Investment, Debt and Taxes*

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Abstract

The extant evidence is mixed on whether companies respond to tax incentives when making capital structure decisions. We argue that it is important to examine capital structure choices in the context of external financing needs, such as when funding corporate investment. We examine 99 years of panel data for US public companies and find that firms use more debt to fund investment when corporate income tax rates are high, consistent with the tax hypothesis. We study, for the first time, the two largest tax hikes of the last century (one in the 1940s, one in the 1950s). Consistent with tax incentives, we find that firms increase leverage in response, and these effects are concentrated among firms with the highest needs for investment funding. A battery of tests shows that these results are unlikely to be driven by changes in economic conditions or investment opportunities associated with the coincident war efforts.

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1 Introduction

The oldest question in modern corporate finance is whether capital structure affects company value. Modigliani and Miller (1958, 1963) show that in the presence of a corporate income tax, the tax deductibility of interest reduces the effective cost of debt, making firm value an increasing function of the leverage ratio. A flurry of research soon developed the trade-off theory, in which companies choose their optimal amount of debt by balancing the positive tax incentive to use debt against various costs of using debt (Robichek and Myers, 1966; Kraus and Litzenberger, 1973; Scott, 1976; DeAngelo and Masulis, 1980). A central prediction of these models is that because higher tax rates shift the benefit of debt function outward, all else equal, optimal leverage should increase in the corporate tax rate.

Despite well-established theoretical arguments for a positive relation between corporate tax rates and debt usage, the empirical evidence has been decidedly mixed. While some studies have documented a positive cross-sectional relation between debt usage and proxies for a firm's debt tax incentives (Mackie-Mason, 1990; Graham, 1996, 2000; Faccio and Xu, 2015), others have found this relation to be insignificant or even in the wrong direction (e.g., Bradley, Jarrell and Kim 1984; Hovakimian, Opler and Titman 2001). Still others find that results are highly sensitive to definitions of either leverage or tax rates (e.g., Faulkender and Petersen 2006; Faulkender and Smith 2016). In the time series, Gordon and Lee (2001) and Fleckenstein, Longstaff and Strebulaev (2020) find a positive correlation between variation in statutory tax rates and corporate debt usage. However, Taggart (1985) and Graham, Leary and Roberts (2015) argue that trends in tax rates are insufficient to empirically explain long-term trends in capital structure, largely due to a mismatch in timing between changes in tax rates and changes in debt use. Studies focusing on recent changes in tax regulation often find that firms' capital structures respond to the change in tax incentives in the expected direction (Givoly, Ofer and Sarig, 1992; van Binsbergen, Graham and Yang, 2010; Doidge and Dyck, 2015; Heider and Ljungqvist, 2015). Recent studies by Bargeron, Denis and Lehn (2018) and Ivanov, Pettit and Whited (2024), though, find firms' financing behavior moving against shocks to their tax incentives.

In light of these mixed results, Hanlon and Heitzman (2022), conclude (p. 510) that "the literature continues to struggle to document a consistent relation between corporate debt policies and taxes." They suggest a more fruitful direction for future research would be to shift attention from documenting average tax effects in debt policies to deepening our understanding of "the conditions under which taxes do matter" (p. 511). Our study contributes to this goal in two ways.

First, we study very large increases in US corporate tax rates, larger than have previously been available in modern data sets. Hennessy, Kasahara and Strebulaev (2020) argue that, because most empirical studies of the relation between taxes and capital structure have been confined to the post-war period, many of them focus on relatively small changes in tax incentives, making it difficult to find significant effects.[1] Between 1936 and 1952, the top US corporate tax rate increased from 15% to 52%, creating a large increase in the tax incentive for debt financing. As noted by Card (2022), studying large shocks helps to "cut through the statistical noise" and increase the power of our tests.

Second, we study how corporate investment impacts the extent and timing of firms' responses to debt tax incentives. A large literature acknowledges that if a company's capital structure deviates from target (for example, if the target has changed due to a sudden change in the corporate tax rate), the firm may not immediately recapitalize its capital structure if it is costly to do so. Hennessy, Kasahara and Strebulaev (2020) demonstrate that with infrequent adjustment, the leverage effects of changes in tax incentives can be difficult to detect in tests over all firm-years. This is because the new tax rates will only affect capital structure actions when the firm hits a refinancing point. At refinancing points, the effect of the new tax rates should be stronger in the data.

To test this implication, we focus on investment spikes as natural refinancing points. Faulkender et al. (2012) provide evidence that marginal adjustment costs are low when

[1] They point out, for example, that the Tax Reform Act of 1986 studied by Gordon and Mackie-Mason (1990) led to a change in effective debt tax shield value of only 2.5 percentage points, and the state tax rate increases studied by Heider and Ljungqvist (2015) averaged only 74 basis points.

firms' external capital needs are high. Periods of high investment thus provide a natural opportunity to rebalance capital structure. From a somewhat different perspective, DeAngelo, DeAngelo and Whited (2011) argue that firms issue debt in periods of investment spikes. In their model, while tax incentives make debt the preferred source of funding investment, in between investment spikes companies work to reduce their leverage in order to free up debt capacity. In either case, the impact of changes in tax incentives are most likely to be apparent when the firm needs to raise capital for investment.

Consistent with these predictions, our analysis indicates that companies' responses to tax rate increases are significantly stronger among firms that invest heavily following the tax hike. Thus, higher tax rates lead to higher leverage, but the adjustment is on average delayed until the next investment-related financing need.

We begin by studying the relation between tax incentives and firms' use of debt to fund investment over our nearly 100-year sample period. We document that over the past century, the relation between asset growth and changes in leverage is highly correlated with firms' marginal tax rates. This relation is robust to controlling for firm characteristics, as well as industry-by-year and firm fixed effects and holds in both the cross-section and time series.

Conversely, our results also show that the relation between marginal tax rates and leverage is very small unconditionally; this finding is important because it is reflective of the weak debt-tax findings in many capital structure studies. We demonstrate that the association between tax incentives and leverage is highly dependent on a firm's level of investment. When investment is at its median, the leverage-tax sensitivity in our analysis is near the midpoint of the distribution of estimated sensitivities reported in the literature (Feld, Heckemeyer and Overesch, 2013). However, among firms with higher investment (upper quartile), our estimated sensitivity falls in the upper end of the estimates from prior studies. The effect of investment on the leverage-tax sensitivity is large in magnitude. Imagine two firms: one with median investment and another whose investment is higher by one standard deviation. Our estimates imply that the latter firm exhibits a leverage-tax elasticity that is approximately five times larger.

We then turn our attention to understanding firms' responses to the sharp increases in corporate tax rates in the 1940s and 1950s, motivated to fund US involvement in World War (WW) II and the Korean War, respectively. In the early 1940s, the Revenue Acts of 1940, 1941, and 1942 more than doubled the top corporate tax rate (on income over $25,000), from 19% to 40%. A decade later, the Revenue Acts of 1950 and 1951 raised rates from 38% in 1949 to 52% by 1952; additionally, the imposition of an excess profits tax created an even higher tax rate on profits in excess of "normal" (pre-war) levels. If tax incentives are a relevant factor in corporate financing decisions, we would expect to see measurable impacts on capital structure from such large shifts in rates. At the same time, given the potential adjustment costs and firms' desires to preserve debt capacity until needed for investment, we expect leverage responses to be concentrated among companies with the largest investment needs after the tax rate hikes. This is exactly what we find.

Because each tax hike episode was actually a series of tax hikes in each of three consecutive years, we define each event period as the full three-year period. For the 1940s tax hikes, we start the 3-year event period in the first full year affected by the first tax act (1941) and end the 3-year period in the year the series of tax acts are fully in place (1943). Similarly, for the 1950s tax hikes, the three-year event period extends from 1951 through 1953. In both the 1940s and 1950s, we find that leverage increases significantly more for high-asset growth firms than for low-asset growth firms after tax rates increase, relative to the respective preceding three-year period. Consistent with our results over the full century, this result suggests that when firms need to raise capital to fund investment, their financing choice responds strongly to tax incentives. We also find that the resulting leverage changes are persistent: High-asset-growth firms maintain their relative increase in leverage for at least several years after the tax rate increases are complete.

A natural concern with studying any change in regulation is that the shift in government policy may not be exogenous to the economic conditions facing the firm. This is a salient issue in our setting because the Tax Acts of the 1940s and 1950s were motivated by a need to fund the war efforts for, respectively, WW II and the Korean War. The tax increases were likely correlated with increases in demand and investment opportunities for domestic manufacturers. We take several steps to show that our results are more likely driven by tax incentives than by a shock to investment opportunities or profitability alone.

First, we exploit the timing of the passage of the tax acts to highlight the connection between tax policy and leverage changes. In both the 1940s and 1950s, in the 12 months immediately following the enactment of the tax acts, there is variation across firms in the month that a given firm's fiscal year ends, relative to the month of passage; this creates variation in the amount of time a firm has to adjust capital structure before reporting debt usage in its financial statements at the end of its fiscal year. Further, in the initial year of the 1950's tax acts, the tax rate that a firm faced also varied with the month of a given firm's fiscal year-end: in 1950, the new tax rate was higher for firms with later fiscal year-ends. We show that a firm's leverage response in the 12 months after a tax act is passed is strongly increasing in the number of months between the month of passage and its fiscal year-end. Thus, firms facing similar macroeconomic conditions (within the same 12-month period) display very different financing behaviors depending on their exposure to the new tax incentives.

Second, we explore in detail possible war effects. In one test, we study the period surrounding the Vietnam War, from 1962 to 1968. Like the early 1940s and 1950s in our main experiment, the mid-1960s was also a time of increased wartime production; but unlike the earlier wars, the average corporate tax rate was virtually identical in the three-year periods before and after the start of US involvement in 1965 (see Figure 1). In contrast to the results discussed above, we find no evidence of a differential change in leverage for high-asset growth firms during the mid-1960s; That is, in the 1960s high-growth firms do not increase their debt usage during a similar war-time period without an increase in tax rates.

We also show that our results are robust to excluding firms whose demand is most exposed to wartime production. We do this in two ways. First, we classify industries as war-related vs. non war-related following Goldin and Margo (1992) and Frydman and Molloy (2011). Our results are as strong or stronger in non-war-related industries. Second, we use data from

Garin and Rothbaum (2025) to identify firms that had war production contracts with the US government during the WW II years. This is an especially relevant sample, as war-contract firms not only faced higher demand, but also likely expected a less risky earnings stream due to the government contract, which could affect their financing choices. Nonetheless, our findings are just as strong once we exclude all firms that received government production contracts. Finally, we examine changes in macroeconomic conditions through our event windows and find no evidence that economic or capital market conditions changed in a direction or magnitude that is likely to explain our results.

In sum, we find that: a) firms use more debt to fund their asset growth when they face higher income tax rates; b) firms make leverage-increasing financing choices after substantial increases in tax rates, but importantly, c) these effects are concentrated among firms making significant investments in the years following the tax hikes. Thus, our evidence is consistent with tax-driven capital structure decisions and is crucially tied to periods of financing need.

These results deepen our understanding of the role of taxes in capital structure decisions and contribute to the literature in several ways. In standard trade-off models of capital structure, the tax benefit of debt plays an important role in explaining why firms may prefer debt over equity. Yet, the empirical relevance of the tax benefits of debt remains unsettled. While some papers document first-order impacts of taxes on capital structure, others find small or no impact. Some authors have suggested that this is because other costs or benefits of debt, like adverse selection costs or financial flexibility, overwhelm those associated with the interest tax shield (e.g., Myers and Majluf 1984; DeAngelo, DeAngelo and Whited 2011). While we do not dispute the importance of these other factors, we present an alternative explanation for the mixed empirical support found in the literature. We argue and show evidence that a weak relation between taxes and leverage in large samples reflects that firms do not respond to tax incentives every period, as emphasized by Hennessy, Kasahara and Strebulaev (2020). They are more likely to wait to rebalance until a time when the marginal cost of rebalancing is low – for example, when they are raising capital for investment. When we focus on firms with high investment rates at times of increased tax incentives, we find substantially stronger tax effects.

In this way, we connect the literature on capital structure and taxes with the literature on capital structure dynamics. Previous studies by Fischer, Heinkel and Zechner (1989), Leary and Roberts (2005), and Strebulaev (2007) suggest that in the presence of adjustment costs, if a change in the corporate tax rate increases optimal leverage, firms may not immediately adjust, but will wait until they hit a rebalancing point. Faulkender et al. (2012) point out that investment spikes provide a natural rebalancing point, since the adjustment cost is low when firms are raising capital anyway. Consistent with these dynamics, we find that leverage changes following large changes in tax rates are statistically and economically large for firms that make significant investments.

We also make two methodological improvements relative to previous studies of taxes and capital structure. First, with our historical data, we are the first, to our knowledge, to study in detail the responses of firms to the large increases in corporate tax rates in the US in the 1940s and 1950s. Second, we simulate marginal tax rates that incorporate key tax code features for public US companies from 1927 to present, enabling us to examine the relation between financing decisions and tax rates over a longer time horizon than has previously been possible. These simulated marginal tax rates will be available online at https://people.duke.edu/∼jgraham/taxform.html.

The remainder of the paper is organized as follows. In the next section, we describe our panel dataset covering publicly traded US firms over the past century as well as our methodology for estimating marginal tax rates at the firm-year level. Section 3 presents our analysis of debt and taxes during the full sample period, while Section 4 focuses on firms' responses to the large increases in corporate tax rates in the early 1940s and early 1950s. Section 5 studies tax effects in the initial year of each tax legislation (1940, 1950), when the number of months a given firm was exposed to the increased tax incentives varies with the month that a given firm's fiscal year ends. Section 6 concludes.

2 Data, Variables, and Summary Statistics

A Sample Selection

We build an unbalanced panel of publicly traded firms from 1925 through 2023. An important advantage of having data from the earlier part of the century is that there were major tax hikes in the early 1940s and the early 1950s (Figure 1a). From 1939 to 1942 and from 1949 to 1952, the top bracket corporate tax rates rose by 21 and 14 percentage points, respectively. Given the sample standard deviation of the annual change in the top bracket corporate rate of 2.5% over the past century, these tax hikes were economically important shocks to firms' tax benefit of debt.

To build a sample that can analyze both time-series and cross-sectional variation in tax incentives over the past century, we start with the sample of firms listed in the Center for Research in Security Prices (CRSP) monthly stock files, which includes all firms listed on the New York Stock Exchange (NYSE) since 1925, all firms listed on the American Stock Exchange (Amex) since 1962, and all firms listed on the Nasdaq since 1972. We append to this dataset the Compustat database, which starts with a set of public firms that existed in 1962.[2] We gather accounting data from two sources: 1) Compustat, and 2) we follow Graham, Leary and Roberts (2015) and use data from various issues of Moody's Industrial Manuals for firm-years not covered by Compustat. For the Moody's firm-years, we collect stock market data from CRSP. To be consistent with the literature, we exclude utilities (SIC codes 4900-4999) and financial firms (SIC codes 6000-6999). We also drop firm-years that require lagged data to estimate tax rates and/or if lagged control variables measuring profitability, tangibility, market-to-book assets, and total assets—are missing. The end result is an unbalanced firm-year panel beginning in 1927 and ending in 2023, covering around 300,000 firm-years for around 25,000 firms.

[2]While Compustat has data going back to the 1950s, the pre-1962 data are backfilled for firms existing in 1962, raising concerns about survivorship bias. We use Moody's data to fill in the data gap created by Compustat's backfill process.

B Key Variables and Summary Statistics

To measure firms' tax incentives for using debt financing, we simulate marginal tax rates (MTRs) following Graham (1996). MTRs measure the present value expected tax savings that a firm obtains with an additional $1 of interest expense, taking into account the probability a firm is taxable and the effects of tax-loss carrybacks and carryforwards, among other features of the tax code. Appendix A provides details about how we estimate MTRs.[3]

Panel B of Figure 1 shows the distribution of MTRs in the following four eras: (i) 1927-1939 (pre-WW II); (ii) 1940-1949 (the period during and after the tax acts to support the world war effort); (iii) 1950-1986 (during and after the tax acts to support the Korean War); and (iv) post-1986 (including the tax-reducing effects of the Tax Reform Act of 1986 and the Tax Cuts and Jobs Act of 2017). Several patterns are notable. First, consistent with panel A, there have been substantial shifts in the level of tax incentives through the century. For example, the distribution of simulated MTRs during the 1940s is almost entirely to the right of the distribution from 1927-1939. Likewise, the distribution during 1950-1986 is largely to the right of the distribution over 1987-2023. Second, even within each era, there is substantial variation in marginal tax rates across firms. For a given tax regime, variation in the sign and magnitude of (current and expected future) profitability and non-debt tax shields induces cross-sectional variation in tax incentives.

Besides MTRs, corporate leverage and investment are key variables in our analysis. The leverage ratio is defined as total debt divided by total assets. We measure firms' investment using their asset growth, defined as the change in the natural log of non-cash total assets.[4]

[3]Our estimation procedure incorporates statutory tax rules on loss carrybacks and carryforwards, as well as the interest expense deduction limits set by the Tax Cuts and Jobs Act of 2017. We thank Gardner, Hanlon and Heitzman (2026) for sharing data on disallowed interest deductions.

[4]Early-period financial statements (e.g., 1920s–1950s data from Moody's Manuals) often omit capital expenditures and depreciation. By relying on balance-sheet change in non-cash total assets, we are able to use a consistent definition of investment across the full sample. Appendix Section C shows that our main results are robust to alternative measures of investment, including the change in total assets, capital expenditures in the modern era when that variable is available, and the change in non-cash assets plus depreciation expense. To implement the last measure, we hand-collect depreciation expense data from Moody's Manuals during 1940-1941 and 1950-1951 – this collection covers only a subset of years due to funding and time constraints. This data entry exercise provides the data to allow us to replicate all but one of the main tests, and for these tests the results remain qualitatively similar using the new investment variable. The correlation between our baseline investment measure and the depreciation-adjusted measure is 0.92.

See Appendix B for definitions of these and other variables. All ratio variables and the asset growth variables are winsorized at the 2% and 98% levels to ensure that results are not driven by outliers. Qualitative implications do not change if we instead winsorize at 5% and 95%. Table 1 presents descriptive statistics for our sample.

3 Capital Structure, Taxes and Investment over the Last Century

In this section, we examine the relation between tax incentives and corporate financing decisions using our full panel of data over the past century. While much of the prior literature has found at best a weak relation between taxes and leverage in large panels, we pay particular attention to capital structure behavior in years that companies fund investment, arguing that this is when debt tax incentives should be most evident. Periods of significant investment provide a natural low-cost opportunity for firms to adjust their capital structure. For example, Faulkender et al. (2012) argue that a firm's marginal cost of adjusting leverage is low when their net cash flow position is either high or low, such that they are either raising or distributing capital. For example, if a firm needs to raise external funding for investment, they can choose their mix of financing instruments to move leverage towards target at the same time, without incurring the cost of an additional trip to the financial markets. Consistent with these predictions, Faulkender et al. (2012) show that leverage adjustment speeds are fastest when the absolute value of a firm's net cash flow position exceeds its deviation from target leverage.

While our historical data do not include cash flow statement data, we argue that periods of significant investment (proxied by asset growth) are likely to coincide with the firm needing to raise external funds (i.e., low net cash flow observations). We thus expect leverage adjustment costs to be low in firm-years with high-asset growth. To validate this conjecture in our data, we first estimate a partial adjustment model of leverage following the approach of Oztekin and Flannery (2012) in which we parameterize the adjustment speed as a function of asset growth and other covariates (firm size, profitability, asset tangibility, market-to-book, and the corporate tax rate). As shown in Figure 2, we find that the estimated speed of adjustment is strongly positively correlated with asset growth.[5] In fact, the magnitude of the relation between adjustment speed and asset growth is much larger than for any of the other covariates. This faster adjustment to target leverage suggests that firms perceive their cost of adjustment to be low when they are investing heavily – providing the context for our tax hypothesis that capital structure effects should be most evident at the time of investment events.

A Leverage Changes from Investment and Corporate Tax Rates

As described in the introduction, we hypothesize that higher tax rates lead to higher leverage, with the timing of levering up tied to corporate investment. Under this hypothesis, firms facing higher tax rates should rely more on debt to finance their investments than firms facing lower tax rates. Consequently, a given investment should generate a larger increase in leverage for high-tax-rate firms.

We start by studying how the relation between corporate investment and changes in leverage varies with changes in the marginal tax rate faced by firms. To do so, we first estimate the following cross-sectional regression for each year in our sample period:

$$\Delta Leverage_{it} = \beta_t AssetGR_{it} + \epsilon_{it}, \tag{1}$$

where i references firm and t references year. $\Delta Leverage_{it}$ is the within-firm change in the leverage ratio. $AssetGR_{it}$ is investment, as measured by the change in the natural log of non-cash total assets. To reduce the effect of the change in composition of firms over time,[6] we restrict the sample to NYSE- or AMEX-listed firms. (Appendix Figure C1 shows that the results also hold on the full sample.) To ensure that the yearly β_t coefficients are estimated precisely, we require a minimum of 200 firm-year observations in each annual cross-section. The estimated β_t coefficient captures the average change in leverage associated with an increase in investment.

[5] Full estimation results are available in Appendix Table C1.

[6] Many smaller firms were added to the Compustat universe during the sample period.

Figure 3 plots the time series of β estimates (blue line) along with the time series of average simulated MTRs (red line). The figure reveals a clear association: except during the 1930s (the period of the Great Depression), the two series generally move together. This pattern suggests that when the typical firm faces higher marginal tax rates, it tends to fund more of its investment with debt, resulting in a larger leverage response to investment. The correlation between the two variables is 0.68.

Table 2 presents results of regression analysis that formalizes the relation shown in Figure 3. We estimate panel regressions of the following form:

$$\begin{aligned}\Delta Leverage_{it} = \beta_1 AssetGR_{it} + \beta_2 MTR_{it-1} + \beta_3 AssetGR_{it} \times MTR_{it-1} \\ + \gamma \Delta X_{it-1} + \alpha_i + \alpha_{kt} + \epsilon_{it}\end{aligned} \tag{2}$$

where i references firm, k references industry, and t references year. As noted above, $AssetGR_{it}$ measures investment. MTR_{it-1} is the lagged simulated marginal tax rate for a given firm-year. ΔX_{it-1} is a vector of lagged first differences of firm controls, including profitability, tangibility, and the market-to-book assets ratio. α_i and α_{kt} are respectively firm and industry-by-year fixed effects. A key feature of the specification is the interaction between $AssetGR_{it}$ and MTR_{it-1}. For ease of interpretation, we standardize the marginal tax rate to have a mean of zero and a standard deviation of one. Standard errors are clustered at the firm level. The coefficient of interest is β_3, which measures how the effect of the company's investment on leverage varies with its marginal tax rate.

The estimated coefficients indicated that, as a stand-alone variable, the effect on leverage from asset growth (the marginal tax rate) in column 1 (2) is small economically. More relevant to our tax hypothesis, the coefficient on the interaction between asset growth and MTR in column 3 shows that investment increases leverage significantly more when firms face higher tax rates. Columns 4-5 show that the coefficient on the interaction is unchanged—both in terms of magnitude and statistical significance—when we add two-digit SIC industry-by-year fixed effects and firm fixed effects. According to column 5, when the marginal tax rate is at its mean, a one-standard-deviation increase in asset growth (0.349) is associated with a 1.7 percentage point increase (0.349×0.049) in leverage. However, for a firm facing a marginal tax rate that is one-standard deviation above its mean, a one-standard-deviation increase in asset growth is associated with a leverage increase of 4.2 percentage points ($0.349 \times (0.049+0.071)$).[7]

This result is robust to several alternative specifications. Appendix Table C2 shows that the results remain qualitatively similar when we: (i) include interactions between asset growth and one-year lagged firm characteristics as additional controls, (ii) measure investment with asset growth that includes cash, (iii) measure investment using the change in non-cash assets plus depreciation expense, (iv) replace MTR with a measure of debt tax incentives net of personal tax effects, (v) limit the sample to Compustat firms, (vi) for the Compustat sample, drop firm-years significantly affected by M&A activity, and (vii) for the Compustat sample, define investment based on capital expenditures. Appendix Table C3 shows that the finding is also robust to controlling for macroeconomic variables that may correlate with MTRs, including the yield spread, expected inflation, and the nominal and real cost of debt.

As an additional robustness test, Appendix Table C4 changes the dependent variable to the change in debt scaled by lagged non-cash assets—$\Delta D/A^{NC}_{t-1}$ rather than $\Delta(D/A)$. This change allows us to estimate the debt proportion of investment and check whether the debt proportion correlates positively with corporate tax rate. The coefficient on asset growth in column 1 indicates that firms on average fund 29.4% of their asset growth with debt. More relevant to the tax hypothesis, the coefficient on the interaction between asset growth and MTR in column 3-5 shows that companies use significantly more debt when facing higher tax rates.

B Leverage-Tax Sensitivity and Investment

Having shown that the effect of asset growth on leverage changes depends on tax incentives, we next ask the reciprocal question: to what extent does the relation between leverage ad-

[7] Appendix Tables C2 and C3 show that our panel B results are robust to the same type of tests used for Panel A.

justments and tax incentives vary with firms' asset growth? Panel A of Figure 4 provides a visual illustration of this heterogeneity. Using the estimated coefficients from column 5 of Table 2, the figure plots the implied effect of a one-percentage-point increase in the marginal tax rate on firms' leverage ratios across different percentiles of asset growth. As shown with red dashed lines, asset growth generates substantial dispersion, with estimated tax sensitivities ranging from –0.08 at the 10th percentile of asset growth to 0.21 at the 90th percentile. To put this magnitude of variation in perspective, we overlay a histogram of estimates of the tax-sensitivity of leverage reported in the literature, obtained from Feld, Heckemeyer and Overesch (2013). Interestingly, the distribution of estimated tax sensitivities in the literature aligns with the asset-growth-conditional spread of tax sensitivities we document. Thus, the variation in leverage-tax sensitivity associated with differences in asset growth is substantial – on par with the variation in sensitivities reported in the literature. Taken together, these findings suggest that the dynamics of firms' responses to tax incentives, and the extent to which capital structure changes are tied to investment activity, may help explain why some previous large-panel studies have found a weak relation between leverage and tax incentives.

4 Do the Large Tax Rate Hikes of the 1940s and 1950s Affect Corporate Leverage?

In this section, we study large shocks to US corporate income tax rates in the early 1940s and 1950s. If tax incentives are an important factor in corporate capital structure decisions, tax effects ought to be apparent in response to such sharp changes in tax rates. However, as discussed above, if adjustment is costly, firms may not immediately respond to higher tax rates. In this case, we expect the effects of increased tax incentives to be most pronounced among firms with the greatest investment financing needs after each tax hike.

A Tax Legislation in the 1940s and 1950s

Figure 5 presents timelines of the tax hike episodes. In the early 1940s, US corporate tax rates increased through four tax acts that jointly increased the top rates from 19% to 40%.

The US government enacted these tax laws to fund its defense spending related to World War II. The First and the Second Revenue Acts of 1940 were passed in June and October 1940, respectively. The two laws jointly increased the top-bracket corporate tax rate by five percentage points. The following year, the Revenue Act of 1941 passed in September 1941, which increased corporate tax rates by an additional seven percentage points. About one year later, the Revenue Act of 1942 passed in October 1942, further increasing statutory corporate income tax rates by an additional nine percentage points.[8]

Similarly, corporate tax rates rose in the early 1950s through a series of tax laws, in this case to fund the Korean War. The first of these was the Revenue Act of 1950. Passed in September 1950, it raised the corporate tax rate by seven percentage points, from 38% to 45%. This was followed by the Excess Profit Tax (EPT) Act of 1950 and the Revenue Act of 1951, which jointly raised the top corporate tax rate by an additional seven percentage points, from 45% to 52%. Although the tax rates were originally scheduled to be reduced to 47% in 1954, the government postponed this reversion, and corporate tax rates remained elevated through the mid-1960s and beyond (see Figure 1).

Given that the increase in tax rates resulted from a series of tax acts enacted over the span of two to three years, our analysis treats each of these 3-year episodes as a single event, defining the event windows as 1941-1943 and 1951-1953, respectively. We exclude 1940 and 1950 from their respective 3-year post-tax hike periods because the tax acts in each sequence were passed mid-to-late in the year, and thus during the early part of the calendar year, no new tax hikes were in effect. In Section 5, we conduct a detailed analysis of 1940 and 1950 conditional on when during the year new tax incentives went into effect.

[8] In addition to these increases in the corporate income tax rate, a temporary excess profit tax (EPT) was introduced in 1940, aimed at firms that earned profits in excess of a normal rate of return times invested capital. Due to the calculation of invested capital in the EPT formula, scholars and practitioners argue that the EPT provided an additional incentive to use debt financing relative to equity (e.g., Hynning 1941; Boulton 1951; Tax Foundation 1952). Our MTR variable does not factor in EPT effects in the 1940s. As mentioned in the main text, an EPT was also passed in 1950, taking effect in 1951. Attached to this EPT legislation was a 2 percentage point increase in the statutory corporate income tax rate in 1951, which we include in our MTR calculations.

B Constructing Matched Samples

Using these large tax hikes, we study whether firms' leverage responses to tax-rate changes are tied to the timing of funding new investment. Specifically, we examine whether, all else equal, companies with high-asset growth increase leverage more than firms with low-asset growth following a tax rate increase.

One concern with comparing low- and high-asset-growth firms is that the marginal cost of issuing debt may differ systematically between the two groups. In particular, high-asset-growth firms tend to be more profitable, which may imply flatter marginal cost curves for debt issuance. For such firms, a given increase in the tax rate would translate into a larger increase in target leverage. As a result, our baseline tests could reflect differences in marginal cost curves rather than differences in firms' investment-driven leverage responses tied to tax benefits from interest deductions.

To mitigate this concern, we construct a matched sample of high- vs. low-asset growth firms. We measure a firm's asset growth as the change in the natural log of non-cash assets from the beginning to end of each three-year event window. We then match each firm in the top tercile of asset growth ("high-asset growth") with up to four firms in the bottom tercile ("low-asset growth") that are observably similar to the high-asset-growth firm at the beginning of the period—which we refer to as a matched pair. We select the control (matched) firms based on propensity scores estimated from a probit model. The covariates include the natural log of total assets, profitability, tangibility, and the market-to-book assets ratio, all measured at the beginning of the event window. To ensure high-quality matches, we apply a caliper of 0.05 and require that each high-asset-growth firm have at least two matched low-asset growth firms.

Table 3, Panels A and B (C and D), respectively, presents summary statistics on the matched sample before and during the tax hikes in the early 1940s (1950s). The table confirms that the matched high- and low-asset growth firms have similar characteristics.

C Leverage Adjustments in Response to Tax Hikes

As discussed earlier, our main hypothesis is that the impact of tax incentives on leverage should be strongest in periods when a firm has high external capital needs. To examine this in the context of the tax hikes of the 1940s and 1950s, in Table 4 we study leverage changes around the changes in tax rates. If firms use more debt financing when facing higher tax incentives, investment activity should lead to a greater increase in leverage in the period after the tax rate hikes than before. For each of the two tax rate increase episodes, we estimate the following regression:

$$\Delta Lev_{ip} = \beta_1 AssetGR_{ip} + \beta_2 AssetGR_{ip} \times Post_p + \gamma \Delta X_{ip} + \alpha_{kp} + \epsilon_{ip} \tag{3}$$

where i denotes firms, k denotes industries, and p denotes the three-year period either before or during the tax hike. $AssetGR$ is a firm's asset growth in each period, $Post$ equals one for the period after the tax hikes begin, and ΔLev_{ip} is the change in the leverage ratio for firm i from the beginning to end of period p. ΔX_{ip} represents the change in firm-level control variables in each period. The specification includes industry-by-period fixed effects α_{kp}, and standard errors are double-clustered at the matched pair and firm levels.

In Panel A of Table 4, column 1 studies the tax acts of the early 1940s. The coefficient on $AssetGR$ indicates that in the period preceding the 1940s tax hikes, a one-standard-deviation increase in 3-year asset growth (0.318) is associated with a 1.9-percentage point decrease (-0.061×0.318) in the leverage ratio.[9] Notably, the relation between leverage and asset growth turns positive after the tax rate increase: the coefficient on $AssetGR \times Post$ of 0.146 indicates that, in the period after the tax rate change, a one-standard-deviation increase in asset growth is associated with a 2.7-percentage point increase in leverage ((-0.061+0.146)×0.318). Relative to an average leverage ratio of 6.7% in 1940, this change represents an economically large magnitude. Thus, firms with large needs to fund investment respond to tax incentives and use more debt following large tax hikes.

[9] The standard deviation is calculated from our panel of firms pooled over the 1940s and 1950s.

We obtain qualitatively similar results in column 2, which examines the tax acts of the early 1950s. First, note that tax rates remained high in the late 1940s, which is the pre-period for our 1950s analysis. Therefore, in the late 1940s, one would expect the relation between leverage and asset growth to be about what was observed in the post-period in column 1. This is what we find, given the 0.092 coefficient on $AssetGR$ in column 2 is similar to the sum of the coefficients in column 1. This 0.092 coefficient indicates that a one-standard-deviation increase in asset growth in the period preceding the 1950s tax hikes (i.e., during the late 1940s) is associated with a 2.9-percentage-point increase (0.092×0.318) in the leverage ratio. In addition, and important for the tax hypothesis, following the 1950s tax hike, even more debt is used to fund asset growth, generating an additional 3.0-percentage-point increase (0.095×0.318) in the leverage ratio. This additional increase is both statistically and economically significant, given that the average leverage ratio in 1950 was 9.7%.

The Appendix shows that our findings are robust to alternative specifications. The results are consistent when investment is measured by growth in total assets rather than non-cash assets (Appendix Table C5), and when we include interactions between $Post$ and beginning-of-period firm characteristics as additional controls in the regressions (Appendix Table C6). The latter test attenuates concerns that $AssetGR$ may proxy for attributes such as profitability or asset tangibility.

We next explore whether these tax-induced increases in leverage are temporary or whether they persist. Panel A of Figure 6 and Panel A of Figure 7 plot the average leverage of high- and low-asset-growth firms, spanning five years before and after the hikes. In Figure 6, high- and low-asset-growth firms are defined based on asset growth during the 1940-43 period, while in Figure 7, the classification is based on asset growth during the 1950-53 period. In each figure, these group assignments are held fixed through the time horizon of each panel. Consistent with our regression results, high-asset-growth firms substantially increase leverage relative to low-asset-growth firms during the hikes. While leverage declines in some years following the asset growth period (e.g., 1944–45), it generally remains high. Overall, the patterns are consistent with the increased tax incentives having a lasting effect on leverage for those firms investing heavily during the post tax-hike periods.

We next examine whether these patterns reflect differential pre-trends between high- and low-asset-growth firms. In both Panel A of Figure 6 and Panel A of Figure 7, the two groups' leverage appears to generally move in parallel during the five years preceding the tax hikes. Panel B of the figures formally tests for differential pre-trends. Specifically, we regress leverage on interactions between year dummies and an indicator for belonging to the high-asset-growth group, as defined in Panel A. To further tighten the source of variation, these regressions include firm fixed effects, industry-by-year fixed effects, and a vector of firm-level controls. The regression results are reported in Appendix Tables C7 and C8. Panel B of the figures plots the estimated coefficients on the interaction terms over time. The interaction coefficients in the pre-period are all statistically insignificant, suggesting no differential pre-trends between high- and low-asset-growth firms.

D Alternative War-related Explanations

The results in Table 4 indicate that firms that invested heavily responded strongly to the sharp increases in tax rates in the 1940s and 1950s by relying significantly more on debt than they did before the tax hikes. While this is consistent with an important role for tax incentives in capital structure decisions, we acknowledge that these tax rate changes were not independent of macroeconomic conditions. In particular, both tax law events were motivated by a need to raise revenue to fund the US's involvement in WW II and the Korean War, respectively. These war efforts led to increased military spending and war-related production by some firms, which could also affect their capital structure choices. For example, much of the war-related investment was to increase manufacturing production, and thus involved mainly tangible plant and equipment. In addition, much of the increased demand came through government war supply contracts, which would imply relatively safe and predictable expected revenue streams. One might therefore expect investment in war-related production to support greater debt capacity.

While it is difficult to fully disentangle the effects of tax rate changes from those of other macroeconomic shocks, we conduct several analyses in an attempt to rule out non-tax war-related explanations our results. We begin by studying the periods around the US's involvement in the Vietnam War. Similar to World War II and the Korean War, the Vietnam War prompted increased military spending by the government and boosted war-related production. A key difference, however, is that the US involvement in the Vietnam War was not accompanied by immediate tax hikes, partly due to President Johnson's resistance to raising taxes. Thus, studying the Vietnam War era allows a placebo analysis in which there are war investment effects but not tax-driven capital structure incentives.[10]

Column 3 in Table 4 presents the results of estimating equation (3) using the periods around the Vietnam War. As in columns 1-2, we create two matched samples, one for the three-year period before the war (fiscal years 1963-1965) and another for the period during the war (1966-1968).[11] The coefficient on $AssetGR$ in column 3 shows that in the period preceding the Vietnam War, a one-standard-deviation increase in asset growth is associated with a 4.0-percentage-point relative increase (0.126×0.318) in the leverage ratio. Importantly, and in contrast to the results for the tax hike episodes during WW II and the Korean War, the coefficient on $AssetGR \times Post$ in column 3 is negative and statistically insignificant. Thus, in a war period without a change in prevailing tax rates, there is no indication of greater debt usage after the start of the war by high-asset-growth firms.

To further mitigate the concern that our results may be influenced by war-driven increases in product demand and investment opportunities, we examine the extent to which our results change when we remove firms operating in war-related industries (i.e., those most likely to be impacted by increased production in support of the war effort). We identify war-related industries based on two-digit SIC codes following Goldin and Margo (1992).[12] In Panel B of

[10] The US government eventually introduced a temporary surcharge tax on firms in June 1968 to help fund its war efforts, several years after direct US military involvement started in 1965. Even then, the magnitude of the tax rate increase was much smaller than those related to the other two wars. Further, the average corporate tax rate during the three years following the start of US involvement (1965) was very similar to that in the three years preceding.

[11] Appendix Table C9 presents summary statistics for these matched samples.

[12] Following the literature (e.g., Goldin and Margo 1992; Frydman and Molloy 2011), war-industries are classified as the following 2-digit SIC categories: chemicals, rubber, fabricated metal products, electrical machinery, other machinery, and transportation equipment.

Table 4, columns 1-2 re-estimate equation (3) for the early 1940s and early 1950s, excluding all firms in industries identified as war-related industries. We obtain similar results for firms in non-war related industries as we do for the full sample. This suggests that the leverage effects documented in Panel A, which are consistent with firms responding to debt-tax incentives, were not driven by war-related production demand.

As an additional test, we identify *individual* companies that obtained war supply contracts from the US government during the 1940s. Firms with those contracts may have been more inclined to use debt financing because government backing made their production less risky. We obtain data on all industrial investments in the early 1940s authorized by the government to support a WW II supply contract from *War Manufacturing Facilities Authorized through October 1944 by General Type of Product Operator* (United States War Production Board, 1945).[13] This book reports the production beginning date for each contract-related industrial investment.

Columns 3-4 of Panel B examine whether removing firms with war contracts affects our results. Column 3 drops firms with contract driven production started by May 1944, the last fiscal year end in the sample used in column 1 of Panel A. Column 4 additionally removes firms with any contract-driven production by May 1945, to cover the possibility that firms may have raised capital for a war contract investment in advance of the production start date. In both columns, we find similar results after removing firms with war supply contracts. As with the analysis in columns 1 and 2 of Panel B, this suggests that the results in Panel A are unlikely to be driven by shifts in war-related production demand.

5 Across-firm Variation in Tax Incentives Tied to Timing of Fiscal Year-End

The previous section provides evidence that firms use more debt to finance their investment growth following the substantial increases in corporate tax rates in the 1940s and 1950s. The fact that these results are robust to excluding firms in war-related industries and firms with war supply contracts, and does not appear around the Vietnam War during which time

[13] We thank Garin and Rothbaum (2025) for making these data publicly available.

tax rates were relatively stable, bolsters the argument that our findings are driven by the tax sensitivity of firms' financing decisions rather than by shocks to war-related demand or investment opportunities alone. To focus even more closely on tax effects separate from concurrent changes in demand conditions, in this section we exploit cross-sectional variation in the month that a given firm's fiscal year ends to better isolate the role of tax effects.

Recall that the 1940s tax hike episode was actually a series of several tax hikes rolled out over a 2-3 year period, as was the 1950s tax hike episode. In our analysis above, we did not include the first year of each episode (1940, 1950) in our post-tax-hike period because the tax hike legislation was enacted late in the calendar year, and so companies could not have reacted to the new, higher tax rates early in 1940 or 1950 (because the higher tax rates were not yet in place).[14] Moreover, recall that the leverage data we observe are from financial statements and hence are measured as of the end of a given firm's fiscal year, and different companies end their fiscal years in different months. Therefore, there is cross-sectional variation in the number of months a given firm would have to react to the new higher tax rates before their fiscal year ends in 1940 (or 1950). In this section, we exploit this variation in the partial year of higher taxes in 1940 and 1950 by comparing firms with earlier fiscal year-ends to those with later fiscal year-ends, expecting a larger capital structure reaction among those with later year-ends.

Consider the first set of tax hikes in the early 1940s—the First and the Second Revenue Acts of 1940 — which were enacted, respectively, in late June and early October 1940. These acts jointly increased the top-bracket corporate tax rate by five percentage points, from 19% to 24%. The new, higher tax rate was applied retroactively to taxable years beginning on or after January 1, 1940; however, a company could not have reacted to the full 5% tax hike until October, when the details were known. Consider two fiscal 1940 firms, the first ending its fiscal year in November 1940 and the second in May 1941. Compared to the May fiscal year-end firm, the November year-end firm operated for six fewer months in fiscal 1940 with

[14] The qualitative implications of our findings above would not change if we instead include 1940 and 1950 as the last year of our pre-tax-hike analysis; we did not include 1940 and 1950 in our previous analysis, in order to make our pre- vs. post-tax-hike period more "clean" in that analysis.

the knowledge that the eventual tax rate for 1940 would be the new, higher rate; therefore, November firms had six fewer months to modify investment and capital structure policies in fiscal 1940 in response. Thus, in fiscal 1940, we would expect the capital structure of the May fiscal year-end firm to respond more strongly than the November fiscal year-end firm to the increased tax incentives resulting from the 1940 tax hikes.

Analogous arguments apply to the tax hikes in the early 1950s. The tax hikes of the early 1950s have an additional feature that is useful in isolating the effects of tax incentives: the Revenue Act of 1950 and the EPT Act of 1950 required firms to apply a blended tax rate—the weighted average of the old and new rates based on the number of days between July 1, 1950 and the end of their fiscal year. For example, consider two firms ending their fiscal year 1950 in January 1951 and May 1951, respectively. The fiscal year for the January firm includes seven months after July 1950, so the 1950 tax rate for this firm equals seven-twelfths of 47% (new rate) plus five-twelfths of 38% (old rate), a weighted-average tax rate of 43.3%. For the May firm, the blended tax rate would be eleven-twelfths of 47% plus one-twelfth of 38%, which is 46.3%. Therefore, subsets of companies faced 12 different tax rates in 1950, depending on the month in which their fiscal year ended. Thus, in our 1950 analysis, firms with earlier fiscal year-ends had both less time to react to the new tax rates and face lower tax rates, relative to later year-end firms.

In the remainder of this section, we examine whether capital structure changes relate to variation in exposure to tax incentives that result from variation in the month of a given firm's fiscal year-end. The key assumption to identify tax effects is that macroeconomic factors, such as changes in investment opportunities or expected profitability, were relatively constant within the twelve months following passage of each tax act, while tax incentives varied based on the timing of their fiscal year end.

A Fiscal Year-end Research Design

To study the heterogeneity based on fiscal-year-end months described above, we construct two matched samples. We match high-asset-growth firms to low-asset-growth firms in fiscal-year-end months ranging from one month before to eleven months after the enactment of major tax hikes, as detailed below. The first matched sample studies the effect of the First and Second Revenue Acts of 1940 and uses fiscal years ending between September 1940 and August 1941. The second examines the response to the Revenue Act of 1950 and the EPT Act of 1950 and includes fiscal years ending between September 1950 and August 1951. In this analysis, we focus on the tax law changes in 1940 and 1950 because these were likely to be the least anticipated, and the year immediately prior to enactment would not include any reactions to a tax change from the previous year.

For each of those 12 sets of fiscal year-ends, we construct matched samples following an approach similar to that in Section 4. We match each high-asset-growth firm to four low-asset-growth firms based on propensity scores tied to firm characteristics. Appendix Table C10 shows the distribution of the matched firms across fiscal year-ends. Table 5 shows that the matched high- and low-asset growth firms have similar characteristics.

We use these samples to estimate regressions similar to equation (3), with the following differences: First, the estimation sample includes only firm-years with fiscal year ends falling in the narrow windows just described (September 1940 through August 1941 and September 1950 through August 1951). Second, instead of capturing changes in tax incentives with the post-event indicator, we now measure variation in tax incentives with the variable $TaxIncent$, defined as the number of months between the passage of the relevant tax act and the firm's fiscal year-end.[15] All regressions include industry fixed effects and firm controls. Standard errors are double-clustered at the matched pair and firm levels.

B Results Conditional on Fiscal Year-end

Column 1 of Table 6 presents baseline estimates without the tax incentive measure (or its interaction with asset growth) for fiscal 1940. The coefficient on $AssetGR$ shows that a one-standard-deviation increase in asset growth (0.179) is associated with an increase in a

[15]The *TaxIncent* variable is similar between the high-asset-growth and low-asset-growth matched sample (within 0.4 months in 1940 and within 0.7 months in 1950), so the time to react to the new tax rules is similar for control and matched firms.

firm's leverage ratio of 0.1 percentage point (0.006×0.179) during fiscal 1940.[16] Importantly, columns 2-3 show that the increase in the leverage ratio is substantially larger for firms with fiscal years that are more exposed to the tax hikes. In column 2, the coefficient on the interaction between asset growth and the number of months between tax law passage and fiscal year end is positive and highly significant. According to the estimate, for companies with an additional 3-month exposure to the higher tax rates of the First and Second Revenue Acts of 1940 (in which case $TaxIncent$ increases by 3), a one-standard-deviation change in asset growth (0.179) is associated with an additional 1.2-percentage-point increase (0.023×0.179×3) in the leverage ratio. This is large relative to the mean leverage ratio of 6.7% in 1940. Column 3 shows that we obtain qualitatively consistent results when we replace our tax incentive measure with a dummy that equals one if at least half of the fiscal year is after the enactment of the tax hikes.

Columns 4-6 present analogous tests using the second sample, comprising firms with fiscal years ending between September 1950 and August 1951, just after the enactment of the Revenue Act of 1950. Results are similar to those in columns 1-3. The coefficient on $AssetGR$ in column 4 indicates that one-standard-deviation increase in asset growth (0.179) during this year is associated with a 1.9 percentage point greater increase (0.104×0.179) in the leverage ratio. Columns 5-6 show that the increase is substantially higher for firms with more months after the enactment of the tax hikes. For companies with an additional 3-month exposure to the higher tax rates of the Revenue Act of 1950 ($TaxIncent$ increases by 3), there is an additional increase of 1.6 percentage points (0.029×0.179×3) in the leverage ratio associated with a one-standard-deviation increase in asset growth. This is large relative to the mean leverage ratio of 9.7% in 1950. From column 6, if at least half of the fiscal year occurs after the enactment, the leverage ratio increases by an additional 3.7 percentage points (0.208×0.179).

The Appendix shows that these findings are robust to alternative specifications. In particular, the results remain qualitatively similar when investment is measured using the

[16]The standard deviation is computed using the pooled panel of firms over the 1940s and 1950s.

growth in total assets or the change in non-cash assets plus depreciation expense (Appendix Tables C11 and C12). We also examine whether changing firm characteristics in the months following the passage of the tax acts could account for the greater debt usage among firms with later fiscal year ends. In Appendix Table C13, we add interactions between $AssetGR$ and end-of year firm characteristics – size, asset tangibility, and profitability – as additional controls. The results remain robust, suggesting that the timing of fiscal year-ends relative to the passage of the tax acts is not simply proxying for changes in firm characteristics.

C Placebo Periods

In order to attribute the results in Table 6 to tax effects, a key assumption is that the month of a firm's fiscal year-end does not systematically correlate with capital structure choices within a given industry for non-tax reasons. To validate this assumption, in Table 7, we run a placebo test by re-estimating the regressions from Table 6 using all years without a significant tax hike. This includes all years from 1928–2023, excluding 1936–1943 and 1950–1953 (see Figure 1a). To be consistent with the timing in Table 6, for each 'year t', we include all firm-fiscal years ending from September of calendar year t through August of year $t + 1$.

Table 7 presents the results. The results show that in years without a significant increase in the corporate tax rate, the relation between asset growth and the change in leverage is unrelated to firms' fiscal year ends. This suggests that the results in Table 6 are not likely to be driven by a systematic non-tax based association between firms' choice of fiscal year end and their financing choices.

D War Effects

A potential alternative explanation for our results in Table 6 is that economic conditions, especially due to increased war-related production, changed within the fiscal year in a way that supported greater debt capacity (e.g., through increases in tangible assets and profitability or reductions in cash flow volatility) for firms with later fiscal year ends. To mitigate this concern, we conduct several additional tests in Table 8. Similar to the analysis in Table 4, Panel A of Table 8 first removes firms in war-related industries (Goldin and Margo, 1992). Columns 2 and 4 show that our main findings are robust to excluding these firms (columns 1 and 3 reproduce the baseline results from Table 6)—the interaction term remains positive and significant, and the economic magnitude is also similar, suggesting that changes in war production opportunities were not the primary driver of the change in financing behavior we find in Table 6.

Second, similar to the analysis in Table 4, we examine whether removing firms with war contracts affects our results. In Panel B of Table 8, column 1 drops firms with any war-contract-driven production by August 1941, the last fiscal year-end in the sample used in columns 1–3 of Table 6. Columns 2 and 3 drop more firms by removing firms with any contract-driven production by, respectively, August 1942 and August 1943, to cover the possibility that firms may have raised capital for a war contract investment well in advance of the production start date. In both columns, we obtain consistent results. This suggests that the results in Table 6 are unlikely to be driven by any shifts within the year in war-related production demand.

E Changing Economic Conditions within the Year

While the analysis in Table 8 mitigates concerns that our results reflect within-year shifts in war-related production, an alternative explanation could be that capital market conditions changed within the year. In particular, if credit market conditions improved across the months within the year following enactment of the tax acts, that could explain the greater increase in leverage with later fiscal year ends.

We examine changes in the yield spread, defined as the difference between BAA- and AAA-rated bond yields, within our two sample periods. Because our focus is on firms' annual investment and capital structure decisions, we compute the spread as the average of monthly annualized yields over each firm's fiscal year. During the first period (September 1940–August 1941), and the second (September 1950–August 1951), the fiscal-year average spread declined by 0.31 percentage points and 0.13 percentage points, respectively. Given that the sample standard deviation of fiscal-year average spreads is 0.64 percentage points, these declines are economically modest.

Nonetheless, we explore whether these changes in credit conditions, proxied by yield spread, are economically important for asset growth-induced leverage adjustments. In particular, could the decline in yield spreads during our sample periods explain the increased use of debt among high-growth firms with later fiscal year ends? Column 1 of Table 9 studies this question, presenting regression analysis using our full panel, from 1927 to 2023. We interact our asset growth variable with the average yield spread over the months in the firm's fiscal year.[17] If a low yield spread increases the leverage change at asset growth events, then the interaction term should be negative. While the interaction term is negative and statistically significant, the magnitude is small. According to our estimates, the decline in average yield spread during our sample periods — 0.31 percentage points in 1940 and 0.13 percentage points in 1950 — raises the leverage increase associated with a one-standard-deviation increase in asset growth (0.179) by only 0.08 percentage points ($-0.010\times(-0.31/0.64)\times0.179$) and 0.04 percentage points ($-0.010\times(-0.13/0.64)\times0.179$), respectively. Expressed on a 3-month basis (to make them comparable to the estimates in Table 6), these translate to average effects of only 0.02 and 0.01 percentage points. These magnitudes are small relative to the three-month exposure effects of 1.2 and 1.6 percentage-point documented in Table 6. These estimates suggest that changes in yield spreads within our estimation years are unlikely to confound our analysis.

Columns 2–4 extend the analysis to alternative macroeconomic variables. Column 2 uses the nominal cost of debt, column 3 uses the real cost of debt, and column 4 uses industrial production growth rate. As in the case of the yield spread, the question is whether within-year changes in these macroeconomic conditions could amplify the leverage response to asset growth among firms with later fiscal year ends. Appendix Table C14 summarizes the implied effects of these within-year changes on leverage adjustments associated with asset

[17]For ease of interpretation, we scale the yield spread to have a mean of zero and a standard deviation of one.

growth. Consistent with the yield-spread results, the estimated effects are economically small. For example, the nominal cost of debt declines by 0.44 percentage points during the 1940 period and increases by 0.04 percentage points during the 1950 period. These changes reduce the leverage increase associated with a one–standard-deviation increase in asset growth (0.179) by 0.03 percentage points ($0.011\times(-0.44/2.90)\times0.179$) in 1940 and raise it by 0.003 percentage points ($0.011\times(0.04/2.90)\times0.179$) in 1950. On a 3-month basis, these translate to average effects of -0.008 and 0.0007 percentage points. These magnitudes are again small relative to the three-month exposure effects of 1.2 and 1.6 percentage-point increases documented in Table 6. We obtain qualitatively similar conclusions for the other macroeconomic variables.

Finally, while our analysis does not exhaust all possible macroeconomic variables that may have changed within 1940 and 1950, Appendix Table C13 further limits the scope for alternative macroeconomic explanations. As shown in that table, our results are not driven by within-year changes in firm characteristics such as size, asset tangibility, and profitability. To the extent that macroeconomic conditions influence corporate debt policies by altering these firm-level characteristics, such channels are therefore unlikely to account for our findings.

6 Conclusion

More than sixty years ago, Modgiliani and Miller (1963) argued that interest deductibility in the presence of corporate income taxes provides an incentive to finance with debt. Since that time, many papers have argued theoretically and empirically in favor of tax incentives affecting capital structure choices, while other research has not supported the premise. We posit that due to adjustment costs, companies may not immediately adjust capital structure in response to changes in corporate tax incentives; rather, capital structure adjustments are more likely to occur when there is a financing need, such as when a company funds an investment spike.

Studying a century of panel data, which includes both tax increase and tax decrease episodes, we find evidence consistent with firms using more debt when tax rates are higher. We drill down to focus on two large, under-researched tax hikes, one in the 1940s and one in the 1950s. We find evidence of tax-driven capital structure changes that is strongest in situations in which there are 1) large tax hikes, and 2) large capital requirements associated with investment spikes. Among other things, this implies that there may be a delay in when a company responds to changes in tax incentives, with the timing tied to financing needs.

From a policy standpoint, regulators aiming to understand the effects of tax rate changes on firms' debt holdings may benefit from conditioning on firms' investment activities. According to our hypothesis, large tax hikes will not necessarily result in substantial leverage ratio increases for firms that do not expand assets. Conversely, even small tax hikes may have immediate and pronounced effects on firms' leverage ratios if firms are actively expanding assets. This paper shows that a combination of large tax policy changes and heterogeneity in firms' investment opportunities leads to differing dynamics of capital structure across firms.

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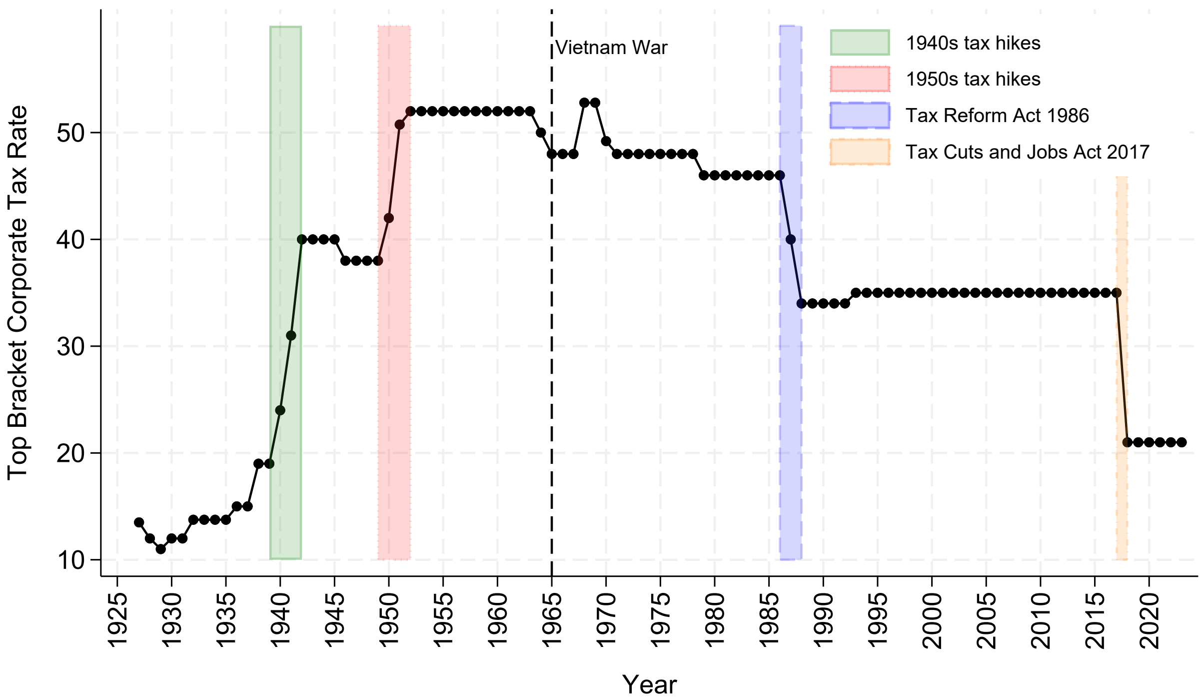
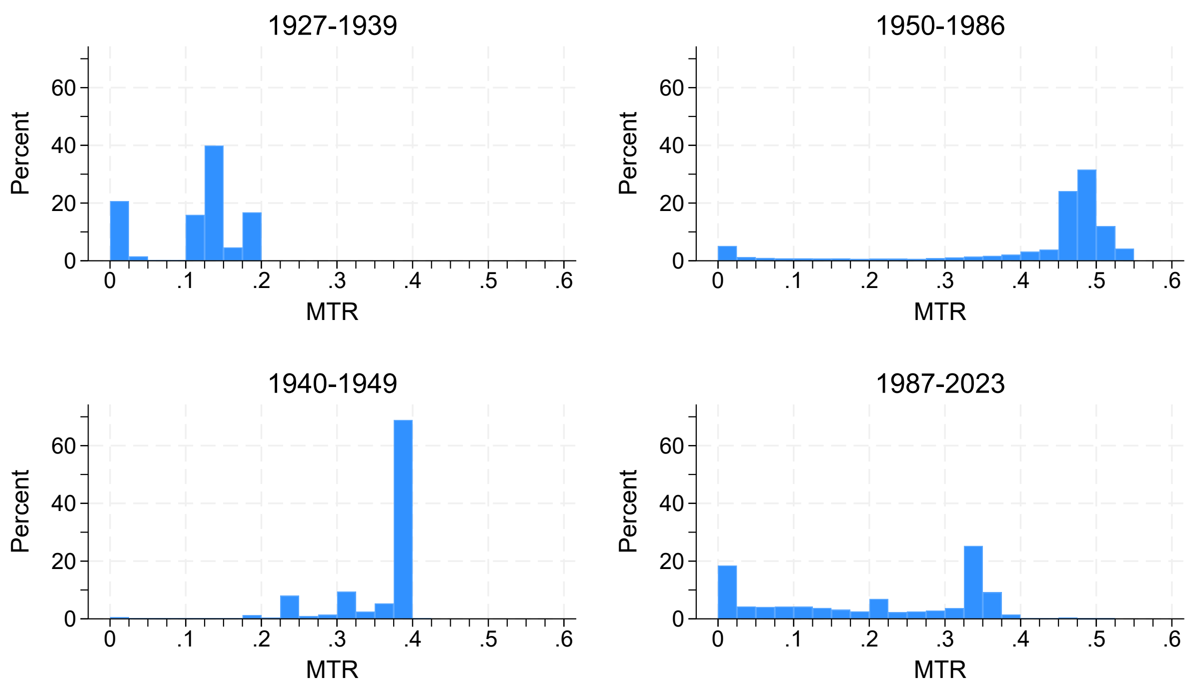
Main Tables and Figures

Figure 1: Statutory Tax Rates and MTRs

Panel A shows the top bracket statutory corporate income tax rates from 1927 to 2023, highlighting the major tax hikes and tax cuts during this time period. Panel B presents the distribution of simulated marginal tax rates (MTRs) for the following four eras: 1927-1939, 1940-1949, 1950-1986, 1987-2023, eras during which the top bracket statutory corporate tax rates were respectively 19%, 40%, 52.8%, and 40%.



(a) Top Bracket Statutory Corporate Income Tax Rates



(b) Distribution of Simulated Marginal Income Tax Rates During Four Eras

Figure 2: Asset Growth and Leverage Adjustment Speed

This figure plots leverage adjustment speed across different percentiles of asset growth. The estimates are based on Appendix Table C1, which follows Oztekin and Flannery (2012) and models adjustment speed as a function of firm characteristics, including asset growth. The results show that asset growth has a statistically significant and economically large effect on adjustment speed.

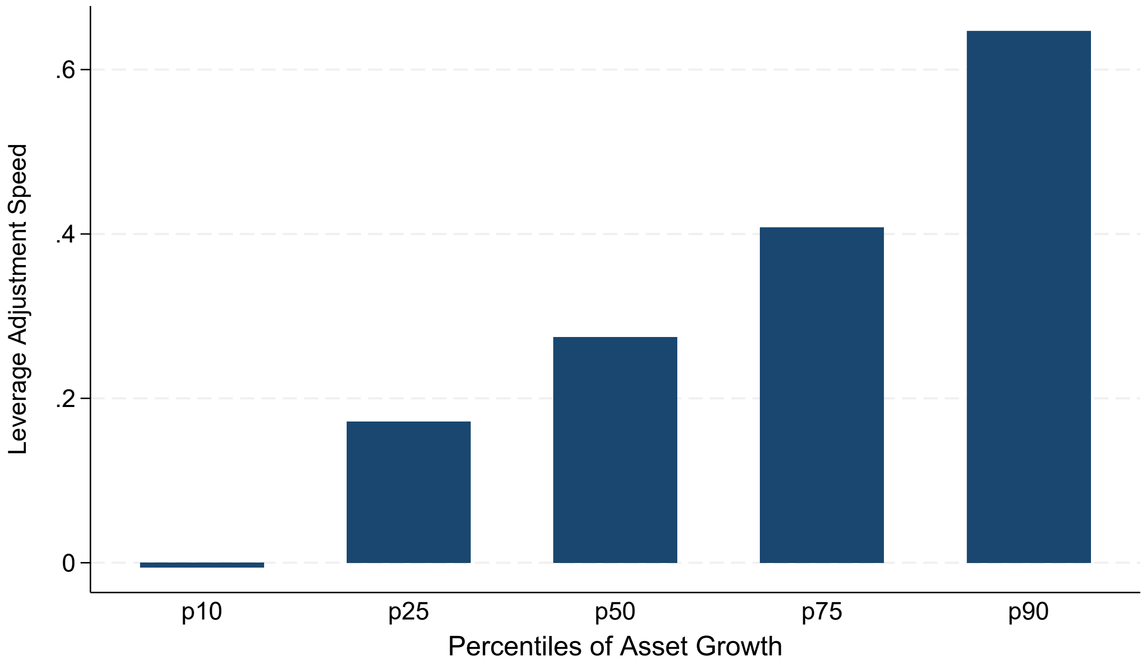


Figure 3: MTRs and Asset Growth Effect on Leverage

For each year in our baseline sample, we limit the sample to NYSE- or AMEX-listed firms and run the following cross-sectional regression for each year in our sample:

$$\Delta Leverage_{it} = \beta_t AssetGR_{it} + \epsilon_{it}$$

where $\Delta Leverage_{it}$ is the change in the leverage ratio of the firm, and $AssetGR_{it}$ is the growth of the firm, as measured by the change in the natural log of non-cash assets. To ensure that the yearly β_t coefficients are estimated precisely, we require a minimum of 200 firm-year observations in each cross-section. The figure below plots the estimated beta coefficients and lagged average simulated marginal corporate income tax rates (MTRs) over time. The time-series correlation between the two series is 0.68, indicating that the asset growth effect on leverage is positively related to the corporate income tax rate.

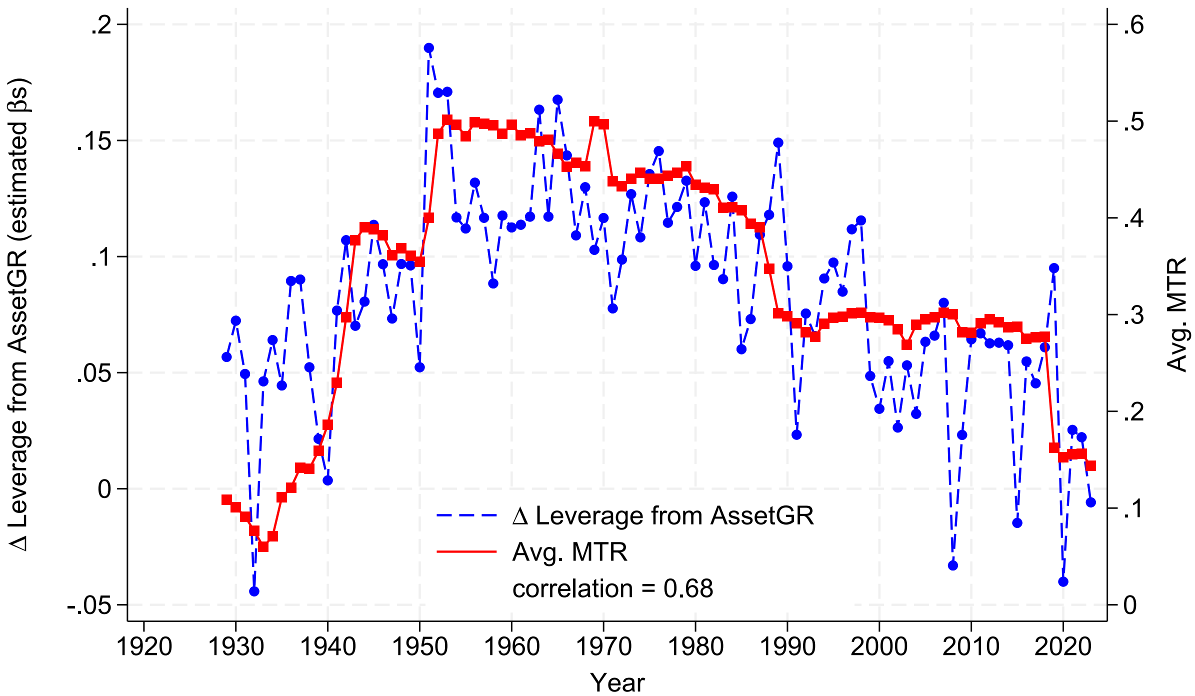


Figure 4: Tax Elasticities

This figure plots, using red dashed lines, the implied tax-sensitivity estimates derived from column 5 of Panel B of Table 2 across different percentiles of asset growth. For example, p75 in the figure is the estimated tax sensitivity from our specification for a firm with asset growth in the 75th percentile. This figure also displays the distribution of tax-sensitivity estimates reported in the prior literature, obtained from Feld, Heckemeyer and Overesch (2013). We focus on the subsample of 28 studies that do not rely exclusively on samples of multinational firms. One study reporting an outlier estimate of 2.14 is excluded from the figure to improve visual clarity. The blue bars depict the resulting histogram of tax-sensitivity estimates.

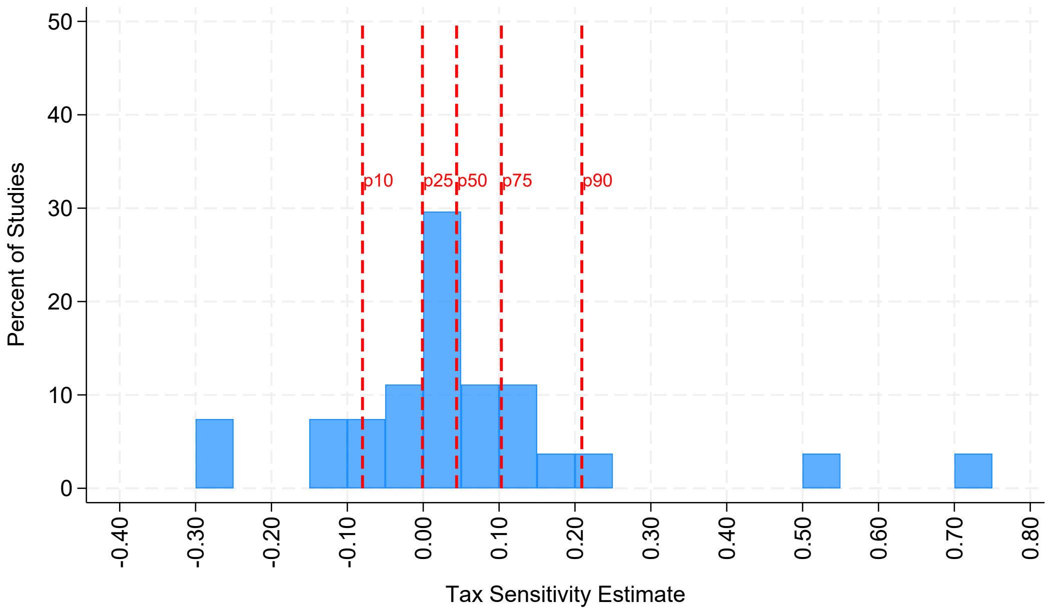
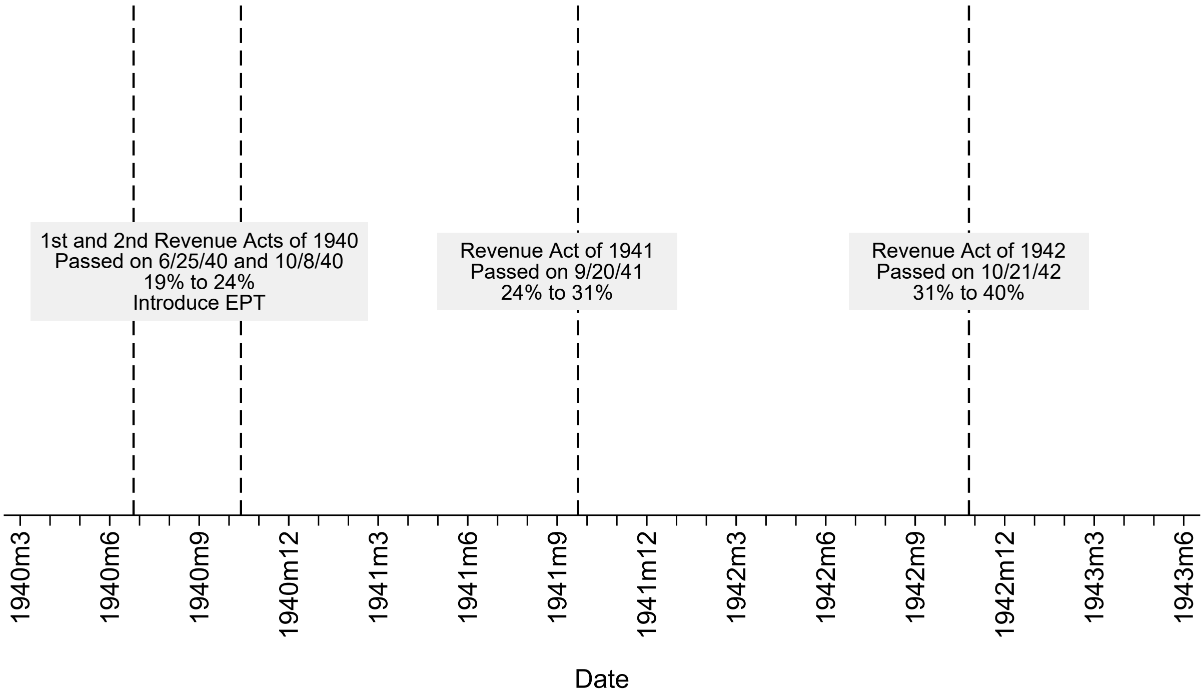
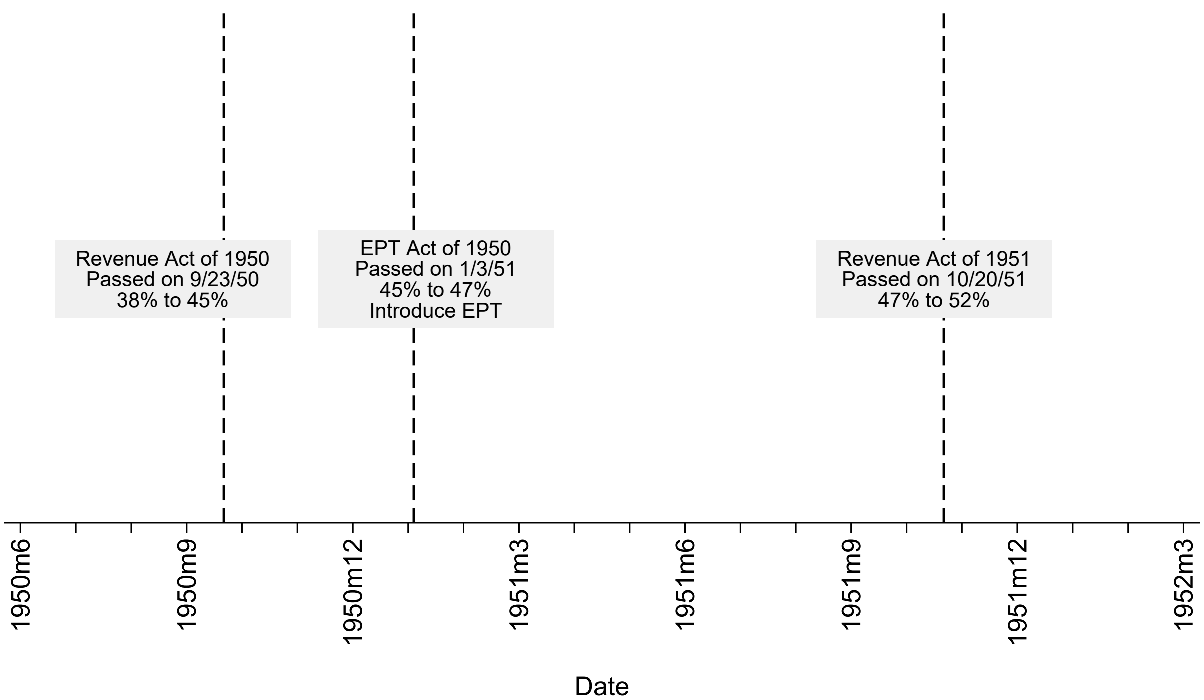


Figure 5: Timeline of Tax Laws

Panels A and B present timelines of the tax hike episodes in the early 1940s and early 1950s, respectively.



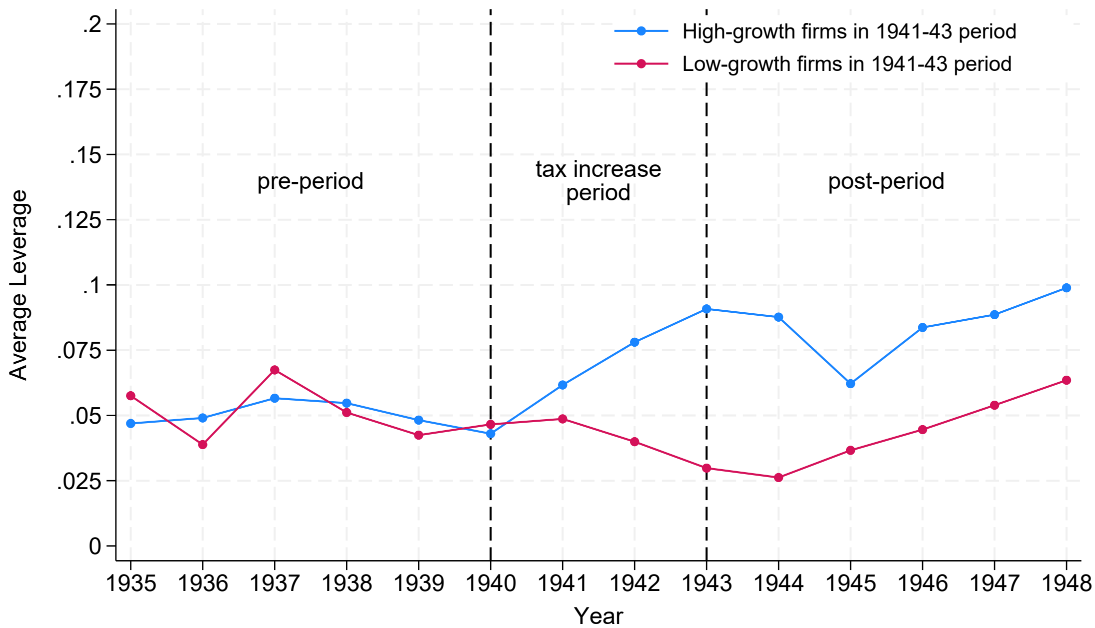
(a) Tax Hikes in the Early 1940's Episode



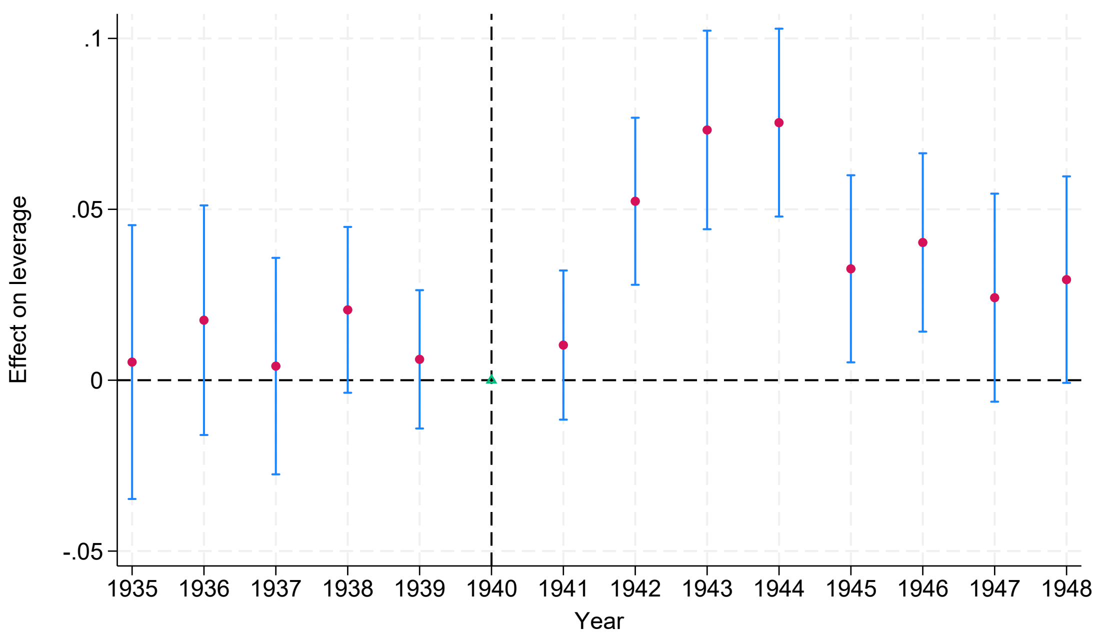
(b) Tax Hikes in the Early 1950's Episode

Figure 6: Leverage Dynamics around Asset Growth in the 1940s Tax Hike Period

Panel A shows the average leverage of high- and low-asset-growth firms in the 1940s tax hike period, spanning the five years before and after the tax-hike period. The top (blue) line presents mean leverage for the high-asset-growth firms; the lower (red) line presents mean leverage for the low-asset-growth matched sample. High- and low-asset-growth firms are defined based on asset growth during the 1941-43 period, and group assignments are held fixed over the time horizon of the panel. Panel B tests for differential pre-trends. We regress leverage on interactions between year indicators and an indicator for belonging to the high-asset-growth group. The regression includes firm fixed effects, industry-by-year fixed effects, and a vector of firm-level controls. Regression results are reported in Table C7. Panel B plots the estimated coefficients on the interaction terms over time.



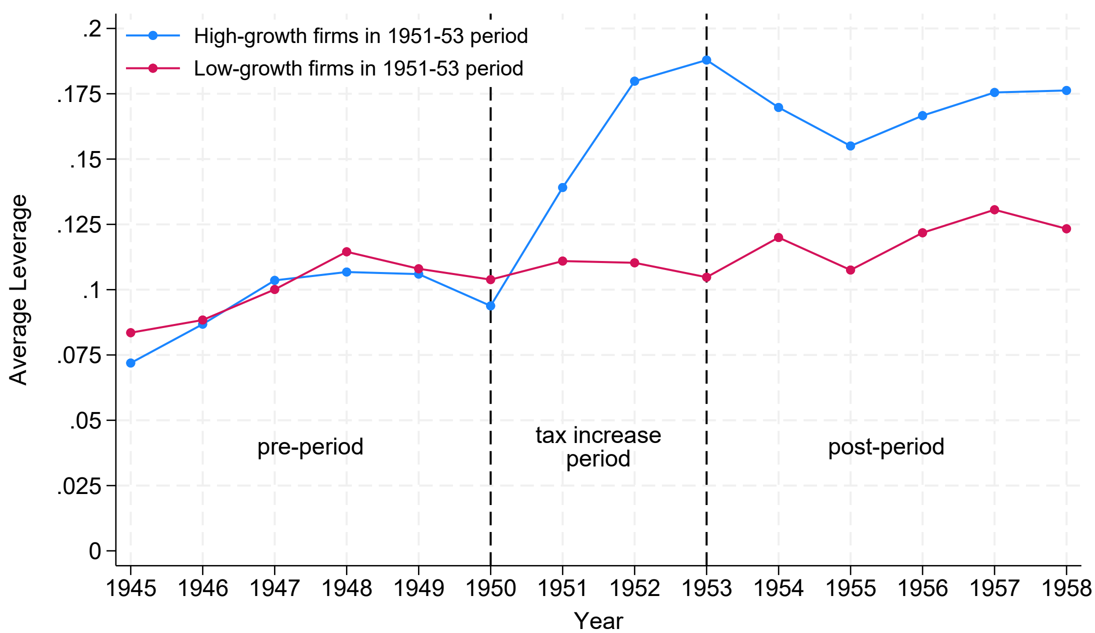
(a) Average Leverage Over Time



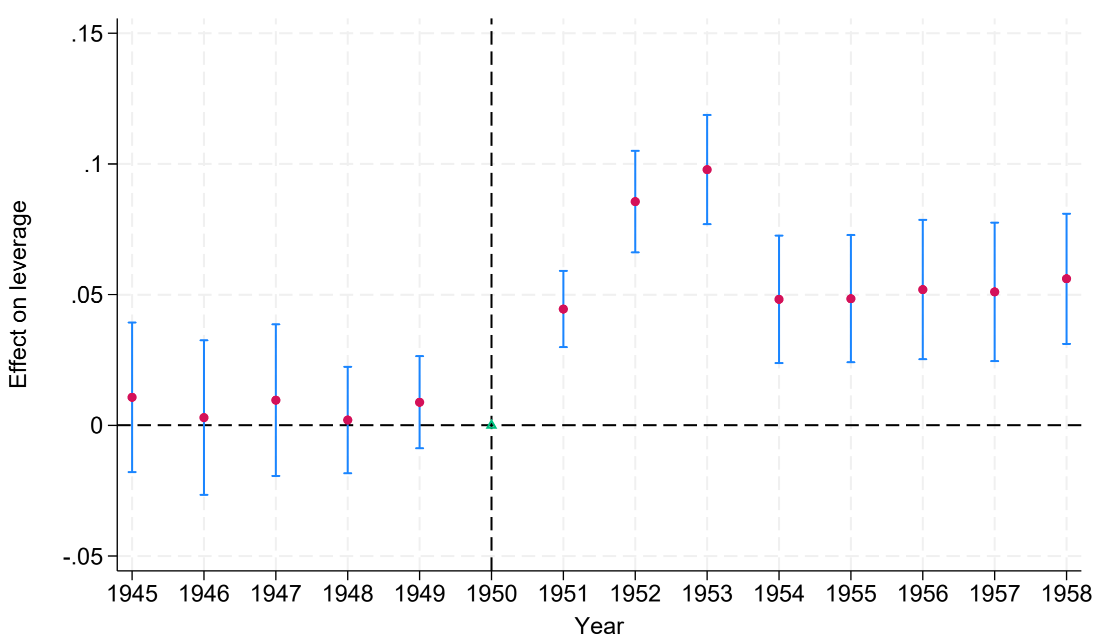
(b) Event Study

Figure 7: Leverage Dynamics around Asset Growth in the 1950s Tax Hike Period

Panel A shows the average leverage of high- and low-asset-growth firms in the 1950s tax hike period, spanning the five years before and after the tax-hike period. The top (blue) line presents mean leverage for the high-asset-growth firms; the lower (red) line presents mean leverage for the low-asset-growth matched sample. High- and low-asset-growth firms are defined based on asset growth during the 1951-53 period, and group assignments are held fixed over the time horizon of the panel. Panel B tests for differential pre-trends. We regress leverage on interactions between year indicators and an indicator for belonging to the high-asset-growth group. The regression includes firm fixed effects, industry-by-year fixed effects, and a vector of firm-level controls. Regression results are reported in Table C8. Panel B plots the estimated coefficients on the interaction terms over time.



(a) Average Leverage Over Time



(b) Event Study

Table 1: Summary Statistics

This table presents firm-year level summary statistics for our sample, which spans the years 1927-2023. All variables are defined in Appendix B. All dollar values are expressed in millions of real dollars, with 2018 as the base year.

	(1)	(2)	(3)	(4)	(5)	(6)
	Mean	SD	P25	Median	P75	N
Total assets	3,283	18,520	47	223	1,053	297,782
Leverage	0.26	0.27	0.04	0.20	0.37	297,161
ΔLeverage	0.01	0.12	-0.03	0.00	0.04	297,161
Asset growth	0.08	0.35	-0.05	0.06	0.20	296,716
Profitability	-0.03	0.38	-0.04	0.07	0.14	297,406
Tangibility	0.31	0.25	0.11	0.25	0.46	297,461
Market-to-book assets	1.85	2.42	0.71	1.06	1.83	295,181
EBIT	278	1,698	-1	12	87	297,406
Taxable income	224	1,538	-3	7	65	297,406
MTR	0.27	0.17	0.11	0.33	0.38	297,129
NetMTR	0.17	0.19	0.00	0.22	0.29	297,129

Table 2: Panel Regressions

This table presents the results from running the following firm-year level OLS regression:

$$\Delta Leverage_{it} = \beta_1 AssetGR_{it} + \beta_2 MTR_{it-1} + \beta_3 AssetGR_{it} \times MTR_{it-1} + \gamma \Delta X_{it-1} + \alpha_i + \alpha_{kt} + \epsilon_{it}$$

where i references firm, k references industry, and t references year. $\Delta Leverage_{it}$ is the change in leverage ratio of the firm. $AssetGR_{it}$ is the growth of the firm, measured as the change in the natural log of non-cash assets. MTR_{it-1} is the lagged simulated marginal income tax rate of the firm. ΔX_{it-1} is a vector of lagged first differences of firm controls, including profitability, tangibility, and market-to-book assets ratio. α_i and α_{kt} are respectively firm and industry-by-year fixed effects. Industry is defined using 2-digit SIC codes. For ease of interpretation, the marginal tax rate variable is standardized to have a mean of zero and standard deviation of one. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	Dep. Var.: ΔLeverage$_t$				
AssetGR$_t$	-0.006***		0.041***	0.041***	0.049***
	(0.002)		(0.001)	(0.001)	(0.002)
MTR$_{t-1}$		-0.010***	-0.014***	-0.014***	0.003***
		(0.000)	(0.000)	(0.000)	(0.001)
AssetGR$_t$×MTR$_{t-1}$			0.068***	0.068***	0.071***
			(0.001)	(0.001)	(0.001)
FE: Year	X	X	X		
FE: Industry-year				X	X
FE: Firm					X
Controls	X	X	X	X	X
N	268978	268978	268978	268978	268978
R^2	0.012	0.016	0.047	0.066	0.195

Table 3: Summary Statistics of Matched Samples for Long-Difference Analysis

This table presents summary statistics of our matched samples. Panel A uses firm characteristics in 1936 to match each high-growth firm to as many as four low-growth firms, using propensity scores based on profitability, tangibility, book-to-market, and log of total assets; the numbers in the panel are the averages and medians of the 1936 values for these four variables for the high-asset-growth (treatment) versus low-asset-growth (matched) firms. The other panels are constructed similarly. Panel A and B are the matched samples for the periods before and during the tax hikes in the early 1940s. Panel C and D are the matched samples for the periods before and during the tax hikes in the early 1950s. The last two columns shows the difference in means and p-values from t-tests of whether the difference in means are statistically different from zero.

	(1)	(2)	(3)	(4)	(5)	(6)
	High-asset growth		Low-asset growth			
	Mean	Median	Mean	Median	Mean diff.	p-value
Panel A: 1936 firm characteristics (1937–39 matched sample)						
Profitability	0.14	0.13	0.13	0.10	0.01	0.20
Tangibility	0.39	0.38	0.41	0.41	-0.02	0.47
Market-to-book assets	1.49	1.33	1.42	1.42	0.08	0.35
Ln(assets)	6.10	5.99	6.07	6.16	0.03	0.87
Asset growth (37-39)	0.26	0.19	-0.11	-0.06	0.37	0.00
Firms	68		247			
Panel B: 1940 firm characteristics (1941-43 matched sample)						
Profitability	0.19	0.18	0.16	0.15	0.02	0.01
Tangibility	0.31	0.32	0.27	0.19	0.04	0.06
Market-to-book assets	1.06	0.91	0.99	0.81	0.07	0.22
Ln(assets)	6.01	5.76	5.73	5.55	0.28	0.02
Asset growth (41-43)	0.63	0.49	-0.11	-0.08	0.74	0.00
Firms	122		432			
Panel C: 1946 firm characteristics (1947-49 matched sample)						
Profitability	0.17	0.14	0.17	0.17	-0.01	0.40
Tangibility	0.32	0.29	0.31	0.27	0.02	0.27
Market-to-book assets	1.08	0.97	1.03	0.88	0.05	0.25
Ln(assets)	6.17	5.96	6.23	6.06	-0.07	0.48
Asset growth (47-49)	0.52	0.49	-0.03	0.03	0.55	0.00
Firms	194		775			
Panel D: 1950 firm characteristics (1951-53 matched sample)						
Profitability	0.21	0.20	0.20	0.19	0.01	0.47
Tangibility	0.33	0.30	0.33	0.32	0.00	0.88
Market-to-book assets	0.82	0.70	0.84	0.68	-0.02	0.63
Ln(assets)	6.26	6.22	6.32	6.19	-0.06	0.52
Asset growth (51-53)	0.58	0.50	0.02	0.07	0.55	0.00
Firms	181		723			

Table 4: Asset Growth and Leverage Adjustments in Response to Tax Hikes

Panel A presents the results from running the following firm-period level OLS regression:

$$\Delta Leverage_{ip} = \beta_1 AssetGR_{ip} + \beta_2 AssetGR_{ip} \times Post_p + \gamma \Delta X_{ip} + \alpha_{kp} + \epsilon_{ip}$$

where i references firm, k references industry, and p references period. Column 1, 2 and 3 respectively use the two periods around the 1940s tax hikes (1937-39 and 1941-43), 1950s tax hikes (1947-49 and 1951-53), and the Vietnam War (1963-65 and 1966-68). $\Delta Leverage_{ip}$ is end of period leverage minus beginning period leverage. In the 40s column for example, $\Delta Leverage_{ip}$ for the post period is 1943 leverage minus 1940 leverage, and 1939 leverage minus 1936 leverage for the pre-period. $AssetGR_{ip}$ is a measure of asset growth over the period, defined as the change in the natural log of non-cash assets. $Post_p$ is a dummy equal to one for the post-tax-hike periods, and zero otherwise. ΔX_{ip} is a vector of first-difference of firm characteristics, defined as firm variables the year before the end of the period minus the firm variables the year before the beginning of the period. The firm characteristics are profitability, tangibility of assets, and market-to-book assets. α_{kp} are industry-by-period fixed effects. Industry is defined using 2-digit SIC codes. Standard errors are double-clustered at the matched pair and firm levels. Panel B tests the robustness of the Panel A results by excluding (i) firms in war industries (columns 1–2) and (ii) firms with war supply contracts (columns 3–4). War industries are defined using 2-digit SIC codes, following Goldin and Margo (1992). Columns 3–4 exclude firms with war-contract-driven production as of May 1944, and May 1945, respectively. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Leverage adjustments before and during tax hikes

	(1)	(2)	(3)
	40s hike	50s hike	Vietnam War
		Dep. Var.: ΔLeverage	
AssetGR	-0.061	0.092***	0.126***
	(0.050)	(0.020)	(0.021)
AssetGR×Post	0.146***	0.095***	-0.013
	(0.055)	(0.027)	(0.024)
Controls	X	X	X
FE: Industry-period	X	X	X
N	869	1873	4810
R^2	0.284	0.398	0.266

Panel B: War-related robustness checks

	(1)	(2)	(3)	(4)
	Non-war industries		No war contracts	
	40s hike	50s hike	40s hike	
		Dep. Var.: ΔLeverage		
AssetGR	-0.039	0.088***	-0.071	-0.129*
	(0.048)	(0.023)	(0.065)	(0.066)
AssetGR×Post	0.234***	0.164***	0.144*	0.235**
	(0.073)	(0.034)	(0.075)	(0.098)
Controls	X	X	X	X
FE: Industry-period	X	X	X	X
Industries	Non-war	Non-war		
No war production as of:			5/44	5/45
N	521	1259	507	332
R^2	0.429	0.481	0.474	0.571

Table 5: Summary Statistics on Matched Samples for Month of Fiscal-year-end Analysis

Panels A and B present summary statistics for our matched samples corresponding to fiscal years ending from one month before to eleven months after the enactment of the major tax hikes in the early 1940s and 1950s, respectively. Specifically, Panel A covers September 1940 to August 1941 (referred to as year 1940), and Panel B covers September 1950 to August 1951 (referred to as year 1950). Panel A uses firm characteristics in 1939 to match each high-growth firm to as many as four low-growth firms, using propensity scores based on profitability, tangibility, book-to-market, and log of total assets; the numbers in the panel are the averages and medians of the 1939 values for these four variables for the high-asset-growth (treatment) versus low-asset-growth (matched) firms. Panel B is constructed similarly. The last two columns show the difference in means and p-values from t-tests of whether the difference in means are statistically different from zero.

	(1)	(2)	(3)	(4)	(5)	(6)
	High-asset growth		Low-asset growth			
	Mean	Median	Mean	Median	Mean diff.	p-value
Panel A: 1939 firm characteristics (1940 matched sample)						
Profitability	0.15	0.13	0.12	0.11	0.03	0.00
Tangibility	0.32	0.32	0.30	0.25	0.02	0.20
Market-to-book assets	1.26	0.94	1.17	0.93	0.09	0.31
Ln(Assets)	5.63	5.51	5.68	5.69	-0.05	0.65
Asset growth (40)	0.25	0.16	-0.03	-0.02	0.28	0.00
Firms	123		473			
Panel B: 1949 firm characteristics (1950 matched sample)						
Profitability	0.14	0.14	0.13	0.13	0.01	0.07
Tangibility	0.30	0.29	0.29	0.27	0.01	0.43
Market-to-book assets	0.77	0.62	0.76	0.65	0.01	0.72
Ln(Assets)	5.76	5.75	5.68	5.67	0.08	0.40
Asset growth (50)	0.31	0.26	-0.01	0.02	0.32	0.00
Firms	203		796			

Table 6: Heterogeneity Based on Month of Fiscal-year-end

The table below presents the results from running the following firm-level regression:

$$\Delta Leverage_i = \beta_1 AssetGR_i + \beta_2 TaxIncent_i + \beta_3 AssetGR_i \times TaxIncent_i + \gamma \Delta X_i + \alpha_k + \epsilon_i$$

where i references firm, and k references industry. Columns 1–3 and 4–6 use the matched samples from Panels A and B of Table 5, respectively. $\Delta Leverage_i$ is the change in leverage over the year being considered. $AssetGR_i$ is the asset growth of the firm, measured as the change in the natural log of non-cash assets. $TaxIncent_i$ is a measure of tax incentive based on the firm's fiscal-year-end month. In columns 1-3 (4-6), this variable counts the number of months in the fiscal year that is after the enactment of First and Second Revenue Act of 1940 (Revenue Act of 1950). $TaxIncentHgh_i$ is a dummy that equals one if this tax incentive measure is greater than or equal to six, and zero otherwise. ΔX_i is a vector of change in firm characteristics, namely profitability, tangibility, and market-to-book assets. α_k are industry fixed effects. Industry is defined using 2-digit SIC codes. Standard errors are double-clustered at the matched pair and firm levels. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
		1940 hike			1950 hike	
	Dep. Var.: ΔLeverage					
AssetGR	0.006	-0.083	-0.018	0.104***	0.005	0.085***
	(0.035)	(0.056)	(0.039)	(0.024)	(0.041)	(0.023)
TaxIncent		-0.002			-0.002	
		(0.001)			(0.002)	
AssetGR×TaxIncent		0.023***			0.029***	
		(0.008)			(0.010)	
TaxIncentHgh			-0.015*			-0.016
			(0.008)			(0.017)
AssetGR×TaxIncentHgh			0.157***			0.208***
			(0.058)			(0.073)
Controls	X	X	X	X	X	X
FE: Industry	X	X	X	X	X	X
N	596	596	596	999	999	999
R^2	0.269	0.302	0.310	0.285	0.304	0.309

Table 7: Placebo Analysis Paralleling the Month of Fiscal-year-end Analysis

This table presents the results of running the regressions in Table 6 on years without tax hikes. The year considered runs from September to the following August to be consistent with the analysis in Table 6. Regression estimates are obtained by imposing equal weights across years. All variables are as defined in Table 6. The sample excludes periods with major tax hikes, which are the years ending between September 1936 to August 1943, and between September 1950 to August 1953. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
	Dep. Var.: ΔLeverage		
AssetGR	0.014***	0.015***	0.013***
	(0.003)	(0.003)	(0.003)
TaxIncent	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
AssetGR$\times$TaxIncent	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Controls		X	X
FE: Year	X	X	
FE: Industry-by-year			X
N	264114	264114	264114
R^2	0.015	0.017	0.046

Table 8: Removing Firms in War Industries or with War-related Contracts

Panel A studies how our results in Table 6 change when we remove firms in war-related industries. Columns 1 and 3 reproduce the baseline results from Table 6, which include firms from all industries. Columns 2 and 4 report the corresponding estimates after excluding firms operating in war-related industries. Panel B studies how our results from the 1940 tax hike period in Table 6 change when we remove firms with war supply contracts. Columns 1, 2, 3 progressively exclude firms with any war-contract-driven production by August 1941, August 1942, and August 1943, respectively. Standard errors are double-clustered at the matched pair and firm levels. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Removing firms in war-related industries

	(1)	(2)	(3)	(4)
	1940 hike		1950 hike	
	Dep. Var.: ΔLeverage			
AssetGR	-0.083	0.031	0.005	-0.027
	(0.056)	(0.068)	(0.041)	(0.066)
TaxIncent	-0.002	-0.003**	-0.002	-0.004*
	(0.001)	(0.001)	(0.002)	(0.002)
AssetGR×TaxIncent	0.023***	0.025*	0.029***	0.048***
	(0.008)	(0.013)	(0.010)	(0.013)
Controls	X	X	X	X
FE: Industry	X	X	X	X
Industries	All	Non-war	All	Non-war
N	596	406	999	665
R^2	0.302	0.523	0.304	0.404

Panel B: Removing firms with war-supply contracts in early 1940s

	(1)	(2)	(3)
	Dep. Var.: ΔLeverage		
AssetGR	-0.086	-0.069	-0.141
	(0.062)	(0.062)	(0.088)
TaxIncent	-0.002*	-0.001	-0.003
	(0.001)	(0.001)	(0.002)
AssetGR×TaxIncent	0.024***	0.018**	0.035***
	(0.009)	(0.008)	(0.011)
Controls	X	X	X
FE: Industry	X	X	X
No war production as of:	8/41	8/42	8/43
N	587	499	396
R^2	0.305	0.284	0.373

Table 9: Market Conditions

This table studies which macroeconomic variables have economically important influence on the leverage adjustments associated with asset growth. The table presents the results from running the following firm-year level regression:

$$\Delta Leverage_{it} = \beta_1 AssetGR_{it} + \beta_2 Z_{mt} + \beta_3 AssetGR_{it} \times Z_{mt} + \gamma \Delta X_{it-1} + \alpha_{kt} + \epsilon_{it}$$

where i references firm, k references industry, m denotes the ending month of the firm's fiscal year, and t references year. The dependent variable $\Delta Leverage_{it}$ is the within-firm change in the leverage ratio. $AssetGR_{it}$ is the asset growth of the firm, measured as the change in the natural log of non-cash assets. Z_{mt} denotes the macroeconomic variable of interest. Across columns, Z_{mt} corresponds to the yield spread (column 1), the nominal cost of debt (column 2), the real cost of debt (column 3), and the industrial production growth rate (column 4). Definitions of these macroeconomic variables are provided in Appendix B. Because our focus is on firms' annual investment and capital-structure decisions, we compute each macroeconomic variable as the average over the firm's fiscal year. We then standardize this averaged variable to have a mean of zero and a standard deviation of one. ΔX_{it-1} is a vector of lagged first-difference controls, consisting of profitability, tangibility, and market-to-book assets. α_{kt} are industry-by-year fixed effects. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Dep. Var.: ΔLeverage			
AssetGR	0.013***	0.013***	0.014***	0.017***
	(0.002)	(0.002)	(0.002)	(0.002)
YieldSpread	0.003			
	(0.002)			
AssetGR×YieldSpread	-0.010***			
	(0.003)			
NominalDebtCost		0.004		
		(0.003)		
AssetGR×NominalDebtCost		0.011***		
		(0.002)		
RealDebtCost			-0.001	
			(0.003)	
AssetGR×RealDebtCost			0.004*	
			(0.003)	
ProductionGR				-0.004***
				(0.001)
AssetGR×ProductionGR				0.025***
				(0.003)
Controls	X	X	X	X
FE: Industry-by-year	X	X	X	X
N	269206	269206	269206	269206
R^2	0.051	0.052	0.051	0.053

Appendix

The Appendix is organized into three parts. Section A describes the computation of MTRs. Section B defines all variables used in the analysis. Finally, Section C presents supplementary empirical results and robustness checks not included in the main text.

A Estimating Marginal Tax Rates

We estimate simulated marginal tax rates (MTRs) following Graham (1996). Following the literature (e.g., Graham, Lemmon and Schallheim 1998; Blouin, Core and Guay 2010; Graham and Kim 2011), taxable income (TI) is defined as: (operating income after depreciation + non-operating income) + rental expense/3 - deferred taxes/top rate + extraordinary items and discontinued operations/(1 - top rate) + special items - deductible interest expense. For the firm-years covered by Moody's Industrial Manuals, given the paucity of historic data, we define TI as EBIT minus interest expense. To simulate future taxable income, we assume TI follows a firm-specific random walk with drift, consistent with prior studies (Shevlin, 1990; Graham, 1996; Graham and Kim, 2011):

$$TI_{i,t+1} = \mu_i + TI_{i,t} + \epsilon_{i,t+1}, \quad \epsilon_{i,t+1} \sim \text{i.i.d. } \mathcal{N}(0, \sigma_i^2),$$

where $TI_{i,t}$ is taxable income of firm i in year t, and μ_i and σ_i denote the firm-specific drift and volatility, respectively. Both parameters are estimated using up to 30 years of each firm's historical data up to year t.[18]

For each firm-year, we generate 200 simulations of future taxable income, each spanning 50 future years. We determine the MTR in a given simulation by increasing interest expense by $1 in the current year and determining the present value of the resulting incremental tax saving.[19] Our procedure incorporates statutory tax rules on loss carrybacks and carryforwards, as well as the interest expense deduction limits set by the Tax Cuts and Jobs Act of 2017. The firm's expected MTR in year t is then defined as the average incremental present value of tax savings across the 200 simulations. Then, to determine the MTR for the next year for a given firm, we step forward one year and repeat the entire process using one more year of historic data.

[18] When estimating μ and σ, we use a simplified measure of TI, defined as: (operating income after depreciation + non-operating income) + rental expense/3 - deferred taxes/top rate - deductible interest income.

[19] Future tax liabilities are discounted using 20-year government bond yields.

B Variable Definitions

This appendix provides additional details on variable construction. We define below the variables used in our analysis.

- Profitability: EBIT divided by lagged assets.
- Tangibility: fixed assets divided by total assets.
- Market-to-book assets: Market value of equity plus book debt divided by total assets.
- MTR: simulated corporate marginal income tax rate as described in Appendix A.
- NetMTR: simulated MTR net of personal tax rates. Following Graham, Leary and Roberts (2015) and Taggart (1985), this variable is defined as 1-(1-t_c)/(1-t_p), where t_c is the corporate tax rate and t_p the personal income tax rate (on interest income). This expression follows from Miller (1977) under the simplifying assumption that equityholders face no personal income taxation. For t_p, we adopt the lowest marginal personal tax rate, since relatively few investors were subject to the top bracket during the mid-twentieth century. Notably, the maximum statutory tax rate exceeded 90% in 16 of the 20 years between 1944 and 1963.
- Asset growth: the change in the natural log of non-cash assets. Non-cash assets is total assets minus cash and short-term investments.
- Leverage ratio: total debt (short-term debt plus long-term debt) divided by total assets.
- Yield spread: The yield spread is defined as the yield on BAA-rated debt minus the yield on AAA-rated debt. The yields are obtained from Federal Reserve Economic Data (FRED).
- Nominal cost of debt: Yield on BAA-rated debt.
- Real cost of debt: Nominal cost of debt minus expected inflation.
- Expected inflation: For the months at or after December 1946, expected inflation is obtained from Livingston Survey. For the months prior to this date, expected inflation is approximated with realized inflation.
- Industrial production growth rate: Monthly growth rate of the industrial production index. The index is obtained from Federal Reserve Economic Data (FRED).

C Additional Results

Figure C1: MTRs and Asset Growth Effect on Leverage (All Firms)

This figure shows that the pattern in Figure 3 is robust to using the full baseline sample. Specifically, for each year in our baseline sample, we run the following regression:

$$\Delta Leverage_{it} = \beta_t AssetGR_{it} + \epsilon_{it}$$

where *Leverage* is the leverage ratio of the firm, and *AssetGR* is the growth of the firm, as measured by the change in the natural log of non-cash assets. To ensure that the yearly β_t coefficients are estimated precisely, we require a minimum of 200 firm-year observations in each cross-section. The figure below plots the estimated beta coefficients and lagged average simulated marginal corporate income tax rates (MTRs) over time. The time-series correlation between the two series is 0.73, indicating that the asset growth effect on leverage is positively related to the corporate income tax rate.

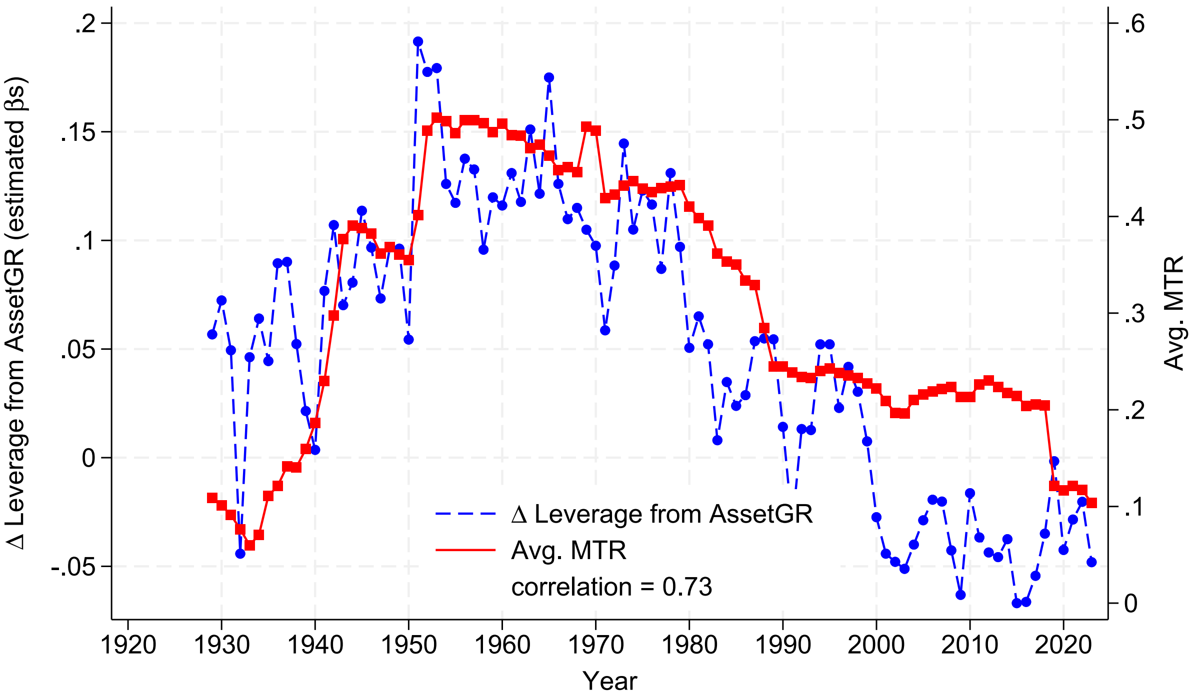


Table C1: Adjustment Speed and Asset Growth

Following the two-step estimation approach in Oztekin and Flannery (2012), this table examines how firms' leverage adjustment speed varies with asset growth. In the first step, we model firms' optimal leverage as

$$Leverage^*_{it} = \beta_F X_{it-1} + \alpha_t$$

where i indexes firms, and t indexes years. X_{it-1} is a vector of lagged firm characteristics, including profitability, tangibility, the market-to-book assets ratio, the natural logarithm of total assets in real dollars, and the top statutory corporate tax rate. α_t denotes year fixed effects. We estimate this model using our baseline sample and obtain predicted values of optimal leverage, $\widehat{Leverage}_{it}$. In the second step, we begin with the standard partial adjustment model of leverage, $Leverage_{it} - Leverage_{it-1} = \lambda(Leverage^*_{it} - Leverage_{it-1}) + \delta_{it}$. To derive the empirical specification, we make two modifications. First, we replace the unobserved deviation from target leverage, $Leverage^*_{it} - Leverage_{it-1}$ with its predicted counterpart, $\widehat{Leverage}_{it} - Lev_{it-1}$, which we denote by $\widehat{Dev}_{it}$. Second, we allow the speed of adjustment, λ, to vary with firm characteristics and investment activity by specifying it as a linear function of lagged controls and asset growth, $\lambda_{it} = \gamma_0 X_{it-1} + \gamma_1 AssetGR_{it}$. For ease of interpretation, the vector of lagged firm characteristics and asset growth are scaled to have a standard deviation of one. Substituting these expressions yields the following estimating equation:

$$Lev_{it} - Lev_{it-1} = \gamma_0 X_{it-1}\widehat{Dev}_{it} + \gamma_1 AssetGR_{it}\widehat{Dev}_{it} + \epsilon_{it}$$

The table below reports the regression results from this second-step estimation.

	(1)	(2)
	Without AssetGR	With AssetGR
	Dep. Var.: ΔLeverage	
Lagged Ln(total assets)×$\widehat{\text{Dev}}$	0.048***	0.024***
	(0.004)	(0.004)
Lagged profitability×$\widehat{\text{Dev}}$	0.032***	0.002
	(0.004)	(0.004)
Lagged tangibility×$\widehat{\text{Dev}}$	-0.004	0.001
	(0.003)	(0.003)
Lagged market-to-book assets×$\widehat{\text{Dev}}$	0.008**	-0.059***
	(0.004)	(0.004)
Lagged tax rate×$\widehat{\text{Dev}}$	0.033***	0.047***
	(0.002)	(0.002)
AssetGR×$\widehat{\text{Dev}}$		0.395***
		(0.004)
Constant	0.011***	0.009***
	(0.000)	(0.000)
N	269049	269049
R^2	0.014	0.054

Table C2: Panel Regressions: Robustness Checks

This table presents robustness tests of the results in Table 2. We examine whether the results are robust to alternative definitions of key variables and to sample restrictions. Column 1 reproduces our baseline result (column 5 of Table 2). Columns 2-6 show that the results remain qualitatively similar when we: include interactions between asset growth and several lagged firm characteristics as additional controls — specifically, the natural log of total assets in real dollars, profitability, tangibility, and market-to-book assets (column 2); measure investment using total asset growth, defined as the change in the natural log of total assets (column 3); measure investment using the change in non-cash assets plus depreciation expense scaled by lagged non-cash assets (column 4); replace MTR with net MTR (column 5); and restrict the sample to Compustat firms (column 6). Columns 7-8 restrict the sample to Compustat firms and show that the results remain qualitatively similar when we drop firm-years with M&As (column 7) and when we measure investment using capital expenditure scaled by lagged non-cash assets (column 8). We identify firm-years with M&As by using the footnote variable of sales. Since this variable is available starting in 1958, column 6 restricts the sample to years after 1957. For ease of interpretation, MTR and net MTR are scaled to have a mean of zero and standard deviation of one. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline	Interacted controls	Total asset growth	Depre. adjusted growth	Net-MTR	Compustat only	Exclude M&As	Capex
	Dep. Var.: $\Delta\text{Leverage}_t$							
AssetGR_t	0.049***	0.051***			0.045***	0.048***	0.027***	
	(0.002)	(0.004)			(0.002)	(0.002)	(0.002)	
MTR_{t-1}	0.003***	0.004***	0.005***	-0.002***		0.003***	0.005***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
$\text{AssetGR}_t \times \text{MTR}_{t-1}$	0.071***	0.047***				0.071***	0.063***	
	(0.001)	(0.002)				(0.001)	(0.002)	
TotAssetGR_t			0.033***					
			(0.002)					
$\text{TotAssetGR}_t \times \text{MTR}_{t-1}$			0.094***					
			(0.002)					
DpAdjAssetGR_t				0.038***				
				(0.001)				
$\text{DpAdjAssetGR}_t \times \text{MTR}_{t-1}$				0.047***				
				(0.001)				
NetMTR_{t-1}					0.003***			
					(0.001)			
$\text{AssetGR}_t \times \text{NetMTR}_{t-1}$					0.067***			
					(0.001)			
Capex_t								0.118***
								(0.004)
$\text{Capex}_t \times \text{MTR}_{t-1}$								0.091***
								(0.003)
FE: Industry-year	X	X	X	X	X	X	X	X
FE: Firm	X	X	X	X	X	X	X	X
Controls	X	X	X	X	X	X	X	X
Interacted controls		X						
N	268978	268978	268978	257348	268978	256744	220668	252647
R^2	0.195	0.214	0.213	0.194	0.192	0.195	0.215	0.177

Table C3: Panel Regressions: Robustness Checks Against Macro Variables

This table presents additional robustness tests of the results in Table 2. We check whether the results are robust to controlling for macroeconomic variables that may correlate with MTRs. Column 1 reproduces our baseline result (column 5 of Table 2). Columns 2-4 show that we obtain qualitatively consistent results when we add several macroeconomic variables and their interactions with asset growth to our regressions. Columns 2, 3, and 4 use, respectively, the average yield spread, the average nominal cost of debt, and the average real cost of debt, each computed over the months in the firm's fiscal year. The subscript m denotes the ending month of the firm's fiscal year. Column 5 addresses a related concern that highly levered firms may issue more debt when expected inflation is high, as higher inflation lowers the real cost of debt. We account for this channel by including an interaction between lagged leverage and the average expected inflation over the months in the firm's fiscal year. All the macroeconomic variables are defined in Appendix B. For ease of interpretation, MTR and net MTR are scaled to have a mean of zero and standard deviation of one. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Baseline	Yield Spread	Nominal Cost of Debt	Real Cost of Debt	Inflation
			Dep. Var.: ΔLeverge$_t$		
AssetGR$_t$	0.049***	0.072***	0.011**	0.028***	0.039***
	(0.002)	(0.004)	(0.005)	(0.004)	(0.001)
MTR$_{t-1}$	0.003***	0.003***	0.003***	0.003***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AssetGR$_t$$\times$MTR$_{t-1}$	0.071***	0.072***	0.068***	0.070***	0.067***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
AvgYldSpread$_{mt}$		0.010***			
		(0.003)			
AssetGR$_{mt}$ $\times$ AvgYldSpread$_{mt}$		-0.023***			
		(0.004)			
NominalDebtCost$_{mt}$			0.002**		
			(0.001)		
AssetGR$_{mt}$ $\times$ NominalDebtCost$_{mt}$			0.005***		
			(0.001)		
RealDebtCost$_{mt}$				0.001	
				(0.001)	
AssetGR$_{mt}$ $\times$ RealDebtCost$_{mt}$				0.004***	
				(0.001)	
Lev$_{t-1}$					-0.151***
					(0.005)
Inflation$_{mt}$					0.002**
					(0.001)
Lev$_{t-1}$ $\times$ Inflation$_{mt}$					-0.009***
					(0.001)
FE: Industry-year	X	X	X	X	X
FE: Firm	X	X	X	X	X
Controls	X	X	X	X	X
N	268978	268978	268978	268978	268978
R^2	0.195	0.195	0.196	0.195	0.245

Table C4: Panel Regressions: Debt Proportion

This table presents the results from running the following firm-year level OLS regression:

$$\frac{\Delta D_{it}}{A^{NC}_{it-1}} = \beta_1 AssetGR_{it} + \beta_2 MTR_{it-1} + \beta_3 AssetGR_{it} \times MTR_{it-1} + \gamma X_{it-1} + \alpha_i + \alpha_{kt} + \epsilon_{it}$$

where i references firm, k references industry, and t references year. $\frac{\Delta D_{it}}{A^{NC}_{it-1}}$ is the change in total debt scaled by lagged non-cash assets. $AssetGR_{it}$ is the growth of the firm, measured as the change in the natural log of non-cash assets. MTR_{it-1} is the lagged simulated marginal income tax rate of the firm. X_{it-1} is a vector of lagged firm characteristics: the natural log of total assets in real dollars, profitability, tangibility, and market-to-book assets. α_i and α_{kt} are respectively firm and industry-by-year fixed effects. Industry is defined using 2-digit SIC codes. For ease of interpretation, the marginal tax rate variable is standardized to have a mean of zero and standard deviation of one. Standard errors are clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
			Dep. Var.: $\frac{\Delta D_t}{A^{NC}_{t-1}}$		
AssetGR$_t$	0.294***		0.362***	0.362***	0.366***
	(0.003)		(0.003)	(0.003)	(0.003)
MTR$_{t-1}$		0.023***	-0.000	-0.000	0.013***
		(0.001)	(0.001)	(0.001)	(0.001)
AssetGR$_t$×MTR$_{t-1}$			0.105***	0.105***	0.107***
			(0.003)	(0.003)	(0.003)
FE: Year	X	X	X		
FE: Industry-year				X	X
FE: Firm					X
Controls	X	X	X	X	X
N	278559	278559	278559	278559	278559
R^2	0.231	0.064	0.251	0.269	0.381

Table C5: Asset Growth and Leverage Adjustments During Tax Hikes: Robustness to Total Asset Growth

This table presents a robustness test of the results in Table 4, replacing growth in non-cash assets (the change in the natural log non-cash assets) with growth in total assets (the change in the natural log of total assets). Besides the asset growth variable, all other variables are as defined in Table 4. Note that the regression samples are different from the ones in Table 4 because we create new matched samples based on the the growth in total assets. Standard errors are double-clustered at the matched pair and firm levels. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	40s hike	50s hike	Vietnam War
		Dep. Var.: ΔLeverage	
AssetGR	-0.098	0.130***	0.164***
	(0.090)	(0.026)	(0.018)
AssetGR×Post	0.214**	0.087**	-0.046**
	(0.092)	(0.034)	(0.022)
Controls	X	X	X
FE: Industry-period	X	X	X
N	864	1872	4819
R^2	0.269	0.360	0.248

Table C6: Asset Growth and Leverage Adjustments During Tax Hikes: Additional Controls

This table presents a robustness test of the results in Table 4, where we include additional controls in our regressions. Specifically, we add to our regressions several beginning-of-the-period firm characteristics (the natural log of total assets, profitability, tangibility, and market-to-book assets) and their interactions with *Post*. All variables are as defined in Table 4. Standard errors are double-clustered at the matched pair and firm levels. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	40s hike	50s hike	Vietnam War
		Dep. Var.: ΔLeverage	
AssetGR	-0.064	0.093***	0.129***
	(0.052)	(0.021)	(0.021)
AssetGR×Post	0.153***	0.097***	-0.013
	(0.056)	(0.027)	(0.024)
Controls	X	X	X
FE: Industry-period	X	X	X
Additional Controls	X	X	X
N	869	1873	4810
R^2	0.301	0.414	0.282

Table C7: Event Study: Asset Growth in the 1940s Tax Hike Period

The table below presents the results from running the following firm-year level regression:

$$Leverage_{it} = \sum_{m=1935}^{1948} \beta_m HighAssetGR_{i41-43} \times Y_m + \gamma X_{it-1} + \alpha_i + \alpha_{kt} + \epsilon_{it},$$

where i denotes firms, k denotes industries, and t denotes years. The estimation sample consists of firm-year observations from the matched sample described in Panel B of Table 3, covering the years from 1935-1948. *Leverage* denotes the firm's leverage ratio. $HighAssetGR_{41-43}$ is a dummy equal to one if the firm belongs in the high-asset-growth group, and zero otherwise; high-asset-growth firms are defined based on asset growth during the 1941-43 period. Y_m is an indicator equal to one in year m, and zero otherwise. The interaction for year 1940 is omitted and serves as the reference year. X_{it-1} is a vector of one-year lagged firm characteristics, namely profitability, tangibility, and market-to-book assets. All regressions include firm fixed effects and industry-by-year fixed effects. Standard errors are double-clustered at the matched pair and firm levels.

	(1)	(2)
	Dep. Var.: Leverage	
$\text{HighAssetGR}_{41-43} \times$ Y35	0.008	0.005
	(0.020)	(0.020)
$\text{HighAssetGR}_{41-43} \times$ Y36	0.017	0.018
	(0.017)	(0.017)
$\text{HighAssetGR}_{41-43} \times$ Y37	0.008	0.004
	(0.016)	(0.016)
$\text{HighAssetGR}_{41-43} \times$ Y38	0.019	0.021*
	(0.012)	(0.012)
$\text{HighAssetGR}_{41-43} \times$ Y39	0.016	0.006
	(0.010)	(0.010)
$\text{HighAssetGR}_{41-43} \times$ Y41	0.010	0.010
	(0.010)	(0.011)
$\text{HighAssetGR}_{41-43} \times$ Y42	0.047***	0.052***
	(0.012)	(0.012)
$\text{HighAssetGR}_{41-43} \times$ Y43	0.064***	0.073***
	(0.014)	(0.015)
$\text{HighAssetGR}_{41-43} \times$ Y44	0.062***	0.075***
	(0.014)	(0.014)
$\text{HighAssetGR}_{41-43} \times$ Y45	0.024*	0.033**
	(0.014)	(0.014)
$\text{HighAssetGR}_{41-43} \times$ Y46	0.035**	0.040***
	(0.014)	(0.013)
$\text{HighAssetGR}_{41-43} \times$ Y47	0.020	0.024
	(0.015)	(0.016)
$\text{HighAssetGR}_{41-43} \times$ Y48	0.031**	0.029*
	(0.016)	(0.015)
Controls		X
FE: Firm	X	X
FE: Industry-Year	X	X
N	6709	6709
R^2	0.743	0.750

Table C8: Event Study: Asset Growth in the 1950s Tax Hike Period

The table below presents the results from running the following firm-year level regression:

$$Leverage_{it} = \sum_{m=1945}^{1958} \beta_m HighAssetGR_{i51-53} \times Y_m + \gamma X_{it-1} + \alpha_i + \alpha_{kt} + \epsilon_{it},$$

where i denotes firms, k denotes industries, and t denotes years. The estimation sample consists of firm-year observations from the matched sample described in Panel D of Table 3, covering the years from 1945-1958. *Leverage* denotes the firm's leverage ratio. $HighAssetGR_{51-53}$ is a dummy equal to one if the firm belongs in the high-asset-growth group, and zero otherwise; high-asset-growth firms are defined based on asset growth during the 1951-53 period. Y_m is an indicator equal to one in year m, and zero otherwise. The interaction for year 1950 is omitted and serves as the reference year. X_{it-1} is a vector of one-year lagged firm characteristics, namely profitability, tangibility, and market-to-book assets. All regressions include firm fixed effects and industry-by-year fixed effects. Standard errors are double-clustered at the matched pair and firm levels.

	(1)	(2)
	Dep. Var.: Leverage	
$\text{HighAssetGR}_{51-53} \times$ Y45	0.009	0.011
	(0.015)	(0.015)
$\text{HighAssetGR}_{51-53} \times$ Y46	-0.004	0.003
	(0.015)	(0.015)
$\text{HighAssetGR}_{51-53} \times$ Y47	0.008	0.010
	(0.015)	(0.015)
$\text{HighAssetGR}_{51-53} \times$ Y48	0.002	0.002
	(0.011)	(0.010)
$\text{HighAssetGR}_{51-53} \times$ Y49	0.006	0.009
	(0.009)	(0.009)
$\text{HighAssetGR}_{51-53} \times$ Y51	0.043***	0.044***
	(0.007)	(0.007)
$\text{HighAssetGR}_{51-53} \times$ Y52	0.076***	0.086***
	(0.009)	(0.010)
$\text{HighAssetGR}_{51-53} \times$ Y53	0.093***	0.098***
	(0.011)	(0.011)
$\text{HighAssetGR}_{51-53} \times$ Y54	0.045***	0.048***
	(0.014)	(0.012)
$\text{HighAssetGR}_{51-53} \times$ Y55	0.048***	0.048***
	(0.014)	(0.012)
$\text{HighAssetGR}_{51-53} \times$ Y56	0.050***	0.052***
	(0.015)	(0.014)
$\text{HighAssetGR}_{51-53} \times$ Y57	0.048***	0.051***
	(0.015)	(0.014)
$\text{HighAssetGR}_{51-53} \times$ Y58	0.052***	0.056***
	(0.013)	(0.013)
Controls		X
FE: Firm	X	X
FE: Industry-Year	X	X
N	11640	11640
R^2	0.811	0.818

Table C9: Summary Statistics of Matched Samples around Vietnam War

Panels A and B present summary statistics of the matched samples covering the periods before and during US involvement in the Vietnam War, respectively. Panel A uses firm characteristics in 1962 to match each high-growth firm to as many as four low-growth firms, using propensity scores based on profitability, tangibility, book-to-market, and log of total assets; the numbers in the panel are the averages and medians of the 1962 values for these four variables for the high-asset-growth (treatment) versus low-asset-growth (matched) firms. The second panel is constructed similarly. The last two columns shows the difference in means and p-values from t-tests of whether the difference in means are statistically different from zero.

	(1)	(2)	(3)	(4)	(5)	(6)
	High asset growth		Low asset growth			
	Mean	Median	Mean	Median	Mean diff.	p-value
Panel A: 1962 firm characteristics (1963-65 matched sample)						
Profitability	0.15	0.14	0.14	0.14	0.00	0.45
Tangibility	0.34	0.31	0.34	0.28	0.00	0.72
Market-to-book assets	1.27	1.06	1.23	1.03	0.04	0.30
Ln(assets)	5.62	5.49	5.50	5.36	0.12	0.16
Asset growth (63-65)	0.62	0.54	0.01	0.08	0.61	0.00
Firms	402		1595			
Panel B: 1965 firm characteristics (1966-68 matched sample)						
Profitability	0.17	0.16	0.17	0.16	0.00	0.57
Tangibility	0.33	0.28	0.33	0.30	-0.00	0.73
Market-to-book assets	1.73	1.32	1.58	1.18	0.15	0.01
Ln(assets)	5.45	5.31	5.39	5.16	0.06	0.36
Asset growth (66-68)	0.93	0.79	0.09	0.13	0.83	0.00
Firms	568		2245			

Table C10: Distribution by Fiscal-year-end Month

Panels A and B present the distribution of fiscal year-end months for the 1940 matched sample (Panel A of Table 5) and the 1950 matched sample (Panel B of Table 5), respectively.

Panel A: 1940 matched sample

	(1)	(2)
	Percentage	N
Sep 40	2.5	15
Oct 40	1.2	7
Nov 40	5.4	32
Dec 40	73.8	440
Jan 41	0.2	1
Feb 41	0.0	0
Mar 41	3.9	23
Apr 41	0.3	2
May 41	1.7	10
Jun 41	9.2	55
Jul 41	0.7	4
Aug 41	1.2	7

Panel B: 1950 matched sample

	(1)	(2)
	Percentage	N
Sep 50	8.9	89
Oct 50	2.0	20
Nov 50	4.7	47
Dec 50	68.9	688
Jan 51	2.5	25
Feb 51	2.3	23
Mar 51	0.8	8
Apr 51	0.6	6
May 51	0.4	4
Jun 51	4.3	43
Jul 51	2.6	26
Aug 51	2.0	20

Table C11: Heterogeneity Based on Month of Fiscal-year-end: Robustness to Using Total Asset Growth

This table presents a robustness test of the results in Table 6, measuring investment using the growth in total assets (defined as the change in the natural log of total assets). Aside from the investment measure, all other variables are defined as in Table 6. Note that the regression samples differ from those in Table 6 because we construct new matched samples based on the growth in total assets. Standard errors are double-clustered at the matched pair and firm levels. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	1940 hike			1950 hike		
	Dep. Var.: ΔLeverage					
AssetGR	-0.015	-0.114*	-0.034	0.107***	0.033	0.085***
	(0.045)	(0.059)	(0.047)	(0.023)	(0.036)	(0.022)
TaxIncent		-0.004**			0.001	
		(0.002)			(0.001)	
AssetGR×TaxIncent		0.029***			0.020**	
		(0.008)			(0.009)	
TaxIncentHgh			-0.029***			0.012*
			(0.011)			(0.007)
AssetGR×TaxIncentHgh			0.193***			0.129**
			(0.067)			(0.059)
Controls	X	X	X	X	X	X
FE: Industry	X	X	X	X	X	X
N	560	560	560	1068	1068	1068
R^2	0.247	0.287	0.284	0.255	0.275	0.283

Table C12: Heterogeneity Based on Month of Fiscal-year-end: Robustness to Using Depreciation-adjusted Asset Growth

This table presents a robustness test of the results in Table 6, using a depreciation-adjusted measure of investment (defined as the change in non-cash assets plus depreciation expense scaled by lagged non-cash assets). Aside from the investment measure, all other variables are defined as in Table 6. Note that the regression samples differ from those in Table 6 because we construct new matched samples based on the growth in total assets. Standard errors are double-clustered at the matched pair and firm levels. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	1940 hike			1950 hike		
	Dep. Var.: ΔLeverage					
DpAdjAssetGR	-0.008	-0.066*	-0.022	0.069***	0.002	0.053***
	(0.022)	(0.036)	(0.024)	(0.018)	(0.031)	(0.017)
TaxIncent		-0.001			-0.000	
		(0.001)			(0.002)	
DpAdjAssetGR×TaxIncent		0.015**			0.019**	
		(0.006)			(0.007)	
TaxIncentHgh			-0.006			0.003
			(0.007)			(0.015)
DpAdjAssetGR×TaxIncentHgh			0.107**			0.130**
			(0.042)			(0.052)
Controls	X	X	X	X	X	X
FE: Industry	X	X	X	X	X	X
N	492	492	492	967	967	967
R^2	0.207	0.248	0.253	0.232	0.257	0.269

Table C13: Profitability, Tangiblity, and Size-based Explanations

This table presents robustness tests of the results of Table 6, examining whether the results are driven by within-year changes in profitability, size, and tangibility of assets. Column 1 reproduces our baseline result from the 1940 tax hike period (column 2 of Table 6) as a baseline. Column 2 adds to the regression the following variables as additional controls: profitability, tangiblity, and the natural log of total assets and their interactions with asset growth. Columns 3-4 repeat the tests using our baseline result from the 1950 tax hike period (column 5 of Table 6). All variables are as defined in Table 6. Standard errors are double-clustered at matched pair and firm levels. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	1940 hike		1950 hike	
	Baseline	Add. Controls	Baseline	Add. Controls
	Dep. Var.: ΔLeverage			
AssetGR	-0.083	-0.122	0.005	0.005
	(0.056)	(0.216)	(0.041)	(0.121)
TaxIncent	-0.002	-0.003**	-0.002	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)
AssetGR×TaxIncent	0.023***	0.024***	0.029***	0.028***
	(0.008)	(0.007)	(0.010)	(0.010)
Prof		-0.058*		-0.032
		(0.033)		(0.040)
AssetGR×Prof		-0.017		-0.091
		(0.258)		(0.148)
Tangi		-0.063***		0.069
		(0.016)		(0.042)
AssetGR×Tangi		0.221		-0.277
		(0.151)		(0.196)
Ln(A)		-0.001		-0.001
		(0.002)		(0.003)
AGR×Ln(A)		-0.001		0.016
		(0.021)		(0.020)
Controls	X	X	X	X
FE: Industry	X	X	X	X
N	596	595	999	995
R^2	0.302	0.349	0.304	0.326

Table C14: Impact of Macroeconomic Variables

This table summarizes the effects of within-year changes in macroeconomic variables on asset growth–induced leverage adjustments during the 1940 period (Panel A) and the 1950 period (Panel B). Column 1 lists the macroeconomic variables analyzed. Column 2 reports the change in each macroeconomic variable from the beginning to the end of the relevant period. Using the estimates from Table 9, column 3 reports the implied effect of this within-period change on the leverage adjustment associated with a one–standard-deviation increase in asset growth.

Panel A: 1940 Period

(1)	(2)	(3)
Variable	Change (%)	Impact on $\frac{\Delta \text{Leverage}}{\Delta \text{AssetGR}}$ (%)
Average Yield Spread	-0.31	0.08
Average Nominal Cost of Debt	-0.44	-0.03
Average Real Cost of Debt	-1.86	-0.05
Average Industrial Production Growth Rate	1.07	0.57

Panel A: 1950 Period

(1)	(2)	(3)
Variable	Change (%)	Impact on $\frac{\Delta \text{Leverage}}{\Delta \text{AssetGR}}$ (%)
Average Yield Spread	-0.13	0.04
Average Nominal Cost of Debt	0.04	0.00
Average Real Cost of Debt	-4.45	-0.11
Average Industrial Production Growth Rate	-1.72	-0.92