range of operating costs given the volatility of a firm's sales. To compute the measure, we use the following equation, as derived in Hackbarth & Johnson (2015):

$$Inflexibility_{i,t} = \frac{\max_{i,t_0,t}\left(\frac{OPC}{Sales}\right) - \min_{i,t_0,t}\left(\frac{OPC}{Sales}\right)}{std_{i,t_0,t}\left(\Delta \log\left(\frac{Sales}{Assets}\right)\right)} \quad (1)$$

where OPC is the operating cost that equals the sum of Cost of Goods Sold ($COGS$) and the Selling, General, and Administrative Expenses ($XSGA$). Since the information in the past may not be relevant now, we adopt a rolling-window approach to construct the inflexibility measure, where year t_0 is the starting year of each estimation window. We use 10-years rolling windows to find out the maximum and minimum of OPC scaled by $Sales$, and the standard deviation of the logarithm differences of the $Sales$ over $Total\ Assets$.[2]

As highlighted in Gu, Hackbarth, and Li (2021), inflexibility is significantly correlated with various variables that potentially capture certain aspects of adjustment costs for capital and labor, including the asset resalability index, the inflexible employment measure, and the industry-level unionization rate, and is available for all public firms over the recent 50 years. Because of these features, we believe inflexibility measure allows us to conduct reliable analysis on the impact of operating inflexibility on firms' tax policies.

2.3. Measuring Tax Avoidance

Following the prior literature, we define corporate tax avoidance as activities that reduce the firm's tax expenses or tax payments relative to its pretax accounting income (Hanlon and Heitzman, 2010). Dyreng et al. (2008) show that cash effective tax rate (Cash ETR) is a better

[2] We also use different estimation rolling windows, namely 3-year, 5-year, and 20-year windows to construct the measure, and our empirical findings are robust with different estimation windows.

measure of corporate tax avoidance because it is less prone to activities related to earnings management. In this study, we use different Cash Tax effective ratios, which are $Cash\ ETR1$, $Cash\ ETR2$, and $Long-term\ Cash\ ETR$. $Cash\ ETR1$ is calculated as the income taxes paid over the pretax income minus the special items. The special items include one-time charge-offs or impairments due to bad investments. $Cash\ ETR2$ includes excess tax benefit stock options from both the cash flow operating and cashflow financing in the numerator, and without special items in the denominator. $Long-term\ Cash\ ETR$ minimizes the impact of possible tax deferral strategies around the years by including the rolling window of 5-year in the calculation. Equations (2) to (4) show the calculations of $Cash\ ETRs$' measures.

$$Cash\ ETR1 = \frac{Income\ Taxes\ Paid}{Pretax\ Income - Special\ Items} \tag{2}$$

$$Cash\ ETR2 = \frac{\begin{array}{c} Income\ Taxes\ Paid + \\ Excess\ Tax\ Benefit\ Stock\ Options\ (Cash\ Flow\ Operating) + \\ Excess\ Tax\ Benefit\ Stock\ Options\ (Cash\ Flow\ Financing) \end{array}}{Pretax\ Income} \tag{3}$$

$$Long-term\ Cash\ ETR = \frac{Moving\ average\ of\ Total\ Income\ Taxes}{Moving\ average\ of\ (Pretax\ Income - Special\ Items)} \tag{4}$$

Consistent with the prior studies, higher Cash ETRs represent higher cash effective tax-paying rates and less corporate tax avoidance activities, lower values of $Cash\ ETR$ shows less cash payments and greater corporate tax avoidance activities. When running regression models, we multiply all the $Cash\ ETR$ measures by -100 for more intuitive interpretations of our findings. After this adjustment, greater values of Cash ETRs indicate greater tax avoidance by a firm.

2.4. Control Variables

We control for firm characteristics that are known to affect a firm's tax avoidance behavior.

We include $Total\ Assets$ to control for firm size, $Discretionary\ Accruals$ to control for financial reporting opacity and firms' incentive of earnings management. Other controls include Tobin's Q ($Tobin's\ Q$), Leverage ($Leverage$), Cash ($Cash$), Cash flow ($Cash\ Flow$), Capex ($CAPEX$), and Working capital ($Working\ Capital$). All variables are defined in Appendix 1.

3. Empirical Results

3.1. Descriptive Statistics

Table 1 presents the summary statistics for our major variables. We winsorize most of our variables at 2.5 and 97.5 percentiles, with the exceptions applying to a few other variables that are either less or more skewed.[3] For the consideration of more intuitive interpretations of the results, we multiply -1 with all the dependent measures. After applying the multiplication, the mean $Cash\ ETR1$, $Cash\ ETR2$, *Long-term Cash ETR* are 24.40, 26.46, and 25.92, respectively. 25% of firm-year observations have *Cash ETR* of below 7% and *Long-Term Cash ETR of below 16%*. The average level of $Inflexibility$ in our sample is 1.197, whereas the median level is 0.736.

[Insert Table 1 about here]

3.2. Baseline OLS Results

To investigate the relationship between inflexibility and corporate tax avoidance, we run the OLS regression:

$$Tax\ Avoidance_{i,t} = \alpha + \beta Inflex_{i,t-1} + \gamma X_{i,t-1} + \tau_t + \tau_j + \epsilon_{i,t} \quad (5)$$

Where Tax avoidance measures are $Cash\ ETR1, Cash\ ETR2, and\ Long-term\ Cash\ ETR$ for firm i in year t. $Inflex_{i,t-1}$ is firm i's inflexibility measured in year $t-1$. $X_{i,t-1}$ is the set of

[3] We winsorize total assets at 1 and 99 percentiles, and discretionary accruals at 5 and 95 percentiles.

control variables including firm size ($Total\ Assets$), discretionary accruals ($Discretionary\ Accruals$), Tobin's Q ($Tobin's\ Q$), leverage ($Leverage$), cash ($Cash$), cash flow ($Cash\ Flow$), capital expenditure ($CAPEX$), and working capital ($Working\ Capital$). τ_t represents the fixed year effects. τ_j indicates the firm-fixed effects.

[Insert Table 2 about here]

Table 2 reports the results from the baseline regression model in equation (5). We find that after controlling for firm-specific factors the coefficients on $Inflexibility$ are positive and statistically significant at the 1% level. The baseline results indicate that inflexible firms tend to have lower effective cash tax rates. This finding is consistent with our expectations and suggests that the inflexible firms are more likely to engage in tax avoidance and pay less cash taxes. It is plausible that for inflexible firms the benefits of lowering tax payments outweigh direct and indirect costs associated with engaging in tax avoidance practices.

3.3. Identification Strategy: The Case of Bank Branching Deregulation

Our baseline regression results show that firm inflexibility is positively associated with tax avoidance. However, we recognize that a firm's tax planning decisions and investment policies may be endogenous. Then our findings will suffer from omitted variable problem and reverse causality issues. In addition, it is difficult to identify a shock that directly generates exogenous variations on inflexibility measure, as the fundamental elements of the inflexibility measure, the historical costs over sales, are relatively persistent. To address these issues, we consider an exogenous shock that would have a significant effect on inflexible firms. Specifically, we adopt the Interstate Banking and Branching Efficiency Act (IBBEA) as a positive credit supply shock (see e.g., Rice and Strahan, 2010; Gu, Hackbarth, and Li, 2021). Several studies show that the

passage of IBBEA has increased the supply of credit and borrowing from banks and decreased the cost of capital of firms (Amore et al. 2013; Rice and Strahan 2010). The IBBEA is expected to affect flexible and inflexible firms differently and provide inflexible firms with greater financial flexibility. Therefore, we examine whether inflexible firms change their tax avoidance behavior significantly in response to the exogenous credit supply shock.

The McFadden Act in 1927 officially granted the state authority to regulate the in-state banking branching lawfully. Banks in many states are prohibited from expanding by opening interstate branches until 1970s. In 1970, only 12 states permitted banking branching without any restrictions, and 16 states did not allow banking branching at all. Regulations on banking restrictions began to change in 1970s in two ways: some states gradually allowed converting the subsidiary banks into branches, and others introduced the de-novo banking branching. These changes eventually led to a push to lift the restrictions entirely. The first state to pass a law of permitting entering of bank holding companies from another state is Maine in 1978. Alaska and New York then followed the similar actions of Maine in 1982 and other states began to reciprocate. Till 1992, all other states except Hawaii had passed similar laws of interstate banking branching. The banking branching restrictions were finally relaxed with the passage of IBBEA in 1994.

The passage of IBBEA granted the authorities of states with substantial freedom to implement the law. The authorities of states were allowed to set four important provisions in the IBBEA law autonomously. These provisions are: a) the minimum age of the target institution, b) de novo interstate branching, c) the acquisition of individual branches, and d) a statewide deposit cap. We follow Rice and Strahan (2010) and construct the IBBEA index from 1994 to 2005. To construct the index, a value of one or zero is assigned to each of the above four provisions, with value one indicating one category being still restricted. The total value of the index, therefore, is

ranging from zero to four. The lower the value is, the more restrictions are lifted in the states, and a value of four indicate that the restrictions of interstate bank branching had not been relaxed in a given state.

3.3.1. Identification Strategy: The Case of Bank Branching Deregulation

We then use a staggered Difference-in-Differences regression to exploit the variations triggered by IBBEA and identify the average treatment effect

$$Cash\ ETRs = \alpha + \beta Inflex_{i,t-1} \times Dereg_{i,t} + \theta_1 Inflex_{i,t-1} + \theta_2 Dereg_{i,t} + \gamma X_{i,t-1} + \tau_t + \tau_j + \epsilon_{i,t} \quad (6)$$

where $Dereg_{i,t}$ is an indicator equal to one if firm *i* is headquartered in a state that had implemented deregulation before year *t.*[4] Other variables are the same as the baseline OLS regression.

In this equation, we are interested in the interaction term, $Inflex_{i,t-1} \times Dereg_{i,t}$. The interaction presents the average treatment effect of deregulation, conditional on firm inflexibility. We expect the coefficient of the interaction to be negative since a positive credit supply shock is supposed to lower external financing costs due to firms being inflexible. In other words, we posit that the inflexible firms lower their corporate tax avoidance after the states where the firms are headquartered have lifted at least one restriction. We report the results in Table 3.

[Insert Table 3 about here]

Table 3 shows the estimation results of Equation (6). We find that all the coefficients of $Inflex_{i,t-1} \times Dereg_{i,t}$ are negative and statistically significant at 1% and 5% levels. For instance, the β in the regressions of $Cash\ ETR1, Cash\ ETR2$ and $Long-term\ Cash\ ETR$ are -1.044, -1.127, and -0.693 respectively. These results support our hypothesis that inflexible firms would

[4] Following D'Acunto, Liu, Pueger, and Weber (2018), and Gu et al. (2021), we treat one state as deregulated state if it removed at least one of the four restrictions, i.e., if the index value for that state is lower than four.

significantly lower their corporate tax avoidance after the bank deregulation.

3.3.2. Testing Pre-treatment Trends

An important assumption of DiD is that there is a parallel trend which requires that in the absence of treatment, the difference between the "treatment" and "control" group is constant over time. To show statistically that our estimation meets the parallel trend assumption, we need to ensure that in the absence of the treatment, which is the banking deregulation, there should not be any statistical difference between treated and non-treated observations. To do so, we follow Bertrand and Mullainathan (2003) to investigate the dynamics of inflexibility-corporate tax avoidance relationship surrounding the deregulation. This test can also ensures that pre-treatment trends do not drive our main results.

We decompose $Inflex_{i,t-1} \times Dereg_{i,t}$ into five interaction terms, namely, $Inflex_{i,t-1} \times Dereg(-2)_{i,t}$, $Inflex_{i,t-1} \times Dereg(-1)_{i,t}$, $Inflex_{i,t-1} \times Dereg(0)_{i,t}$, $Inflex_{i,t-1} \times Dereg(1)_{i,t}$, and $Inflex_{i,t-1} \times Dereg(2+)_{i,t}$, all of which indicate the number of years relative to the year of deregulation. We expect to see the significant coefficients only for the post-deregulation terms, not for the pre-deregulation terms. Table 4 report the results. As we expected, we fail to observe any statistically significant coefficients of pre-deregulation interaction terms, and the effects become statistically significant about 1 year after the deregulation on average. Overall, the results in the Table 4 confirm the parallel trend assumption.

[Insert Table 4 about here]

To complement the regression results, we also expand the above regression by including more pre- and post-deregulation observations, and present graphs of variables for inspection of pre-event trends. To do so, we include 7 indicators centered on the deregulation events in the full DiD regression model and graph those indicators. The results are presented in Figure 1. The solid

lines plot the coefficients, and the dashed lines are confidence intervals at 5 and 95 percentiles. We present the figures for all three tax avoidance measures. Consistent with all our results so far, we see a drop in corporate tax avoidance after the deregulation, and the effect does not seem short-lived. More importantly, we do not observe any significant loadings for pre-deregulation coefficients.

[Insert Figure 1 about here]

4. Cross-sectional Tests

In this section, we explore the possible mechanisms through which inflexibility affects tax avoidance. Specifically, we focus on firms' operational conditions, financial constraints, and their growth stage.

5.1. Cash Flow Volatility

We split the sample based on cash flow volatility to investigate whether firm inflexibility exerts asymmetric effects on the tax avoidance depending on the volatility of a firm's cash flows. Han and Qui (2007) and Bates et al. (2009) show that firms with high cash flow volatility hold more cash, especially when external financing is costlier. Inflexible firms with volatile cash flows are likely to face greater financing constraints and incur additional costs to offset their operational flexibility. The benefits of avoiding taxes will be greater for inflexible firms. Following Keefe and Yaghoubi (2016), we use the operating income before depreciation scaled by the net asset (Total asset minus Cash & short-term investment) to calculate the 5-year cash flow volatility. We divide firms into two groups based on the median immediately before the deregulation, and then estimate the same regression equation we report in Table 3 separately for high cash flow volatility and low cash flow volatility subsamples. We expect that the effect of firm inflexibility on tax avoidance is

more pronounced for firms with higher cash flow volatility. We report the results in Table 5. In table 5, column (1) to column (3) present the results for the firms with lower cash flow volatility, the column (4) to column (6) for the firms with higher cash flow volatility. Consistent with our expectations, the coefficient of the interaction term $Inflexibility \times Dereg$ are negative and statistically significant only in columns (4) to (6) that include high cash flow volatility firms. These results suggest that inflexible firms with greater cash flow volatility avoid more cash taxes.

[Insert Table 5 about here]

4.2. Product Market Competition

In this subsection, we explore whether the effect of inflexibility on tax avoidance varies by the level of a firm's product market competition. Increase in market competition, especially when switching costs are lower for consumers, is positively related to higher idiosyncratic risks (Irvine and Pontiff, 2009). These risks will further lower values of inflexible firms and saving tax payments may become the cheapest way for them to achieve financial flexibility. We use 2-digital SIC Herfindahl-Hirschman Index (HHI) as the proxy. We partition the sample based on the pre-deregulation HHI and assign the firms with HHI above the median to the high HHI subsample, and the firms below the median to the low HHI subsample. We expect that when firms face higher competition, it becomes more urgent for inflexible firms to avoid more taxes. Table 6 reports the results where we present the results for the firms with lower HHI (greater market competition) in column (1) through column (3), and for the firms with higher HHI (lower market competition) in column (4) through column (6). Consistent with our expectations, the coefficient of the interaction term $Inflexibility \times Dereg$ are negative and statistically significant for firms with higher product market competition.

[Insert Table 6 about here]

4.3. Financial Constraints

Financial constraints can potentially worsen the negative impact of firm inflexibility. Greater financial constraints are associated with greater external financing costs and encourage inflexible firms to avoid more taxes. We expect the effect of inflexibility on tax avoidance is more pronounced for financially constrained firms. We use the KZ-index from Kaplan and Zingales (1997) to proxy financial constraints. Firms with a higher KZ-index are more likely to subject to financial constraints, and vice versa. We partition the sample based on the pre-deregulation KZ-index and assign the firms with KZ-index above the median to the high financial constraints subsample, and the firms below the median to the low financial constraints subsample. Table 7 reports the results. Specifically, column (1) through column (3) report the results for the firms with lower KZ-index, the column (4) through column (6) for the firms with higher KZ-index. Consistent with our expectations, the coefficient of the interaction term $Inflexibility \times Dereg$ are negative and statistically significant for financially constrained firms, and the coefficients for unconstrained firms are insignificant. These results suggest that inflexible firms facing greater financial constraints avoid cash taxes more.

[Insert Table 7 about here]

4.4. Contraction vs. Expansion

We also examine whether the effect of inflexibility on tax avoidance is conditional on firms' growth opportunities. We examine this effect for firms based on whether they are in contraction or in expansion phase. We use book-to-market ratio to measure contraction and expansion inflexibility. A growth firm usually has lower book-to-market, and vice versa. Therefore, we partition the sample based on the pre-deregulation book-to-market ratio and assign the firms with book-to-market ratio above the median to the contraction subsample, and the firms below the

median to the expansion or growth subsample. Then, we re-estimate the baseline DiD regressions separately for two subsamples, and we report the results in Table 8. We find that the coefficient of the interaction term $Inflexibility \times Dereg$ are negative and statistically significant for low growth (high Book-to-Market ratio) firms. These results suggest that the effect of inflexibility is more pronounced for firms in contraction.

[Insert Table 8 about here]

In summary, the results in this section show that inflexible firms avoid cash taxes more when firms face greater cash flow volatility, greater market competition, greater financial constraints, and lower growth opportunities.

5. Robustness Tests

5.1. Falsification Test

To ensure the results we document so far are not driven by other factors or shocks not associated with the banking deregulation, we conduct placebo regressions for falsification tests (Slusky, 2017). We randomly assign a pseudo year that are not 3 years before and after the banking deregulation for each state, except the states that never lift the restrictions of bank branching. We repeat this procedure 1,000 times. We expect that the randomly assigned banking deregulation events have no significant effect on corporate tax avoidance. To be consistent with the baseline DiD regressions, we use the same dependent variables and control variables with the firm and year fixed effects. We use the randomly assigned banking deregulation years to replace the indicator variable $Dereg$ and generate the betas of the interaction term $Dereg \times Inflexibility$.

Figure 2 illustrates the coefficients of the coefficients of the repeated placebo runs. The average coefficients of the regressions on Cash ETR1, Cash ETR2, and Long-term Cash ETR are

-0.150, -0.256, and -0.458 respectively, the corresponding t-statistics of the average coefficients in the distribution from the repeated regressions are -0.030, -0.027, and -0.003, indicating there is no significant effect from the placebo events. This further confirms that the documented relationship between inflexibility and tax avoidance are likely to be causal.

[Insert Figure 2 about here]

5.2. Alternative Identification Attempt: The Case of China's Joining the WTO

In this section, we make additional identification attempt to make sure our results are not sensitive to specific regulatory shocks. We follow Chen, Harford & Kamara (2019) and use China's joining in World Trade Organization (WTO) in 2001 as an exogenous shock that relieves the burden of inflexible firms. Pierce and Schott (2016) document that China's joining in WTO leads the manufacturing firms to switch from labor-intensive to capital-intensive production technologies. More capital-intensive product technologies imply higher demand and more channels of the credit supply gradually increase in the market. Similar to the shock of banking deregulation, we expect to find similar effects of China's joining WTO that is the inflexible firms are likely to reduce the corporate tax avoidance when their credit supply increases. To conduct this analysis, we estimate the following regression:

$$Cash\ ETRs_{i,t} = \alpha + \beta_1 Inflexibility_{i,t-1} \times WTO_{i,t} + \beta_2 Inflexibility_{i,t-1} + \beta_3 WTO_{i,t} + \gamma X_{i,t-1} + \tau_t + \tau_j + \epsilon_{i,t} \quad (7)$$

where the $WTO_{i,t}$ is a dummy variable equal to one if the fiscal year is between 2002 and 2004, and equals 0 if the fiscal year is between 1999 and 2001.[5] The other variables are defined in the previous sections. We are interested in the interaction terms $Inflexibility \times WTO$. We find the coefficients of the interaction terms are negative and statistically significant and negative. The

[5] We also define the dummy alternatively, by considering year 1998 to 2000 as pre-WTO event window, and the results are qualitatively similar.

results suggest that the firms' incentive of engaging in tax avoidance due to inflexibility reduces after China's joining the WTO, further confirming our baseline results.

[Insert Table 9 about here]

6. Conclusion

Operationally inflexible firms incur greater operational adjustment costs losing growth opportunities and not adapting to changing market dynamics. Firms suffering from operational inflexibility also face greater external financing constraints and rely on internal funds to achieve financial flexibility. Corporate income structure has a significant effect on the value of financial flexibility and one of the ways firm can achieve such flexibility is lowering tax payments. In this paper, we examine corporate tax avoidance behavior of firms with operationally inflexible business structure.

We show that firm inflexibility and corporate tax avoidance are positively related. Inflexible firms are likely to avoid cash taxes more. We use bank deregulation rules as a credit supply shock to firms to mitigate endogeneity concerns and confirm our baseline OLS result. These results extend the prior literature that show substitution effect between operational flexibility and financial flexibility.

In cross-sectional tests, we check for the impact of firm and industry specific factors. Specifically, we show that inflexible firms with greater financial constraints, higher product market competition, volatile cash flows, and limited growth opportunities engage in more cash tax avoidance. We conduct several robustness tests to confirm validity of our results. We also discuss the important implications of our findings for corporate managers and policymakers.

Reference

Amore, M. D., Schneider, C., & Žaldokas, A. (2013). Credit supply and corporate innovation. *Journal of Financial Economics*, 109(3), 835–855.

Bertrand, M., & Mullainathan, S. (2003). Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of political Economy*, 111(5), 1043-1075.

Chen, Z., Harford, J., & Kamara, A. (2019). Operating leverage, profitability, and capital structure. *Journal of Financial and Quantitative Analysis*, 54(1), 369-392.

Gu, L., Hackbarth, D., & Johnson, T. (2018). Inflexibility and stock returns. *Review of Financial Studies*, 31(1), 278-321.

Gu, L., Hackbarth, D., & Li, T. (2021). Inflexibility and leverage. *Working Paper*.

Hackbarth, D., & Johnson, T. (2015). Real options and risk dynamics. *Review of Economic Studies*, 82(4), 1449-1482.

Hanlon and Heitzman, 2010

Keefe, M. O. C., & Yaghoubi, M. (2016). The influence of cash flow volatility on capital structure and the use of debt of different maturities. *Journal of Corporate Finance*, 38, 18-36.

Pierce, J. R., & Schott, P. K. (2016). The surprisingly swift decline of US manufacturing employment. *American Economic Review*, 106(7), 1632-62.

Rice, T., & Strahan, P. E. (2010). Does Credit Competition Affect Small-Firm Finance? *Journal of Finance*, 65(3), 861–889.

Appendix 1: Variable Definitions

Variables	Definition
Cash ETR1	Income Tax Paid / (Pre-tax Income – Special Items), multiplying by 100
Cash ETR2	(Income Tax Paid + Excess Tax Benefit Stock Options of Cash Flow Operating + Excess Tax Benefit of Stock Options of Cash Flow Financing) / Pretax Income, multiplying by 100
Long-term Cash ETR	Moving average mean of 5-year on Income Tax Paid / (Pre-tax Income – Special Items), multiplying by 100
Inflexibility	Inflexibility measure calculated as the range of firms operating costs over sales divided by the standard deviation of the annual growth rate of sales over assets, with a 3-year rolling window
Dereg	Dummy variable which equals 1 if the state in which a firm is headquartered experienced regulation change in banking branches in or before year *t*, and 0 otherwise
WTO	Dummy variable which equals 1 if the fiscal year is in 2002 to 2004, the three years after China's joining in WTO. The dummy variable equals 0 if the fiscal year is from 1999 to 2001, the three years before China's joining in WTO
Total Assets	The logarithm of total assets.
Discretionary Accruals	The absolute value of discretionary accruals.
Tobin's Q	The ratio of the market value of equity + book value of assets-the book value of common equity - deferred taxes scaled by the book value of assets.
Leverage	(Total debt in current liabilities + total long-term debt) / total assets
Cash	Cash divided by lagged total assets.
Cash Flow	(Income before extraordinary items + depreciation and amortization) / lagged total assets.
CAPEX	Capital expenditure / lagged total assets.
Working Capital	(Total current assets – total current liabilities – cash) / lagged total assets.

HHI	2-digital SIC HHI index.
Cash Flow Volatility	The logarithm of the standard deviation of the 5-year rolling window of Adjusted Operating Profit Before Depreciation scaled by the net total asset. Followed Keefe & Yaghoubi (2016)
B/M Ratio	Book-to-Market Ratio
KZ-index	(Cash flow / lagged total asset) * -1.002 + (Market value / lagged total asset) * 0.283 + Leverage * 3.139 – (Dividend / lagged total asset) – (Cash / lagged total asset) * 1.315

Table 1: Descriptive Statistics

This table reports summary statistics for major variables in the empirical analysis with a sample period of 1987-2019. We exclude companies from the financial (SIC 6000 – 6999) and utility (SIC 4910 – 4999) industries. The firm-year observations with missing total assets are excluded. The firms that are not incorporated in the United States are excluded. All variables are defined in Appendix A.

	N	Mean	Median	STD	P25	P75
Cash ETR1	50,652	24.40	22.63	21.54	6.33	35.00
Cash ETR2	50,652	26.46	24.43	23.44	6.85	37.13
Long-Term Cash ETR	36,944	25.92	26.74	15.24	16.04	34.82
Inflexibility	50,521	1.197	0.736	1.646	0.409	1.282
Dereg	50,652	0.690	1.000	0.463	0.000	1.000
Total Assets	50,574	5.672	5.857	2.452	4.025	7.444
Discretionary Accruals	50,044	0.045	0.015	0.327	-0.057	0.114
Leverage	50,416	0.248	0.200	0.259	0.047	0.351
Tobin's Q	45,923	2.070	1.463	2.181	1.097	2.164
Cash	49,892	0.122	0.066	0.165	0.021	0.159
Cash Flow	50,417	0.064	0.103	0.289	0.061	0.153
CAPEX	50,167	0.061	0.040	0.071	0.019	0.076
Working Capital	48,596	0.131	0.147	0.334	0.009	0.302
HHI	50,652	0.004	0.003	0.004	0.002	0.003
Cash Flow Volatility	50,418	3.059	3.144	0.980	2.512	3.705
B/M Ratio	48,203	1.606	1.028	1.936	0.596	1.788
KZ-index	47,425	0.749	0.635	1.740	0.121	1.206

Table 2: Firm Inflexibility and Corporate Tax Avoidance: Baseline Regression Results
This table reports the results of baseline panel regressions. The panel is composed of firm-year observations for 1987-2019. Column headings indicate the dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term Cash ETR*
Inflexibility	0.445***	0.525***	0.400***
	(0.132)	(0.143)	(0.133)
Total Assets	-3.265***	-3.518***	-1.618***
	(0.282)	(0.305)	(0.305)
Discretionary Accruals	-0.032	0.015	0.000
	(0.286)	(0.336)	(0.215)
Tobin's Q	-0.183**	-0.216**	0.321***
	(0.082)	(0.088)	(0.074)
Leverage	3.353***	4.001***	2.860***
	(0.869)	(0.940)	(0.881)
Cash	-3.177***	-3.984***	1.793**
	(0.906)	(0.959)	(0.870)
Cash Flow	-3.462***	-4.177***	3.059***
	(0.626)	(0.657)	(0.594)
CAPEX	-0.746	-1.438	5.410***
	(2.297)	(2.370)	(1.892)
Working Capital	0.449	-0.105	1.026
	(0.756)	(0.781)	(0.712)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	42,309	42,309	32,288
Adj. R^2	0.321	0.297	0.566

Table 3: Difference-in-Differences Regression Results: Banking Deregulation

This table reports the results of Difference-in-Differences regressions, using the deregulation that allows banks to open cross-state branches. The panel is composed of firm-year observations for 1987-2019. Column headings indicate different dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term Cash ETR*
Inflexibility × Dereg	-1.044***	-1.127***	-0.693**
	(0.286)	(0.296)	(0.287)
Inflexibility	1.246***	1.389***	0.961***
	(0.278)	(0.286)	(0.286)
Dereg	1.535**	0.814	0.411
	(0.736)	(0.802)	(0.593)
Total Assets	-3.279***	-3.531***	-1.622***
	(0.281)	(0.304)	(0.305)
Discretionary Accruals	-0.016	0.032	0.009
	(0.286)	(0.336)	(0.215)
Tobin's Q	-0.178**	-0.210**	0.326***
	(0.081)	(0.088)	(0.074)
Leverage	3.416***	4.065***	2.875***
	(0.868)	(0.940)	(0.881)
Cash	-3.170***	-3.988***	1.780**
	(0.903)	(0.956)	(0.869)
Cash Flow	-3.524***	-4.244***	3.013***
	(0.622)	(0.653)	(0.593)
CAPEX	-0.608	-1.310	5.482***
	(2.299)	(2.371)	(1.892)
Working Capital	0.395	-0.157	1.000
	(0.750)	(0.776)	(0.711)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	42,309	42,309	32,288
Adj. R^2	0.322	0.297	0.567

Table 4: Deregulation: Testing Parallel Trend

This table reports the results of dynamic Difference-in-Differences regressions, using the deregulation that allows banks to open cross-state branches. Column headings indicate different dependent variables. The variables *Dereg (-2), Dereg (-1), Dereg (0), Dereg (1) and Dereg (2+)* indicate two years before, one year before, current year, one year after, and two years and onwards the banking deregulation. The panel is composed of firm-year observations for 1987-2019. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term CASH ETR*
Inflexibility × Dereg (-2)	-0.113	-0.163	0.505
	(0.453)	(0.372)	(0.354)
Inflexibility × Dereg (-1)	-0.277	-0.390	0.664
	(0.514)	(0.555)	(0.443)
Inflexibility × Dereg (0)	-0.343	-0.293	-0.708
	(0.539)	(0.556)	(0.534)
Inflexibility × Dereg (1)	-0.728*	-0.974**	-0.075
	(0.379)	(0.417)	(0.419)
Inflexibility × Dereg (2+)	-1.337***	-1.492***	-0.682*
	(0.341)	(0.369)	(0.364)
With Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	42,309	42,309	32,288
Adj. R^2	0.322	0.297	0.567

Table 5: Difference-in-Differences Regression Results, Partitioned by 5-Year Cash Flow Volatility

This table reports the results of Difference-in-Differences regressions, partitioned by Cash Flow Volatility. Columns 1 to 3 report the results for the sample of firms with less volatile cash flow, and columns 4 to 6 report the results for the sample of firms with more volatile cash flow. The panel is composed of firm-year observations for 1987-2019. Column headings indicate different dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term Cash ETR*	*(4)* *Cash ETR1*	*(5)* *Cash ETR2*	*(6)* *Long-Term Cash ETR*
	Low Cash Flow Volatility			*High Cash Flow Volatility*		
Inflexibility × Dereg	-0.385	-0.533	-0.472	-1.811***	-1.492**	-1.168*
	(0.393)	(0.389)	(0.356)	(0.537)	(0.607)	(0.697)
Inflexibility	1.022**	1.254***	0.738**	1.684***	1.827***	1.768***
	(0.407)	(0.410)	(0.362)	(0.525)	(0.570)	(0.673)
Dereg	-1.082	-1.501	1.222	1.906*	0.475	0.803
	(1.164)	(1.199)	(0.857)	(1.011)	(1.193)	(0.903)
Total Assets	-3.239***	-3.484***	-1.558***	-2.792***	-3.179***	-1.146*
	(0.531)	(0.550)	(0.534)	(0.599)	(0.655)	(0.599)
Discretionary Accruals	-0.299	0.084	0.073	-0.018	0.204	0.614
	(0.625)	(0.694)	(0.506)	(0.615)	(0.790)	(0.413)
Tobin's Q	-0.051	-0.173	0.228*	0.436	0.978*	0.693**
	(0.181)	(0.191)	(0.127)	(0.389)	(0.525)	(0.284)
Leverage	5.815***	6.142***	6.287***	5.162**	7.341***	3.537*
	(1.981)	(2.095)	(1.719)	(2.162)	(2.487)	(2.103)
Cash	-5.327***	-6.216***	5.036***	-12.872***	-12.942***	-1.188
	(1.781)	(1.904)	(1.533)	(3.495)	(3.828)	(2.574)
Cash Flow	-4.769***	-6.392***	4.568***	-5.598	-6.353	4.526
	(1.560)	(1.643)	(1.581)	(4.810)	(6.371)	(3.362)
CAPEX	0.181	-2.321	5.735*	-2.494	-0.809	-2.177
	(4.067)	(4.154)	(3.274)	(5.631)	(6.072)	(3.962)
Working Capital	-2.404	-2.886*	0.150	0.839	-0.295	-0.883
	(1.640)	(1.633)	(1.495)	(2.560)	(2.710)	(2.016)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	10,549	10,549	8,085	11,548	11,548	9,480
Adj. R^2	0.276	0.263	0.528	0.233	0.185	0.462

Table 6: Difference-in-Differences Regression Results, Partitioned by Herfindahl-Hirschman Index (HHI)

This table reports the results of Difference-in-Differences regressions, partitioned by 2-digital SIC HHI. Columns 1 to 3 report the results for the sample of firms with lower HHI index which indicates firms are in industries with more competitive competence, and columns 4 to 6 report the results for the sample of firms with higher HHI index. The panel is composed of firm-year observations for 1987-2019. Column headings indicate different dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term Cash ETR*	*(4)* *Cash ETR1*	*(5)* *Cash ETR2*	*(6)* *Long-Term Cash ETR*
		More Competition			*Less Competition*	
Inflexibility × Dereg	-1.189**	-1.693***	-0.925*	-0.551	-0.330	-0.544
	(0.498)	(0.582)	(0.511)	(0.392)	(0.391)	(0.390)
Inflexibility	1.514***	1.955***	1.237**	1.131***	1.296***	0.936**
	(0.508)	(0.607)	(0.515)	(0.409)	(0.409)	(0.394)
Dereg	0.769	0.333	0.106	-0.388	-1.389	0.773
	(1.366)	(1.533)	(1.128)	(1.237)	(1.412)	(1.007)
Total Assets	-2.966***	-3.419***	-0.924	-3.090***	-3.329***	-1.762***
	(0.597)	(0.660)	(0.610)	(0.519)	(0.547)	(0.522)
Discretionary Accruals	-0.847	-0.219	0.076	0.417	0.462	0.650
	(0.667)	(0.849)	(0.536)	(0.572)	(0.635)	(0.401)
Tobin's Q	0.213	0.218	0.384**	0.078	0.121	0.306**
	(0.245)	(0.282)	(0.193)	(0.228)	(0.249)	(0.153)
Leverage	9.791***	11.174***	6.031***	3.336*	4.109**	4.865***
	(2.420)	(2.671)	(2.199)	(1.832)	(1.983)	(1.682)
Cash	-8.635***	-9.413***	1.356	-5.874***	-6.168***	4.752***
	(2.424)	(2.633)	(2.047)	(2.079)	(2.297)	(1.729)
Cash Flow	-5.043**	-6.779***	6.844***	-5.523**	-6.527***	3.113*
	(2.221)	(2.494)	(2.547)	(2.266)	(2.409)	(1.746)
CAPEX	-4.416	-3.246	1.707	1.471	-0.440	3.812
	(5.893)	(5.930)	(4.738)	(3.886)	(4.152)	(2.965)
Working Capital	0.692	-0.456	-2.535	-2.581	-2.839	1.690
	(2.173)	(2.198)	(1.837)	(1.786)	(1.867)	(1.649)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	9,942	9,942	7,850	12,163	12,163	9,718
Adj. R^2	0.256	0.223	0.488	0.264	0.238	0.506

Table 7: Difference-in-Differences Regression Results, Partitioned by KZ-index

This table reports the results of Difference-in-Differences regressions, partitioned by KZ-index. Columns 1 to 3 report the results for the sample of firms with lower KZ-index, and columns 4 to 6 report the results for the sample of firms with higher KZ-index. The panel is composed of firm-year observations for 1987-2019. Column headings indicate different dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	Cash ETR1	*Cash ETR2*	*Long-Term Cash ETR*	*Cash ETR1*	*Cash ETR2*	*Long-Term Cash ETR*
	Financially Unconstrained Firms			*Financially Constrained Firms*		
Inflexibility × Dereg	-0.417	-0.434	-0.540	-1.205***	-1.261***	-0.940**
	(0.518)	(0.531)	(0.450)	(0.412)	(0.443)	(0.460)
Inflexibility	0.892*	1.288**	0.410	1.646***	1.763***	1.620***
	(0.530)	(0.556)	(0.440)	(0.412)	(0.444)	(0.456)
Dereg	0.208	-0.348	0.257	0.644	-0.654	1.976**
	(1.000)	(1.128)	(0.771)	(1.219)	(1.321)	(1.004)
Total Assets	-3.146***	-3.799***	-1.660***	-2.956***	-3.075***	-1.059*
	(0.569)	(0.610)	(0.557)	(0.564)	(0.610)	(0.589)
Discretionary Accruals	-0.083	0.374	0.007	-0.404	-0.414	0.873
	(0.521)	(0.663)	(0.384)	(0.782)	(0.857)	(0.598)
Tobin's Q	0.434**	0.624**	0.410**	-0.203	-0.237	0.231
	(0.211)	(0.251)	(0.160)	(0.241)	(0.257)	(0.181)
Leverage	5.439**	6.141**	6.752***	5.161**	7.089***	2.336
	(2.138)	(2.386)	(1.971)	(2.111)	(2.275)	(1.879)
Cash	-8.331***	-9.209***	3.446**	-6.419**	-7.264***	2.216
	(2.189)	(2.424)	(1.741)	(2.552)	(2.714)	(2.027)
Cash Flow	-6.733**	-6.921**	7.850***	-5.244**	-6.897***	2.847
	(3.023)	(3.323)	(2.709)	(2.102)	(2.300)	(1.731)
CAPEX	3.892	1.893	5.032	-3.418	-2.891	-1.444
	(5.037)	(5.464)	(3.585)	(4.494)	(4.571)	(3.652)
Working Capital	-2.636	-3.640*	0.402	-0.909	-1.253	-0.910
	(1.948)	(2.110)	(1.768)	(1.954)	(1.929)	(1.638)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	12,264	12,264	10,024	9,346	9,346	7,212
Adj. R^2	0.252	0.209	0.480	0.246	0.229	0.498

Table 8: Difference-in-Differences Regression Results, Partitioned by Book-to-Market Ratio

This table reports the results of Difference-in-Differences regressions, partitioned by Book-to-Market ratio. Columns 1 to 3 report the results for the sample of firms with lower Book-to-Market ratio, and columns 4 to 6 report the results for the sample of firms with higher Book-to-Market ratio. The panel is composed of firm-year observations for 1987-2019. Column headings indicate different dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

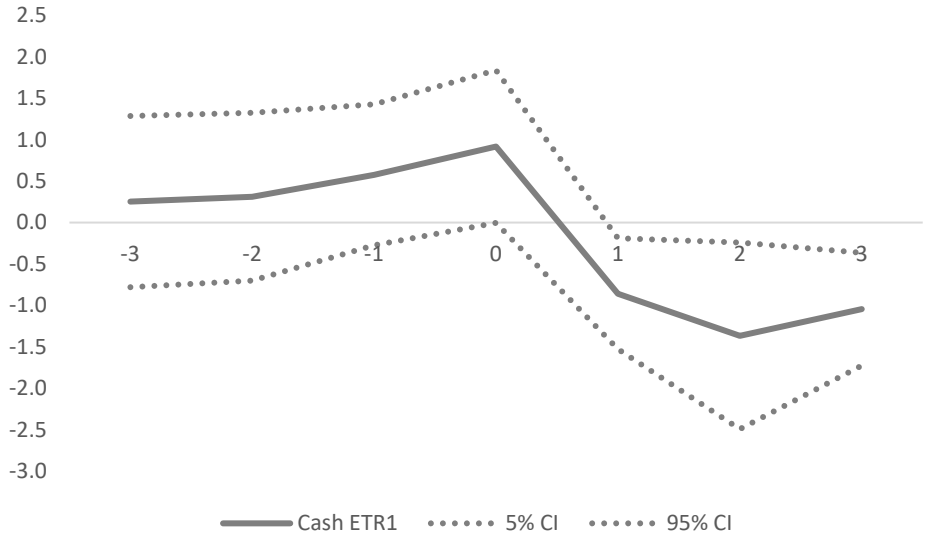
	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term Cash ETR*	*(4)* *Cash ETR1*	*(5)* *Cash ETR2*	*(6)* *Long-Term Cash ETR*
	Low Book-to-Market Ratio (High Growth)			*High Book-to-Market Ratio (Low Growth)*		
Inflexibility × Dereg	-0.327	-0.240	-0.478	-1.192**	-1.270**	-1.257*
	(0.349)	(0.349)	(0.363)	(0.563)	(0.592)	(0.733)
Inflexibility	0.762**	0.989***	0.825**	1.805***	2.020***	2.078***
	(0.365)	(0.370)	(0.379)	(0.503)	(0.548)	(0.703)
Dereg	0.429	-0.406	0.842	0.431	-0.243	0.988
	(0.849)	(0.939)	(0.651)	(1.252)	(1.367)	(1.123)
Total Assets	-2.759***	-3.276***	-0.755*	-3.446***	-3.374***	-2.276***
	(0.466)	(0.520)	(0.418)	(0.648)	(0.668)	(0.755)
Discretionary Accruals	-0.615	-0.428	0.114	0.162	0.149	0.545
	(0.483)	(0.611)	(0.377)	(0.783)	(0.877)	(0.528)
Leverage	5.675***	5.604***	3.941**	4.410*	7.344***	6.426***
	(1.720)	(1.882)	(1.649)	(2.358)	(2.600)	(2.150)
Cash	-3.599**	-5.155***	4.220***	-13.401***	-12.318***	1.946
	(1.785)	(1.977)	(1.471)	(2.845)	(3.145)	(2.465)
Cash Flow	-4.049*	-4.256**	5.189***	-6.578**	-9.573***	6.972***
	(2.081)	(2.102)	(1.854)	(2.635)	(3.248)	(2.692)
CAPEX	3.838	3.304	4.527	-9.058	-9.215	0.297
	(3.594)	(3.882)	(3.398)	(5.748)	(5.837)	(3.655)
Working Capital	-0.724	-0.715	-1.630	-3.603	-4.979**	-0.259
	(1.577)	(1.710)	(1.430)	(2.287)	(2.322)	(2.163)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	13,099	13,099	10,895	10,288	10,288	7,714
Adj. R^2	0.280	0.230	0.522	0.230	0.214	0.459

Table 9: Difference-in-Differences Regression Results: WTO

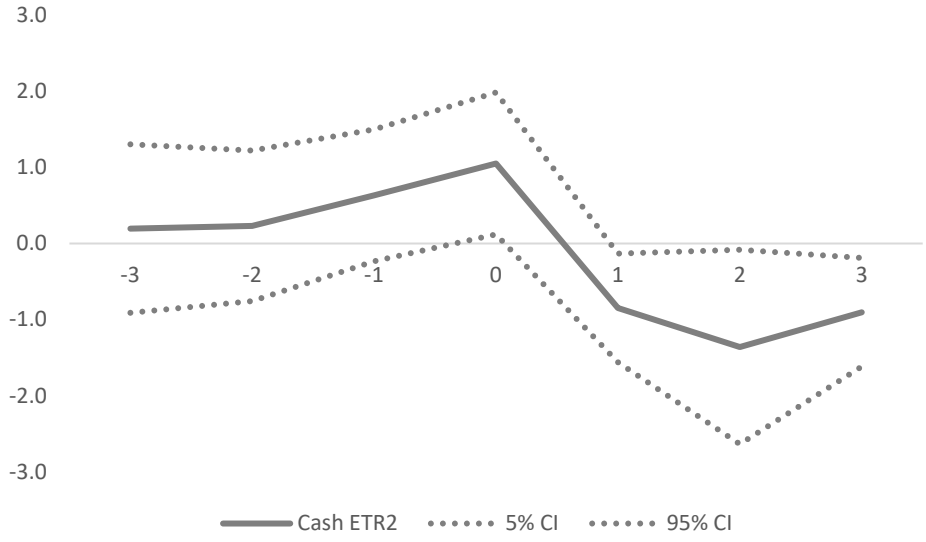
This table reports the results of Difference-in-Differences regressions, using China's joining in WTO in 2001 as an alternative shock to the U.S. firms. The panel is composed of firm-year observations for 1999-2004, the three years before China's entry of WTO (1999-2001) and three years after China's entry of WTO (2002-2004). WTO dummy equals one if the fiscal year is after 2001 and 0 otherwise. Column headings indicate different dependent variables. Standard errors are displayed in the parentheses under each coefficient. Standard errors are adjusted for heteroskedasticity and are clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

	(1) *Cash ETR1*	*(2)* *Cash ETR2*	*(3)* *Long-Term CASH ETR*
Inflexibility × WTO	-0.759**	-0.933***	-0.357*
	(0.295)	(0.334)	(0.202)
Inflexibility	0.061	0.483	0.401
	(0.542)	(0.610)	(0.296)
WTO	6.001***	5.644***	4.042***
	(1.155)	(1.311)	(0.875)
Total Assets	-2.934**	-3.416**	-0.703
	(1.185)	(1.341)	(1.024)
Discretionary Accruals	-0.723	-0.575	-0.277
	(0.875)	(1.002)	(0.527)
Tobin's Q	-0.009	-0.127	0.169
	(0.197)	(0.233)	(0.116)
Leverage	6.633**	8.495***	4.634*
	(2.836)	(3.202)	(2.618)
Cash	-5.964*	-6.150*	1.332
	(3.117)	(3.676)	(1.833)
Cash Flow	-2.720	-4.202**	0.711
	(1.683)	(1.794)	(1.099)
CAPEX	2.490	-3.329	-0.888
	(7.195)	(7.315)	(4.630)
Working Capital	2.236	1.599	0.467
	(2.396)	(2.555)	(1.821)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	6,632	6,632	5,775
Adj.R2	0.400	0.362	0.780

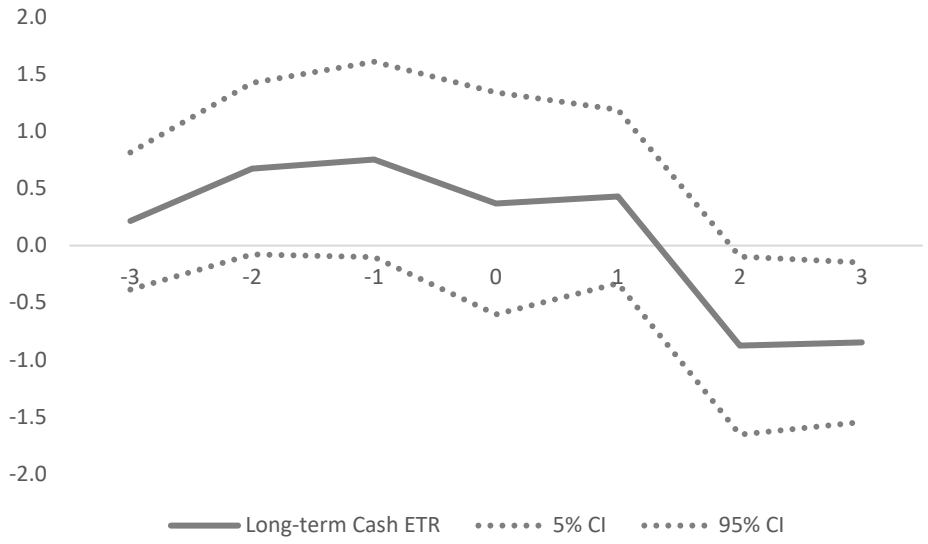
Figures



Panel A: The Dynamic Effect on Cash ETR1

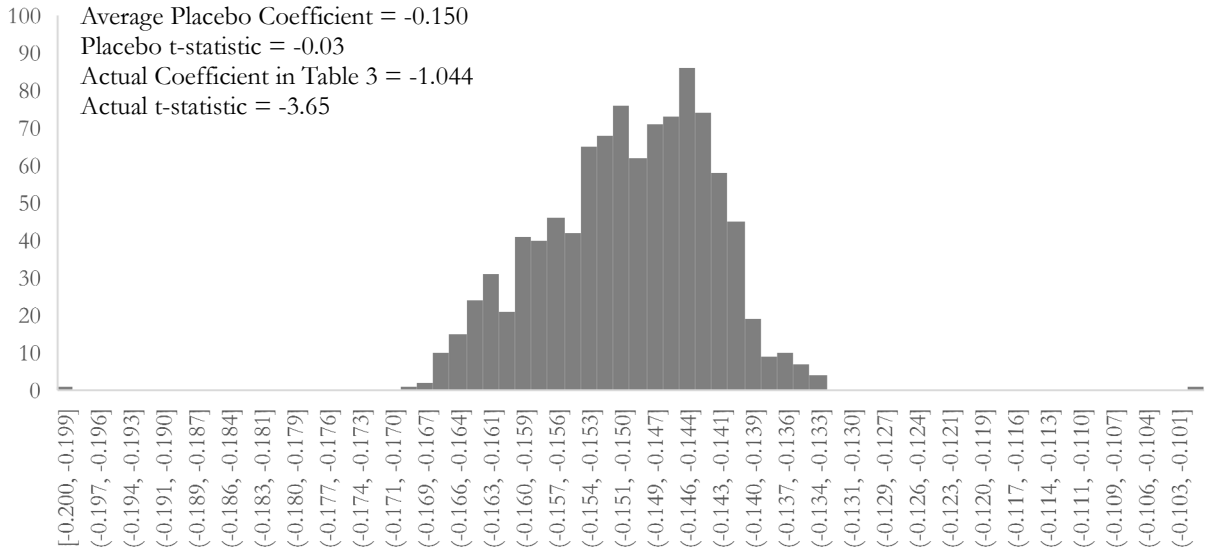


Panel B: The Dynamic Effect on Cash ETR2

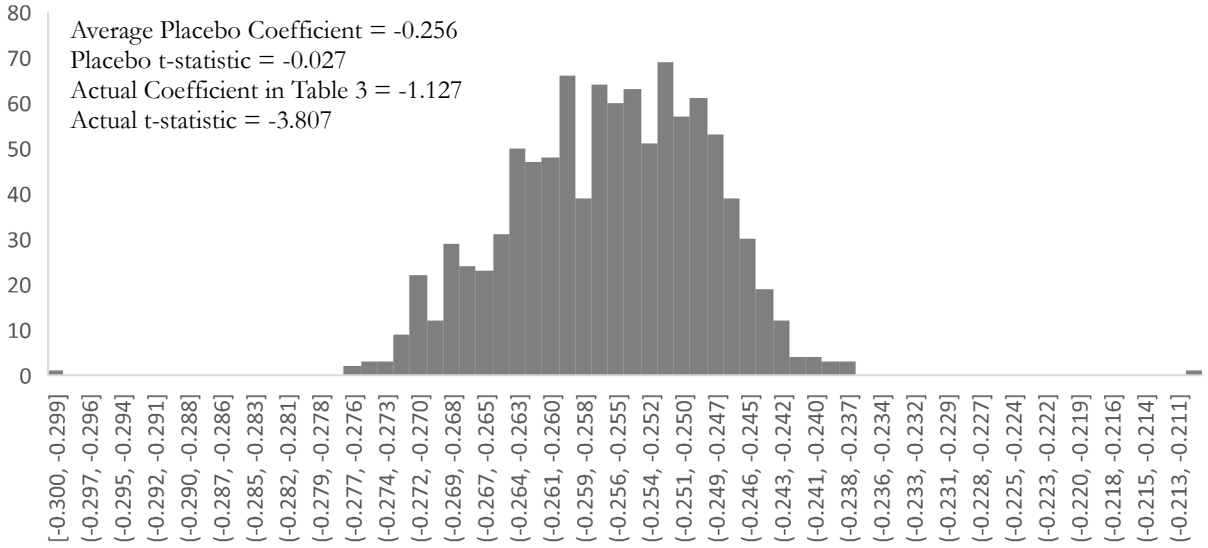


Panel C: The Dynamic Effect on Long-term Cash ETR.

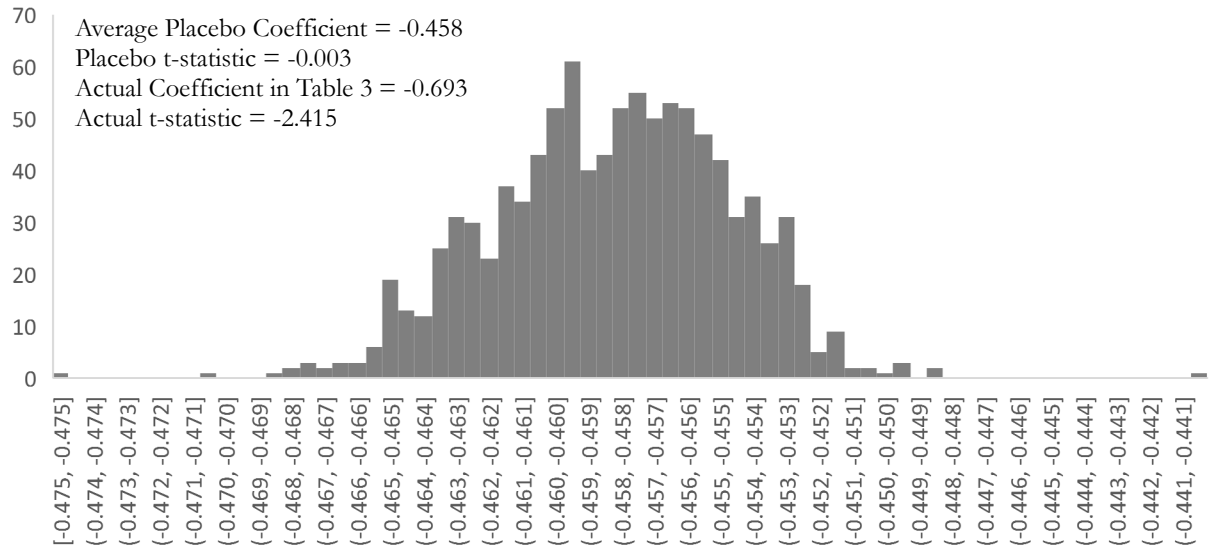
Figure 1: The Effect of Banking Branching Deregulation on Tax Avoidance.
This figure illustrates the effect of banking branching deregulation on Cash ETR1 (Panel A), Cash ETR2 (Panel B), and Long-term Cash ETR (Panel C). The Y-axis shows the coefficient estimates from regressing cash effective tax rates on year and firm fixed effects and interation term of inflexibility and dummy variables indicating the year relative to the state banking deregulation. X-axis indicates the year relative to the adoption of the banking deregulation. The dashed lines correspond to the 95% confidence intervals of the coefficient estimates. The sample period is from 1987-2019.



Panel A: the histogram of the coefficients of pseudo interaction terms on the Cash ETR1



Panel B: the histogram of the coefficients of pseudo interaction terms on the Cash ETR2



Panel C: the histogram of the coefficients of pseudo interaction terms on the Long-term Cash ETR

Figure 2: Falsification Tests

Figure 2 illustrates the histograms of the results of falsification tests based on the banking deregulation. We randomly assign a pseudo year of banking deregulation for each state between 1987 to 2019, except the states that are never lift the restrictions of banking deregulation. We exclude 3 years before and after the actual banking deregulations. We repeat this process 1,000 times. To be consistent with the baseline DiD regressions, we use the same dependent variables and control variables with the firm and year fixed effects. We use the randomly assigned banking deregulation years to replace the $Dereg$ and generate the betas of the interaction term $Dereg \times Inflexibility$. We report the mean coefficient of the placebo runs and the actual coefficient from Table 3. We also present the t-statistics of the average coefficients from the 1,000 placebo runs and from the actual coefficients in Table 3.