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Corporate taxes, leverage, and investment: Evidence from Nazi-occupied Netherlands

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Abstract

We examine the Netherlands around the Second World War, where the occupying Nazi regime overhauled the country's corporate tax regime and introduced a profit tax of 55 per cent. We estimate that the new tax regime cost investors at least 300 million guilders, an amount equivalent to 5 per cent of Dutch GDP in 1940. We demonstrate that the tax introduction changed the financing of Dutch businesses. In particular, we find strong evidence that debt financing increased because it provides a tax shelter. The changes in taxation also led to an after-tax reduction in the cost of debt, which had large real effects on firm investment. After the end of the war, firms with more leverage had higher capital expenditures.

KEYWORDS

capital structure, Second World War, taxation, the Netherlands

JEL CLASSIFICATION

G31, G32, H25, H32, N24

In the Second World War, the Netherlands was occupied by Nazi Germany between 1940 and 1945. In the first years of the occupation, the occupiers aimed to integrate the Dutch economy into the Third Reich, whilst also extracting financial resources to finance the war effort. One of the main ways in which the Nazi government did so was through a major overhaul of the Dutch tax code, including the introduction of corporate taxes. After the first introduction of a profit tax in July 1940, November 1940 saw a near-trebling of its tax rate. And in May 1942, another major overhaul followed, where the initial profit tax was replaced by the much heavier corporate tax. We

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examine the economic consequences of this introduction of corporate taxes in the Netherlands with a unique hand-collected dataset of all Dutch firms listed on the Amsterdam stock exchange from 1938 to 1948.

In the early years of the occupation, the economic policies of the occupier were a balancing act between maximizing the expropriation of Dutch business and maintaining or improving its production capacity.¹ In contrast to the other occupied countries, which were placed under German military rule, the Nazis installed a civil administration in the Netherlands, led by the Austrian Arthur Seyss-Inquart. Another Austrian, Hans Fischböck, was appointed as *Generalkommissar für Finanz und Wirtschaft* and thereby became the main person responsible for economic and financial policy in the occupied Netherlands. Although the years of the occupation saw several serious economic impediments, there was no large-scale collapse of economic activity until the war's final stages. According to Klemann,² Dutch GDP in 1943 was still 96 per cent of its 1938 level, and despite various legal restrictions, most markets found a way to maintain operations. Most firms maintained operations without direct Nazi control and many of them generated additional income by producing for the occupying forces.^{3,4}

Before the occupation, corporate profits were not taxed, and only paid-out profits incurred small taxes on dividends and management compensation. This changed abruptly during the war, in a series of fiscal changes that culminated in the corporate tax (*Vennootschapsbelasting*) of May 1942. The revisions of the tax laws for Dutch corporations were mainly motivated by the need to finance the occupation and thus increase tax revenues.^{5,6} They furthermore aimed to integrate the Dutch economy in the Third Reich. In November 1940 Fischböck announced a serious increase of the tax burden on firms, soon transpiring into an increase of the tax rate from 11.5 per cent to 26.5–31.5 per cent. This profit tax was accompanied by relatively flexible rules on the calculation of the profit. In May 1942 the 2-year-old profit tax was replaced by the new corporate tax, the rate of which was set at 55 per cent of profits. This tax was implemented retroactively as of 1941, albeit for this year at only 45 per cent, and came with stricter rules on determining taxable profits.

We study Dutch firms with a listing on the Amsterdam stock exchange. We use the annual official guide of the Amsterdam stock exchange to construct a list of all companies listed at any point in time between 1938 and 1948 and collect all stock prices and financial information of these companies. Ultimately, our dataset consists of 280 unique firms with 1762 firm-year observations, spanning a wide variety of sectors such as trade, shipping, retail, real estate, and multiple branches of industrial production. We answer three questions. First, how much value did Dutch investors lose as a consequence of the change in taxation? Second, how did the tax overhaul change the way Dutch corporations were financed? Third, how did the change in the financing of Dutch corporations change their level of investment?

To examine the first question, we perform an event study analysis on the tax announcements to measure the effect of debt tax shields on the loss of firm value. The relevance of the second

¹ Klemann and Kudryashov, *Occupied economies*.

² Klemann, *Nederland 1938–48*, p. 429.

³ A sinister exception to this otherwise relatively benign corporate environment was the process of Aryanization: the forced takeover of Jewish firms and the forced removal of Jewish board members (Aalders, *Roof*, ch. 5). Most non-Aryanized firms however were able to maintain operations without direct Nazi control.

⁴ Klemann, *Nederland 1938–48*; Meihuizen, *Noodzakelijk kwaad*.

⁵ However, the Nazis also aimed to implement some of the darkest sides of national-socialist ideology, which was reflected in the unequal fiscal treatment of Jews and other marginalized groups.

⁶ Adriani, *Fiscale ervaringen in bezettingstijd*; Essers, *Belast verleden*.



question lies in the use of debt as a tax shelter. Building on the irrelevance theorems established in their 1958 paper, Modigliani and Miller have theoretically established the influence on debt of the tax-deductibility of interest expenses in their subsequent correction.⁷ In the presence of corporate taxes, an increase in leverage will reduce a firm's cost of capital, motivating firms to maximize debt funding.^{8,9} This so-called debt tax shield was already known to contemporaries in the 1940s. The Dutch economist Meij,¹⁰ for instance, pointed out that debt financing implied a decrease of taxable profits. We expect that leverage increased after the introduction of corporate taxes. To answer the third question we measure the effect of a change in leverage after of the tax introduction. The tax deduction of interest expenses reduces the cost of capital after an increase in leverage. We expect that, because of this lower cost of capital, levered firms will invest more than their equity-funded peers.¹¹

We first conduct an event study to examine the response of investors on the Amsterdam Stock Exchange to the announcement of the tax measures. Commentaries in the general and financial press at that time indicated that the new corporate taxes came as a shock to firms and investors. We corroborate this by showing that the announcements in November 1940 and May 1942 resulted in negative 4-day abnormal returns of 6.7 per cent and 3.3 per cent, respectively. This event study provides a causal estimation, where the returns of non-Dutch companies in the Third Reich are used as counterfactual. In total, these two announcements led to a loss of firm value of over 300 million guilders, the equivalent of roughly 5 per cent of the annual Dutch GDP at the time. This estimated loss is a lower bound since alternative specifications yield even higher estimates, and because the loss is only observable for a set of firms listed at the Amsterdam stock exchange.

We then follow Doidge and Dyck, and Faccio and Xu, and test whether the abnormal returns following the tax announcements are less negative for firms with more debt and debt capacity.¹² For the corporate tax introduction of May 1942, we find that firms with more debt lose less stock market value. We find the same result for firms with higher net profits, which we believe is because these firms can more easily attract new debt. These results imply that both the actual and potential debt shields are considered valuable by investors.

Next, we measure capital structure changes following the introduction of corporate taxes. Ideally, we would use a control sample of firms unaffected by corporate taxes and perform a difference-in-differences test on a treatment sample for post-1942 years. There are two obstacles. First, we have to distinguish an effect during the war years 1942–5, and a post-war effect in 1946–8. We only expect that the tax effect starts in 1946, because in 1944–5 capital markets were disrupted

⁷ Modigliani and Miller, 'The cost of capital'; *eisdem*, 'Corporate income taxes'.

⁸ Modigliani and Miller, 'Corporate income taxes and the cost of capital'.

⁹ Empirically, the effect of corporate taxes has been established only for small changes in the corporate tax rate (e.g. Graham et al., 'A century of capital structure'; Faccio and Xu, 'Taxes and capital structure'; *eisdem*, 'Taxes, capital structure choices'; Hennessy et al., 'Empirical analysis of corporate tax reforms'). These studies are problematic for three reasons. First, in a setting with transaction costs, both simulation tests (Hennessy et al., 'Empirical analysis of corporate tax reforms') and long-term empirical analyses (Graham et al., 'A century of capital structure') of incremental tax changes reveal the weakness of empirical tests of the hypothesis that taxes do not induce debt. Second, disentangling corporate and personal taxes' effects is not straightforward (Givoly et al., 'Taxes and capital structure'; Graham, 'Do personal taxes?'; Faccio and Xu, 'Taxes and capital structure'). Third, we cannot extrapolate the marginal effect of small changes to large adjustments because the marginal tax benefits of leverage are most likely decreasing, whilst non-tax costs of debt will increase.

¹⁰ Meij, *Weerstandsvermogen en financieele reorganisatie van ondernemingen*.

¹¹ Modigliani and Miller, 'Corporate income taxes'.

¹² Doidge and Dyck, 'Taxes and corporate policies'; Faccio and Xu, 'Taxes, capital structure choices'.



by the war. Furthermore, the Dutch government in exile explicitly announced in 1944 that the corporate taxes would not be abolished. For this reason, from this point on, firms and investors knew that they were facing a permanent instead of a temporary tax hike. Second, we do not have a control sample of tax-exempted firms. Therefore, we perform two analyses with quasi-control samples and observe differences in leverage before and after 1942 for this sample, and then compare the difference with the changes in remaining set of (treated) firms. In the first analysis we are agnostic about the determinants of leverage and study a sample of firms with high leverage before the new tax regime. We assume that the marginal benefits of debt for firms in the upper quartile of leverage (before the tax change) change little after taxation compared with firms with normal leverage.¹³ Our second quasi-control group is based on the strong relationship between tangibility and leverage.¹⁴ We take as a quasi-control sample the firms in the highest quartile of tangibility in 1938–41, observed before the tax change. These firms have high collateral value of their assets, which provides them access to debt financing even when there are no tax advantages.¹⁵ Deloof and van Overfelt have demonstrated the strong relation between asset tangibility and leverage for Belgian firms before the First World War.¹⁶ We conduct several tests to demonstrate the validity of the quasi-control samples.

We run a panel regression model and estimate the changes in leverage relative to 1938–41 for treated firms compared with both the quasi-control samples of high-leverage and high-tangibility firms. For the period 1946–8, we find that leverage (debt over total assets) in the treatment sample increases by a statistically and economically significant 10 percentage points, using the high-tangibility firms as the control sample. This is a large effect because the leverage in this sample was 33 per cent before the introduction of corporate taxes. We find a 0.20 percentage point increase in leverage for each percentage point change in corporate taxes.¹⁷

We then examine the impact of the tax change on corporate investments. Finance theory argues that, in the presence of corporate taxes, firms with more debt have lower costs of capital. Therefore, we expect that firms invest more when they have more leverage.¹⁸ We run a standard model to explain capital expenditures and find a positive effect for leverage in the entire sample, which becomes much larger after 1945. We find that a one-standard-deviation increase in leverage after the tax reform induces an increase of 17–20 per cent of a standard deviation in the average firm's investment. This result provides evidence that the corporate tax also had strong real effects on the Dutch economy.

This study makes two distinct contributions. First, we contribute to the literature on the expropriation of the Netherlands during the Nazi occupation.¹⁹ We document that the Nazis expropriated at least 300 million guilders from investors by introducing taxes on Dutch corporations. Secondly, we document longer-term effect of the corporate tax, which was not abolished after the war. We demonstrate how policies enacted during wartime can have consequences after

¹³ This estimation suffers from widely documented mean reversion in leverage, mainly because of target adjustment; see [Flannery and Rangan](#), 'Partial adjustment towards target capital structures'; [Byoun](#), 'How and when do firms adjust?'.

¹⁴ [de Jong et al.](#), 'Capital structure around the world'; [Frank and Goyal](#), 'Capital structure decisions'.

¹⁵ [Rajan and Zingales](#), 'What do we know'; [Rampini and Viswanathan](#), 'Collateral and capital structure'.

¹⁶ [Deloof and van Overfelt](#), 'Were modern capital structure theories valid?'.

¹⁷ This effect is smaller than the effect documented by recent studies for minor changes in tax rates ([Faccio and Xu](#), 'Taxes and capital structure'), and corroborates the effect of 0.19 per cent for large changes in [Dojdie and Dyck](#), 'Taxes and corporate policies'.

¹⁸ [Modigliani and Miller](#), 'Corporate income taxes'.

¹⁹ E.g. [Klemann and Kudryashov](#), *Occupied economies*.



the war has ended. Corporate financing and investment policies changed permanently in the wake of the introduction of the new corporate taxes.

I | HISTORICAL BACKGROUND

On 10 May 1940, German forces invaded the Netherlands, as part of a combined attack on the Low Countries and France. After 5 days of fighting, the Dutch government saw the writing on the wall and was forced to surrender. This surrender marked the start of an occupation period that would last until Spring 1945.²⁰ Apart from Rotterdam, which saw the destruction of its city centre in the bombing of 14 May 1940, relatively little damage resulted from the brief period of combat. Once the occupation had started, most individuals and firms tried to maintain ‘business as usual’ as much as possible.²¹ Klemann and Kudryashov carefully document the exploitation policy of Nazi Germany.²² The Nazis pursued two different policies: one for the Western occupied countries and one for the Eastern countries. For the Western countries their goal was to leave economies intact as much as possible whilst confiscating most of the production and profits. This required relative stability in the occupied countries. The policy was partly inspired by the fact that the Nazis saw the Dutch population as racially more similar to Germans than those of the Eastern countries. However, it was also motivated by the more pragmatic point that the economic power of these countries was too large to go unused.

The Nazis chose a civil administration in the Netherlands, headed by Arthur Seyss-Inquart. Hans Fischböck was appointed as *Generalkommissar für Finanz und Wirtschaft* and became responsible for economic and financial policies. Much of the Dutch bureaucracy was left intact, but all ministries, as well as other important administrative organizations such as the Dutch central bank or the tax administration, were placed under governance of the Nazi administration. A small number of large industrial firms that the Nazis deemed crucial for military production were placed under German supervision, by installing a caretaker (*Verwalter*) tasked with the supervision of the board and its directors. Some other firms were appointed a caretaker in the process of Aryanization: the forced takeover of Jewish firms and the forced removal of Jewish board members.²³ Most non-Aryanized firms however were able to maintain operations without direct Nazi control.²⁴

Despite the war, the Dutch economy fared relatively well during the earlier years of the occupation, whilst economic activity only took a serious dive after 1943. In the online appendix (section A1) we provide a concise description of the Dutch economy and stock exchange during the war. We conclude that, between 23 September 1940 and 11 September 1942, securities trade on the Amsterdam stock exchange took place without serious legal restrictions and with ample liquidity. Short-run price movements during this period should therefore accurately reflect information on the stock market, and are thus suitable for measuring the effect of news reaching the stock market. From September 1942 onwards, security prices became less informative as price rises were

²⁰ The southern provinces of the Netherlands were liberated in Autumn 1944. The liberation of the rest of the country took place in Spring 1945. The German army formally capitulated on 5 May 1945.

²¹ Klemann, *Nederland 1938–48*.

²² Klemann and Kudryashov, *Occupied economies*.

²³ Aalders, *Roof*, ch. 5.

²⁴ For example, none of the seven major merchant banks were appointed a caretaker at any point during the occupation; see van Tielhof, *Banken in bezettingstijd*.



increasingly curtailed for existing securities. Nevertheless, the stock market did remain open until September 1944, and there remained an active market for new issues of stocks and bonds. In the subsequent analysis, we exploit the relative stability of the Amsterdam Stock Exchange to assess the investors' response to introduction of corporate taxes.

One of the most pronounced changes to the Dutch fiscal system during the Second World War was how limited liability corporations were taxed. We describe changes in the tax regime and discuss to what extent investors anticipated the tax hikes, and which dates can therefore be seen as the main shocks to the market at the time. Using the digitized archives of Dutch newspapers, we have searched newspapers around all tax announcements. Additionally, we searched the available scans of publications from the Dutch underground press, but these publications did not often discuss financial or fiscal matters. We aim to use announcements of new measures to estimate value effects. Therefore, it is crucial for this event study to identify at what point in time new information reaches investors.²⁵

Until 1940, corporate profits were subject to tax only at the moment of payout, by the tax law on dividends and management compensation of 1917. In contrast, most other countries in Western Europe, as well as the Dutch East Indies, directly taxed corporate profits already in the early 1930s.²⁶ Plans to replace the tax on dividends and management compensation with a direct tax on profits had been around for most of the interwar, but had not yet been implemented.²⁷ In fact, a parliamentary majority to institute a profit tax had been reached just before the invasion, as in April 1940 the Dutch lower house approved a proposal to do so.²⁸ When the new German authorities formally implemented the profit tax on 26 July 1940, its design was completely in line with the pre-war proposal.²⁹ We therefore exclude the publication of the profit tax on 26 July 1940 as a potentially newsworthy event, as this measure was announced and expected well in advance.

The new profit tax was levied at a rate of 11.5 per cent, including a 1.5 per cent surcharge for the municipal government that collected the tax. According to the guide for entrepreneurs by Polak,³⁰ the two crucial aspects of the new profit tax were the absence of rules on how the profit was to be calculated, and the rules regarding retained earnings from before 1940.³¹ Firms were fairly free to follow their judgment when it came to valuing assets, calculating depreciation expenses, generating reserves, or smoothing profits across years, as long as their practice was consistent across time. This flexibility implied, however, that firms should have easily been able to generate additional costs in a year when profits would have been high, thus avoiding part of the tax bill.

Next, in Autumn 1940, tax rates were increased drastically. The first serious wartime shock to corporate taxation came in Autumn 1940, when the rate of the profit tax was raised from 11.5 per cent to a rate between 26.5 per cent and 31.5 per cent.³² The official resolution (VB 228/1940)

²⁵ MacKinlay, 'Event studies in economics and finance', pp. 14–5.

²⁶ Adriani, *De grondbeginselen der wetten*, ch. 1.

²⁷ Debates about a direct tax on profits in the Netherlands go back at least to 1924 (Treub and Wibaut, *Prae-adviezen*).

²⁸ Harmsen, 'Belastingheffing van de Naamlooze Vennootschap', p. 4.

²⁹ The implementation of the profit tax was announced by resolutions VB 83/1940 and VB 84/1940 in the *Verordeningenblad voor het bezette Nederlandsche gebied*, the official announcement bulletin of the occupation government.

³⁰ Polak, *Besluit op de winstbelasting 1940*.

³¹ See also the discussion in Harmsen, 'Belastingheffing van de Naamlooze Vennootschap'.

³² The exact rate was a progressive function of the level of profit.



for this was published on 14 December 1940, but *Generalkommissar* Hans Fischböck had already hinted at this raise explicitly at a lecture held on 8 November 1940, which reached the headlines of most major newspapers the subsequent day, stating: ‘The profit tax (currently 11.5 per cent) will be raised before the end of the year. In Germany the profit tax amounts to 40 per cent and due to other levies the total rate reaches 60 to 65 per cent. However, the profit tax will not be raised to this rate this year.’³³ Other than the rate of taxation, resolution VB 228/1940 left the previous law intact, including the flexible rules on the calculation of taxable profits. For the announcement, we take the date of Fischböck’s announcement as the event date rather than the date of official publication. Newspaper reports around 14 December 1940 confirm that the publication of VB 228/1940 did not contain any news value, and the stock market showed no reaction to it.³⁴

In the online appendix (section A2) we discuss additional tax-related measures announced in August 1941, and argue that these do not provide a relevant announcement date.

On 4 May 1942 a set of major revisions to corporate taxation was announced, which would replace the 1940 profit tax. Most important was the corporate tax (VB 51/1942): a tax on profits of limited liability firms of 55 per cent of profits, implemented retroactively as of 1941 (albeit for that year at only 45 per cent).³⁵ In addition to the high rate of taxation, the corporate tax included stricter rules on the calculation of profits. In this respect, the new corporate tax was in many ways similar to its counterpart in Germany, the *Körperschaftsteuer*, which had been in place since 1934. Specifically, as in Germany, interest was deductible for the corporate tax. No other important announcements were made on that day. Several newspapers wrote rather critically about the new corporate tax on the day it was announced, displaying a level of criticism that was remarkable in light of the restrictions on the Dutch press at the time. Especially the retroactive levy over 1941, as well as the restrictive rules on the calculation of profits, were heavily criticized both during and immediately after the war.³⁶

The guide by Hamstra Pik (1943) details how firms were to handle the new regulations.³⁷ For instance, the corporate tax included rules on the treatment of long-term debt, investments in (foreign and domestic) subsidiaries, the valuation of fixed assets, and the extent to which losses from earlier years could be carried over. This implied that, under the new corporate tax, there was less leeway to adjust the reported level of profits than under previous legislation.

Before May 1942 there was a general expectation that taxes would be increased at some point, given both the difficulties of the Dutch treasury and the fact that the corporate tax in Germany was still substantially heavier than that of the Netherlands. Nevertheless, as both contemporary

³³ *Amsterdamsch Effectenblad*, 9 November 1940, ‘De Nederlandsche economie’, which discusses an interview with Hans Fischböck. Translation from the Dutch original by the authors.

³⁴ Further testament to the importance of Fischböck’s 8 November press conference, and the irrelevance of the 14 December publication, is the following account of events in 1940 in the *Financieel Jaarboek 1941*: ‘Then [after 8 November], however, a sore reaction set in, caused by the circumstance of Dr. Fischböck’s announcement of a forceful increase of the taxes on profits of limited liability corporations (...) The influence of the aforementioned factors [a bull market during most of 1940] was so strong, that the market showed a remarkable immunity to the very drastic increase of the profit tax which was announced on 14 December.’ [*Financieel Jaarboek* (1941), p. 14]. Translation from the Dutch original by the authors.

³⁵ In addition, an enterprise tax was introduced on profits of all firms up to 5 per cent (VB 50/1942) as well as a wealth tax of 0.5 per cent of the equity level of limited liability firms (VB 52/1942).

³⁶ See for instance Dijker, ‘De strijd tegen het voortbestaan van de naamloze vennootschappen’.

³⁷ Hamstra Pik, *Practische handleiding voor belastingplichtigen*.



newspaper reports and post-war discussions reveal, the content of the new tax rules of May 1942 was worse than anticipated. Stock market reactions around 5 May 1942 therefore will be a reflection of the difference between investors' expectations and the actual tax burden of these new taxes.³⁸

In Belgium, tax changes during the war years were less dramatic. In 1941, personal taxes – which were below levels in Germany – were increased by taxing investors for paid-out and non-paid-out firm profits, in the form of the *taxe professionnelle*, at a rate between 5 per cent and 9 per cent. However, as compensation, the so-called *taxe mobilière* was reduced from 22 per cent to 10 per cent. Later, an additional corporate progressive crisis tax of 4 per cent to 15 per cent was levied, and the *taxe mobilière* was increased to 12 per cent in 1942 and 15 per cent in 1943 (Centre d'étude des sociétés, 1941; Buisseret, 1943; Baudhuin, 1945).³⁹ In France, taxes also increased in 1942, but these changes particularly targeted the revenues from agriculture by eliminating exemptions. From 1942 onwards, business profits were taxed at 21 per cent.⁴⁰

The introduction of the corporate tax in May 1942 was one of the last major fiscal changes that was implemented in the occupied Netherlands. From mid-1942 onwards, the Nazi authorities shifted their priorities to other, more short-term, objectives, as the outcome of the war started looking increasingly bleak for them. After the Netherlands were liberated in May 1945, many of the new taxes were left in place. Only the most punitive taxes, as well as all fiscal measures specifically directed against Jews and other minorities, were immediately abolished after the end of the Second World War.⁴¹ One reason why many taxes were left in place was that the reconstruction necessitated higher tax revenues than what had been typical before 1940. Additionally, many contemporary fiscal experts were actually quite positive about most of the fiscal changes that had taken place during the occupation.⁴² For our purposes, what is most important to mention is that the corporate tax and the related measures were all left in place. This was already announced on 20 September 1944 by the Dutch cabinet in exile in resolution E93.⁴³ This resolution specified how all Nazi-era legislation would be treated after the liberation. All the aforementioned tax resolutions were placed on list C, which meant that these would remain in place until further notice. As it turned out, the 1941 dividend cap was replaced by a somewhat more flexible variant only in 1950, whereas the 1942 corporate tax did not see fundamental changes until 1967.

³⁸ Illustrative of how the new taxes were interpreted by the financial press are the opening lines of the *Nederlandsche Financier* of 5 May 1942: 'The long expected — or rather, feared — taxes, that from now on will also burden business, were included in the *Verordeningenblad* of 4 May. In line with the prospect we repeatedly held up, they will weigh heavily on us, as even our boldest expectations have been exceeded. The stock market therefore had no reason to cheer at the birth of this triplet, although she had been urgently warned'. Translation from the Dutch original by the authors.

³⁹ Centre d'étude des sociétés, *La taxe professionnelle et la taxe mobilière*; Buisseret, *Manuel théorique et pratique des impôts sur les revenus*; Baudhuin, *L'économie belge sous l'occupation*.

⁴⁰ F. Occhino, K. Oosterlinck, and E. N. White, 'How occupied France financed'; Nogaró, *Le financement des dépenses publiques*.

⁴¹ Essers, *Belast verleden*, ch. VII.

⁴² This remarkably positive stance can be seen in the collection of essays on the wartime tax changes by Adriani, *Fiscale ervaringen in bezettingstijd*, although the enthusiasm was not uniform across all authors.

⁴³ Published as 'Besluit Bezettingsmaatregelen' in the *Staatsblad van het Koninkrijk der Nederlanden uitgegeven te Londen*, Series 1944-E.



II | DATA

We study Dutch firms with a listing on the Amsterdam stock exchange.⁴⁴ Most large firms in the Netherlands were listed limited liability corporations, and our sample covers a wide variety of firms in terms of location and sector. For this reason we believe that these firms are representative of large firms more generally. Arguably, the series of tax changes that we study might have had different effects on small firms. However, for non-listed firms, consistent financial data are not available, which prevents us from studying systematically how small firms dealt with the corporate tax.

We use the annual official guide of the Amsterdam stock exchange⁴⁵ to construct a list of all companies listed at any point in time between 1938 and 1948. We exclude financial institutions and firms primarily active in the Dutch colonies.⁴⁶ This leads to a sample of 280 firms, active in various sectors such as trade, shipping, retail, real estate, and multiple branches of industrial production.⁴⁷

We collect the financial statements of this group of firms from the annual publication *Van Oss' Effectenboek*, editions 1940–50. The *Van Oss' Effectenboek* was the leading investor manual in the Netherlands during the first half of the twentieth century. It contained financial statements of all firms that were listed on the Amsterdam stock exchange, as well as other key facts about these firms such as board composition and dividend history. Each financial statement consists of a balance sheet, a profit and loss statement, and a so-called profit distribution: a specification of how the net profit was distributed between shareholders, managers, taxes, additions to specific reserve accounts, and retained earnings.⁴⁸ The financial statements published in the *Effectenboek* typically use the exact same wording and format as those published in firms' annual reports. Since *Van Oss' Effectenboek* was not published between 1944 and 1947, for any missing accounts we rely on editions of *Van Nierop en Baak's Naamlooze Vennootschappen*: a periodical that likewise published copies of firms' annual accounts.

We should note that the annual accounts that we use are not fiscal accounts but commercial accounts, that is, annual accounts as reported to shareholders as opposed to those reported to the tax administration. Spoerer shows that, for interwar Germany, there could be substantial differences between the tax balance sheet and the commercial balance sheet.⁴⁹ For some of the purposes of this article, it would be better to rely on fiscal accounts, especially since these show more explicitly how firms dealt with reserves and provisions. However, there is unfortunately no wide sample of fiscal accounts available for Dutch firms in our period. That said, many of the key outcome variables such as leverage or profitability are likely not to deviate much between the two sets of

⁴⁴ The replication package is available at [Fliers et al.](#), 'Corporate Taxes'.

⁴⁵ The *Gids bij de Prijscourant van de Vereeniging voor den Effectenhandel*.

⁴⁶ We exclude colonial businesses because these firms (in the Dutch East Indies) were subject to a different tax regime, and because very little information about these firms was available in the Netherlands during the war.

⁴⁷ We acknowledge that the focus on exchange listed firms reduces the generalizability of our results beyond that of Dutch listed companies. Whilst our sample is representative for the population of large Dutch firms, our examination is limited in that the effect for small firms might be different and may be conditional on the institutional setting.

⁴⁸ After digitizing and cross-checking our data, we classify all entries on the balance sheets, profit and loss statements, and profit distributions into standardized categories (see [de Jong et al.](#), 'Catering and dividend policy'). Firms were relatively free in the construction of their accounts, and as such, a categorization of the sometimes-eclectic set of posts is necessary. Finally, we use the profit distributions to calculate post-distribution balance sheets.

⁴⁹ [Spoerer](#), 'Window-dressing in German inter-war balance sheets'.



accounts. Furthermore, as van den Brand mentions, according to the principles underlying the Nazi-era tax changes, ‘the tax balance sheet must be derived from the commercial balance sheet’.⁵⁰

Daily stock prices come from the *Officieele Prijscourant*, which was the official announcement bulletin of the Amsterdam stock exchange.⁵¹ In addition to the share price, the *Officieele Prijs-courant* reports the type of price quote and the volume that was traded on each day.⁵² If a firm has multiple securities listed, we take the price of either the common stock or the certificate thereof, unless another security (such as preferred stock) is by far the most intensively traded security. We correct prices for dividend payments, details of which are taken from the *Van Oss' Effectenboek*. The *Effectenboek* is also the source for the levels of nominal share capital outstanding for all securities, which we combine with year-end prices from the *Financieel Jaarboek* to construct index weights.

To estimate abnormal returns in the event study, we require an index of market returns. We construct a so-called ‘Third Reich index’ for this purpose: an equal-weighted index of daily stock returns in Germany, Belgium, and France. We cannot include Dutch stocks, because these are all affected by the announcements. During the occupation, the Dutch economy was part of the Third Reich’s economy, where most of the industrial production took place in Germany and the Western occupied countries.⁵³ For this reason, we believe that an index of major firms from these three geographically closest countries can serve as a valid measure of market returns for this period. We collect stock price data for a set of 73 stocks from the Berlin (26), Brussels (23), and Paris (24) stock exchanges. These foreign prices are taken from the *Amsterdamsch Effectenblad*, a leading financial daily in the Netherlands. The stocks we include in our Third Reich index are those that are frequently reported in the section on foreign stocks exchanges in *Amsterdamsch Effectenblad*, which we see as a sign that it was these stocks that Dutch investors might have been interested in. We do not have consistent information on the industries that these foreign firms were active in.

We also report results when correcting for single-country indices. The reason for this is that we want to verify that the results are not driven by a particular country’s stock market. As with the Amsterdam stock exchange, that of Berlin became subject to a price cap from early 1943 onwards, which means that, from that point onwards – but not during our two event windows – stock prices no longer reflected the actual valuation of firms. The Paris stock exchange was still closed in 1940, and therefore we include the French prices only in the second event. For Berlin, we obtain dividend data and stock market capitalization from Nachtigall,⁵⁴ which enables the construction of a value-weighted index for the Berlin market.⁵⁵

Our approach for calculating the value effects of the introduction in corporate taxes has two advantages. First, by using an event study method, we can provide causal estimations where we compare affected firms with a control sample using a market index. In other words, our empirical strategy provides a counterfactual with the Third Reich index. Second, we can assess the degree

⁵⁰ van den Brand, ‘Financial reporting, environmental factors and their relationship’, p. 132.

⁵¹ Our analyses are limited by the liquidity of the exchange-listed firms. We have to limit the sample to those firms whose stocks are sufficiently liquid, since only then will share prices be informative. We operationalize this by excluding firms from the event study for which shares have zero turnover for more than 2 months in the year of the event. Monthly turnover values are taken from the annual *Financieel Jaarboek*. This leads to the removal of two firms from the November 1940 sample and three firms from the May 1942 sample.

⁵² The type of price quote — bid and/or ask — was only reported if no trade took place.

⁵³ Tooze, *The wages of destruction*; Klemann and Kudryashov, *Occupied economies*.

⁵⁴ Nachtigall, ‘Konstruktion und Analyse eines Aktienindex’.

⁵⁵ Similar data are not available to us for the Brussels and Paris stock exchanges.



to which the announcements were anticipated by investors because the price reaction contains the value effect that has not yet been incorporated in the price levels before the announcement.

III | THE VALUE EFFECTS OF THE TAX CHANGES

To estimate the value effects of the tax changes, we measure share price reactions on the announcement dates of two key events. The first is the announcement on 8 November 1940 that taxes on businesses would soon be increased, which turned out to be the prelude to the increase of the profit tax, published 14 December 1940. The second event is the publication of three new corporate taxes in the *Verordeningenblad* on 4 May 1942. Based on our reading of the financial press, we believe that in both cases the announcements were made after the stock market was closed. This means that the two event dates – the first trading days when the respective announcement could affect prices – are 9 November 1940 and 5 May 1942. The announcements came as shocks to investors.⁵⁶

To measure how much firm value was lost in response to the tax announcements of November 1940 and May 1942, we analyse the behaviour of stock prices in the days surrounding these announcements. Our methodology is based on Armstrong et al., Lewis and Verwijmeren, and Grewal et al.⁵⁷ We first construct a portfolio of all stocks in our sample. We then regress the daily return on this portfolio on a measure of market returns and dummy variables for the event window, that is, those dates for which we expect the returns to be affected by the respective tax announcement. The cumulative abnormal return (CAR) in response to the tax announcement equals the sum of abnormal returns of all event dates. The estimated aggregate loss of firm value then follows as the product of the cumulative abnormal return and the total market capitalization. Formally:

$$r_{pt} = \alpha_p + \beta_p r_{mt} + \sum_t^K \gamma_{pt} \delta_t + \epsilon_{pt}. \quad (1)$$

Here, r_{pt} is the daily return on the portfolio of Dutch firms on day t , whilst r_{mt} is the market return on day t . δ_t is a dummy that equals one for the event window K and zero otherwise, whilst ϵ_{pt} is the robust error term. γ_{pt} is the abnormal return of the portfolio on day t . It follows that the cumulative abnormal return of the portfolio in the event window is defined as:

$$\mu_p \equiv \sum_{t \in K} \gamma_{pt}. \quad (2)$$

⁵⁶ There was little to no advance writing about the kind of measures that were eventually implemented. Moreover, the daily stock exchange report in the newspaper *Nederlandsche Financier* and *Dagelijksche Beurscourant* in the months surrounding November 1940 and May 1942 would have discussed the distress that the tax announcements caused and did not anticipate the shock. To validate the choice to include two, and exclude other announcements, we collect stock prices in an event window around 30 August 1941, which is the date the dividend cap was announced. The index of stock prices does not show any reaction to the announcements of 30 August, nor do firms that paid high dividends before 1941 show a different reaction. See also appendix A2.

⁵⁷ Armstrong et al., 'Market reaction to the adoption of IFRS in Europe'; Lewis and Verwijmeren, 'Cash-settled convertible bonds'; Grewal et al., 'Market reaction to mandatory nonfinancial disclosure'.

**TABLE 1** Event study results

	Equal-weighted portfolio	Value-weighted portfolio
Event date: 9 November 1940		
Raw returns	-4.9%	-11.8%
Third Reich index (Berlin and Brussels)	-6.7%	-13.1%
Berlin index	-6.7%	-13.0%
Brussels index	-5.6%	-12.1%
Event date: 5 May 1942		
Raw returns	-2.8%	-2.2%
Third Reich index (Berlin, Brussels, and Paris)	-3.3%	-3.4%
Berlin index	-3.4%	-3.6%
Brussels index	-3.5%	-3.9%
Paris index	-3.4%	-3.8%

Notes: This table presents the 4-day announcement effects for 9th November 1940 and 5th May 1942 over the window [0,3]. The returns are in percentages and all effects are significant at the 1% level. We present equal-weighted results in the first column and results weighted by the market value of the firms by 31 December of the previous year in the second column. Respectively four (1940) and five (1942) market models are estimated using Equations (1) and (2). Market returns are based on the Third Reich index (an index of the most liquid stocks across the markets of Berlin, Brussels, and Paris), a value-weighted index of Berlin stocks, an equal-weighted index of Brussels stocks, and an equal-weighted index of Paris stocks.

Sources: Amsterdamsch Effectenblad, Nachtigall, 'Konstruktion und Analyse eines Aktienindex', and authors' calculations.

We calculate this cumulative abnormal return for the first event in November 1940 ($\mu_{p,I}$) and for the second event in May 1942 ($\mu_{p,II}$) and test whether this differs significantly from zero. We assume that the announcements will affect stock returns up to the third day after the event date so that the event window is specified as $t \in [0, 3]$.⁵⁸

The resulting estimates are presented in table 1. In addition to the estimates of CAR using alternative market indices, we present the raw returns of the portfolio in the event windows.

The raw estimated cumulative abnormal return for 9 November 1940 is -4.9 per cent and -11.8 per cent for equal-weighted and value-weighted portfolios, respectively. As with all estimated effects, these negative returns differ from zero with 1 per cent significance when we conduct a t -test on $\mu_{p,I}$. When we use the Third Reich index as a benchmark, we find abnormal returns of -6.7 per cent and -13.1 per cent. The estimate is larger in absolute terms for the value-weighted portfolio than for its equally weighted counterpart, which suggests that firms with a larger market capitalization were hit harder. For the announcement of 5 May 1942, the variation between specifications is smaller and the estimated CAR is -3.3 per cent or -3.4 per cent when using the Third Reich index as the measure of market returns. For both announcements the results with the Third Reich index are very similar to estimates that control for a single country, which indicates that country-specific effects in the index do not drive our results. We conclude that the announcement of new taxes in May 1942, similar to that of November 1940, led to a substantial loss of firm value and loss in shareholder wealth. To quantify the aggregate loss of firm value, we

⁵⁸ Although estimation windows are usually specified as a series of trading days before the event date (MacKinlay, 'Event studies in economics and finance'), this is in both cases complicated by a confounding event. In 1940, the stock market is closed until 23 September, so the window cannot start before this date. In the first weeks of March 1942, the Amsterdam stock market was disrupted by fire-sales of shares confiscated from Jewish owners (Aalders, Roof). For this reason we start the 1942 estimation window in April. To ensure an adequate length of all data series, we extend both estimation windows to cover a couple weeks after the respective event dates.



multiply the estimated cumulative abnormal return based on the value-weighted index with the total market value of the portfolio. The total market value of the stocks in the portfolio equals 3.15 billion guilders at the end of 1939 and 4.05 billion guilders at the end of 1941. Based on the conservative value-weighted CAR estimates of -6.1 per cent in 1940 and -2.8 per cent in 1942, the estimated losses of firm value around these events therefore amount to 192 million guilders and 113 million guilders, respectively. We conclude that the announcement of increased corporate taxes of November 1940, and the publication of the new corporate tax in May 1942, jointly cost Dutch investors over $f300$ million. This amount is in the order of magnitude of 5 per cent of the annual Dutch GDP in the 1940s (see table A1, panel A).

One way to validate our estimate of the amount of lost firm value is to compare it with the tax revenues reported in panel B of table A1. The sum of profit taxes and corporate taxes paid equals $f1.189$ billion (for all Dutch limited liability corporations and including non-listed, financial, and colonial firms). The total book value of equity of all limited liability corporations at the end of 1939 equals $f8.72$ billion, whereas that of our sample equals $f3.24$ billion.⁵⁹ If we assume that the tax burden on our sample of firms is representative of the universe of corporations, the total amount paid in terms of profit and corporate taxes by our sample of firms is therefore estimated to have been $f442$ million up until 1948, which suggests that our estimate ($f300$ million) is in the correct range. An alternative, more direct way to measure the increase of the tax burden is to sum the tax payments that firms document in their accounts. Unfortunately, only a small number of firms explicitly report the amount of profit tax or corporate tax paid. We search all profit and loss statements and profit distributions in our database for tax entries that can, by their description, clearly be earmarked as relating to these two types of taxes. From 1940 to 1948, a total of 61 financial statements report such entries, at an average value of $f188\,920$. If we make the assumption that these 61 observations are representative of the sample as a whole, this would bring the total tax bill of profit and corporate taxes for our sample to around 355 million guilders for the period 1940–8. Again, this is somewhat larger than the estimated loss of firm value that we find in our event study. This exercise suggests, as before, that the estimated loss of firm value of $f300$ million is a lower bound estimate, and in the right order of magnitude.

Although the shareholders of Dutch companies faced a loss, this might have been partially compensated by a gain in the value of holdings of Dutch state bonds, in case the expected additional tax revenues reduce the default risk on the bonds. To investigate this, we collect the yields for a 3 per cent 1938 Dutch State Loan at a monthly frequency and examine the yield changes around our events. We find a significant reduction in the Dutch yields for both events. However, this effect does not seem to persist past the first month following the announcement (the results are reported in the online appendix, table A2 and figures A1 and A2). This implies that the loss of equity value is not offset by a gain on government bonds, except in the immediate short term.

Having established an aggregate loss of firm value in response to the two tax announcements, we proceed to study how this loss varied across firms. This variation shows which firms lost most value upon the news of increased taxes and can be related to these firms' characteristics. This approach allows us to determine whether investors expected that the tax hikes would be more damaging to some firms than others, for instance, to those firms that were most profitable or that had less scope to create tax shields. To estimate firm-level cumulative abnormal returns, we follow Schipper and Thompson and estimate the following model as a set of seemingly unrelated

⁵⁹ See CBS, *Jaarcijfers voor Nederland*, Table VIII.4.



regressions (SUR).⁶⁰

$$r_{it} = \alpha_i + \beta_i r_{mt} + \sum_t^K \gamma_{it} \delta_t + \epsilon_{it}. \quad (3)$$

Variables in Equation (3) are defined in an analogous way to those of Equation (1), and thus we can define $\mu_i \equiv \sum_{t \in K} \gamma_{it}$ as the estimated cumulative abnormal return of firm i . We estimate the firm-level CARs separately for event I and event II. We then regress the estimates of CAR on firms' financial characteristics. For event I of November 1940, we therefore estimate the following model:

$$\hat{\mu}_{i,I} = \alpha + \beta X_{i,1939} + \epsilon_i. \quad (4)$$

Here, $X_{i,1939}$ is a vector of firm-level financial indicators which serve as determinants of the cumulative abnormal returns. These indicators are measured at the end of the preceding accounting year, which for the 1940 event is 1939. For the second event in 1942, the model of Equation (4) is estimated analogously by using financial indicators from 1941 as the determinants. We estimate the model as a weighted least squares (WLS) regression, where the weights are the inverse of the standard error of each CAR's estimate from Equation (3), to give more weight to cumulative abnormal returns that are estimated with more precision. In all models, we include a full set of industry fixed effects.

In addition to firm size, we include the following explanatory variables. Firstly, we include leverage (total debt over total assets) to study whether investors take account of existing debt tax shields in their price reaction.⁶¹ Secondly, we include tangibility, profitability, dividend yield, and the market-to-book ratio, as variables that all capture the financial performance of firms, either currently or as expected for future years. Thirdly, we include the variables 'accounting conservatism' (a dummy variable that equals one if any of the fixed assets on a firm's balance sheet is valued at 10 guilders or less, reflecting a conservative approach to valuing fixed assets), liquidity, and depreciation, as measures of the composition of firms' assets. Lastly, we include a dummy for stocks that trade on less than 40 per cent of the days within the estimation window, to control for the fact that stock prices of these firms may not change regularly enough to immediately incorporate the tax announcements. Based on this criterion, around 28 per cent of all stocks classify as having limited trading activity. Table 2, panel A, presents the descriptive statistics of these explanatory variables for both events, whilst panel B shows the regression outcomes. We run the models for the full sample and a subset without the accounting conservative firms because this may distort the measurement of financial variables.

For the announcement of November 1940, we find that profitability and limited trading have a positive effect: a smaller loss of stock market value. These results are also found for May 1942. We explain the positive coefficient for profitability by debt capacity. Firms with higher net profits have more financial flexibility to issue additional debt, which may offset tax payment. The result that firms of which the stocks were less frequently traded lose less value is most likely a mechanical

⁶⁰ Schipper and Thompson, 'The impact of merger-related regulations'. See also Doidge and Dyck, 'Taxes and corporate policies'.

⁶¹ Ibid.; Faccio and Xu, 'Taxes, capital structure choices'.

**TABLE 2** Determinants of cumulative abnormal returns**Panel A: explanatory variables**

Year = 1939	1939		1941	
	Mean	Standard deviation	Mean	Standard deviation
Leverage	33.2%	20.1%	33.1%	20.3%
Firm size (log)	14.8	1.3	14.6	1.2
Tangibility	0.4	0.3	0.3	0.3
Profitability	5.4%	8.6%	5.4%	5.9%
Dividend yield	6.6%	8.4%	2.9%	2.7%
Market-to-book	0.98	0.82	1.77	1.03
Accounting conservatism	0.078	0.269	0.082	0.276
Liquidity	25.6%	16.9%	26.6%	17.9%
Depreciation	3.1%	3.3%	2.3%	2.4%
Limited trading activity	0.281	0.451	0.348	0.478

Panel B: determinants of cumulative abnormal returns, WLS CAR (0,3)

	9 November 1940		5 May 1942	
	Full sample	Excluding conservatism	Full sample	Excluding conservatism
Leverage	-0.008 (-0.391)	-0.009 (-0.413)	0.030* (1.809)	0.033* (1.781)
Firm size (log)	-0.008 (-1.424)	-0.007 (-1.088)	0.000 (0.059)	0.000 (0.010)
Tangibility	0.015 (0.783)	0.013 (0.639)	0.002 (0.125)	0.002 (0.126)
Profitability	0.156* (1.849)	0.172** (1.986)	0.256*** (3.971)	0.222*** (3.020)
Dividend yield	0.051 (1.142)	0.045 (1.003)	-0.222** (-2.470)	-0.197** (-2.167)
Market-to-book	0.002 (0.421)	0.002 (0.292)	-0.009* (-1.882)	-0.007 (-1.453)
Accounting conservatism	-0.018 (-1.397)		0.028** (2.373)	
Liquidity	-0.001 (-0.028)	-0.010 (-0.357)	-0.021 (-1.117)	-0.019 (-0.929)
Depreciation	-0.052 (-0.357)	-0.060 (-0.401)	0.072 (0.411)	0.058 (0.330)
Limited trading activity	0.033*** (3.017)	0.034*** (2.875)	0.017** (2.103)	0.016* (1.961)
Observations	146	134	135	125
Industry fixed effects	Yes	Yes	Yes	Yes
R ²	0.313	0.300	0.302	0.273

(Continues)

**TABLE 2** (Continued)

Note: This table presents the determinants of the abnormal returns. Panel A provides descriptive statistics (means and standard deviations) for the years preceding the year of the announcement, 1939 and 1941. Leverage is total debt scaled by total assets. Firm size is the logarithm of total assets in constant 1938 guilders. Profitability is net profits scaled by total assets. The dividend yield is the total dividend scaled by the market value of equity. Market-to-book is the ratio of the market and book values of equity (per 31 December). Accounting conservatism is a dummy variable with a value of one if the firm has fixed assets with a value below 10 guilders on the balance sheet, and zero otherwise. Liquidity is cash holdings scaled by total assets and depreciation is also scaled by total assets. Limited trading activity is a dummy that equals one if a stock trades less than 40% of days in the respective estimation window, and zero otherwise. All data are taken from Van Oss' Effectengids and the Financieel Jaarboek. Non-dummy variables are winsorized at the 2% level. Panel B presents the weighted least squares (by the standard error of the abnormal returns) estimation of Equation (4), explaining the cumulative abnormal return for the window [0,3] using the Third Reich index as the benchmark. The estimations include industry fixed effects (not reported). For each event window we estimate our models for a subsample where we exclude firms with conservative depreciation policies using the variable accounting conservatism. *t*-Values are in parentheses (***, **, and * indicate 1%, 5%, and 10% significance, respectively), and all standard errors are clustered at the firm level.

Source: Authors' calculations.

consequence of the fact that some of these stocks simply do not change price at all during the event window.

The results for May 1942 indicate that leverage is positively associated with the CAR. That is, firms with more debt lose less value. This is also in line with the presence of debt tax shields. Firms with large amounts of debt will be able to generate ample debt tax shields for years ahead, and apparently this is priced by investors. In the presence of corporate taxes, an increase in leverage will reduce a firm's cost of capital and will increase firm value due to the interest cost deductibility from the taxable profits.⁶² For May 1942 the coefficient of dividend yield is negative, which means that shareholders of firms that were paying more dividends may have feared that their dividends would be cut owing to the tax effects, despite the typical policy of stable dividends in this period.⁶³ Accounting conservatism is also significant and positive, which implies that firms that deliberately and openly undervalue their assets have less negative CARs. This is inconsistent with limited options to depreciate, and signals the market's appreciation of firms' willingness to depreciate future assets rapidly and to create non-debt tax shields. The results for a subsample of firms without accounting conservatism are similar. Our model is able to explain between 27.3 per cent and 31.3 per cent of the variation in abnormal returns.

IV | TAX EFFECTS ON DEBT

The new taxes on corporations will of course have affected not just their investors but also, and perhaps most importantly, the corporations themselves. Barring outright tax evasion, Dutch firms in the 1940s could resort to a number of strategies to reduce the corporate tax bill. On the basis of contemporary fiscal literature, guides and manuals, and annual reports of stock market listed firms, we identify two main strategies that firms had available to avoid the corporate tax.⁶⁴

⁶² Doidge and Dyck, 'Taxes and corporate policies'; Faccio and Xu, 'Taxes, capital structure choices'.

⁶³ de Jong et al., 'Catering and dividend policy'.

⁶⁴ A third strategy open to firms would be to change their legal corporate form. Since the 1942 corporate tax only applied to limited liability corporations, changing to an unlimited liability corporate form, such as a partnership, would no longer make the firm liable to corporate taxation. For the listed firms in our sample, changing to an alternative legal form



The first strategy we observe is the use of discretionary adjustments to the reported profit. We refer to this set of strategies as earnings management.⁶⁵ Even though the 1942 corporate tax contained a more restrictive set of rules regarding the calculation of profits than the preceding 1940 profit tax, the corporate tax still left room for discretion, particularly in the valuation of two types of balance sheet categories: (1) reserves and provisions and (2) fixed assets. In terms of fixed assets, a viable approach to decrease the reported level of profits would be to increase the depreciation on fixed assets.⁶⁶ Likewise, by increasing the level of tax-deductible reserves and provisions, firms could generate additional expenses to decrease profits. In addition to reserves directly related to the fiscal treatment of pre-1940 retained earnings, the reservation of funds for payments to staff members was a key way to increase costs whilst keeping the money within the firm.⁶⁷

The second profit-decreasing strategy that firms could employ was to attract debt, thereby generating interest expenses. The corporate tax law of 1942, similar to almost all corporate tax laws, allowed for the deductibility of interest expenses, in contrast to dividends or other payments on equity. This debt tax shield was first formalized by Modigliani and Miller in 1963,⁶⁸ but already known in the 1940s. In 1946, the Dutch economist Meij writes:

In addition, a large importance [for changes in capital structures] can be attached to the increase of taxes that took place in recent years. Financing through bonds implies a decrease of the taxable profit. After all, the interest expenses from bonds are deducted from profits; dividends paid to shareholders form a part of the taxable profit.⁶⁹

To assess to what extent firms have applied earnings management and adjusted their capital structures, we study the development over time of the main financial variables and accounting categories. Table 3 provides yearly information about firm's key financial characteristics for the full sample.

Table 3 demonstrates that the net profitability relative to total assets was relatively high in 1940 and 1941, and then declined during the war. The post-war profits are higher again, above

will not have been a viable option, as it would imply delisting and the introduction of unlimited liability for all partners/shareholders. In fact, the only firm that delisted and changed to an unlimited liability form in our sample was the textile manufacturer *Vitrage-Weverij Anglo-Holland (Van Oss Effectenboek 1947/48, pp. 473–5)*. As this reorganization takes place only in 1945 it is questionable whether this was driven primarily by fiscal motives.

⁶⁵ Dechow et al., 'Detecting earnings management'; Burgstahler and Dichev, 'Earnings management to avoid earnings decreases and losses'; Healy and Wahlen, 'A review of the earnings management literature'.

⁶⁶ That depreciation costs played a key role in earnings management at the time is confirmed by Meij (*Weerstandsvermogen en financieele reorganisatie van ondernemingen*, pp. 96–7): '[it] cannot be denied that the level of depreciation is strongly related to the amount that one would like to see as profit and potentially as loss'. Translation from the Dutch original by the authors.

⁶⁷ One illustration of the role of fiscal incentives in these types of reservations is provided by the 1940/41 annual report of the textile firm *Vereenigde Nederlandsche Kleermakerijen* which mentions that 'f100.000 [will be allocated] to a fund for members of staff, provided that the tax administration decides that this allocation will be seen as an operating expense for the purpose of the calculation of taxable profits'. *Van Oss* (1942, p. 734). Translation from the Dutch original by the authors.

⁶⁸ Modigliani and Miller, 'Corporate income taxes'.

⁶⁹ Meij, *Weerstandsvermogen en financieele reorganisatie van ondernemingen*, p. 65. Translation from the Dutch original by the authors.



TABLE 3 Development of key variables, 1938–48

Panel A: full sample											
	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
Profitability	2.6%	5.4%	7.9%	5.4%	2.8%	2.0%	−0.8%	−1.5%	6.3%	6.3%	6.3%
Leverage	33.0%	33.2%	34.3%	33.1%	30.6%	27.6%	25.5%	32.2%	38.7%	42.0%	41.5%
Maturity	27.6%	27.5%	25.1%	24.8%	21.6%	18.6%	17.8%	21.9%	21.5%	19.8%	21.0%
Tangibility	37.8%	35.6%	33.6%	32.0%	31.2%	26.5%	27.8%	27.8%	24.0%	22.5%	24.1%
Depreciation	3.1%	3.5%	2.9%	2.5%	2.2%	1.8%	1.8%	1.6%	2.2%	2.6%	3.3%
Additions to staff and pension funds	0.1%	0.2%	0.3%	0.3%	0.3%	0.3%	0.1%	0.1%	0.3%	0.4%	0.4%
Provisions and bad debt provisions	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total discretionary accruals	3.3%	3.8%	3.4%	3.0%	2.5%	2.2%	2.0%	1.9%	2.6%	3.2%	3.8%
Panel B: pre-change leverage											
	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
<i>Normal pre-change leverage</i>											
Profitability	3.3%	6.1%	8.5%	6.0%	2.8%	2.1%	−1.1%	−2.2%	6.2%	7.0%	6.6%
Leverage	22.8%	24.7%	25.8%	24.4%	22.8%	20.2%	19.8%	27.0%	33.3%	37.3%	36.9%
Maturity	23.7%	24.5%	20.6%	20.2%	17.5%	14.9%	13.8%	16.1%	18.5%	17.5%	19.2%
Tangibility	33.6%	33.4%	30.8%	28.7%	28.1%	24.5%	25.3%	24.1%	22.0%	19.3%	21.4%
Depreciation	3.0%	3.4%	2.7%	2.3%	2.2%	1.8%	1.9%	1.5%	2.1%	2.8%	3.5%
Additions to staff and pension funds	0.2%	0.1%	0.3%	0.3%	0.3%	0.4%	0.1%	0.1%	0.3%	0.5%	0.4%
Provisions and bad debt provisions	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Total discretionary accruals	3.3%	3.8%	3.1%	2.7%	2.5%	2.3%	2.1%	1.8%	2.6%	3.3%	4.0%
<i>High pre-change leverage</i>											
Profitability	0.3%	3.3%	6.0%	3.8%	2.7%	1.6%	−0.9%	−0.1%	6.1%	3.9%	5.0%
Leverage	64.5%	62.3%	61.6%	59.5%	53.7%	52.8%	48.1%	49.3%	58.8%	60.4%	58.6%
Maturity	39.8%	37.4%	39.6%	38.5%	33.8%	24.9%	25.6%	35.8%	28.5%	25.8%	39.8%
Tangibility	50.7%	43.0%	42.7%	42.0%	40.5%	30.1%	36.4%	38.3%	29.3%	29.3%	30.2%
Depreciation	3.1%	3.8%	3.6%	3.2%	2.2%	2.0%	1.8%	2.1%	2.9%	2.7%	3.4%
Additions to staff and pension funds	0.1%	0.2%	0.3%	0.3%	0.3%	0.2%	0.1%	0.0%	0.2%	0.2%	0.3%
Provisions and bad debt provisions	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Total discretionary accruals	3.2%	4.1%	4.0%	3.8%	2.5%	2.1%	1.9%	2.5%	3.1%	3.0%	3.8%

(Continues)



TABLE 3 (Continued)

Panel C: pre-change tangibility											
	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
<i>Normal pre-change tangibility</i>											
Profitability	3.2%	6.5%	9.2%	6.1%	3.1%	2.0%	-1.0%	-2.2%	6.4%	6.7%	6.8%
Leverage	30.1%	31.3%	31.7%	30.8%	28.2%	25.4%	23.7%	29.8%	38.0%	43.3%	42.0%
Maturity	18.4%	19.4%	16.3%	14.8%	12.2%	10.1%	9.7%	11.4%	13.4%	11.7%	14.2%
Tangibility	25.1%	23.8%	22.6%	21.1%	21.5%	19.9%	19.9%	17.9%	15.9%	14.0%	15.1%
Depreciation	3.0%	3.7%	3.0%	2.5%	2.2%	1.8%	1.8%	1.6%	2.2%	2.6%	3.5%
Additions to staff and pension funds	0.1%	0.1%	0.3%	0.3%	0.3%	0.4%	0.1%	0.1%	0.3%	0.4%	0.4%
Provisions	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Total discretionary accruals	3.3%	4.0%	3.4%	3.0%	2.5%	2.3%	2.1%	2.0%	2.7%	3.2%	4.0%
<i>High pre-change tangibility</i>											
Profitability	0.5%	1.7%	2.8%	2.8%	1.5%	1.9%	-1.3%	0.2%	5.3%	4.8%	4.5%
Leverage	42.7%	39.8%	44.9%	42.5%	40.1%	39.6%	37.1%	40.3%	42.1%	39.0%	40.4%
Maturity	57.5%	55.5%	61.2%	65.1%	60.1%	57.2%	46.4%	54.2%	47.0%	46.2%	43.0%
Tangibility	79.0%	76.7%	79.2%	76.5%	71.2%	59.1%	62.3%	61.9%	51.1%	48.2%	51.8%
Depreciation	3.1%	2.9%	2.8%	2.6%	2.3%	2.2%	1.9%	1.8%	2.6%	3.3%	3.5%
Additions to staff and pension funds	0.2%	0.2%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.3%	0.3%	0.2%
Provisions	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total discretionary accruals	3.3%	3.2%	3.1%	2.8%	2.5%	2.2%	2.0%	2.0%	2.9%	3.7%	3.8%

Notes: This table describes the annual development of firms' key financial characteristics. Panel A presents the full sample (256 firms and 1881 firm-years). Panel B separately reports these figures for all the firms with normal pre-change leverage (166 firms and 1354 firm-years) and all the firms with top quartile pre-change leverage (55 firms and 408 firm-years). Panel C distinguishes firms with normal pre-change tangibility (166 firms and 1394 firm-years) and firms with top quartile pre-change tangibility (55 firms and 368 firm-years). Leverage is total debt scaled by total assets. Maturity is long-term debt scaled by total debt. Profitability is net profits scaled by total assets. Tangibility is fixed assets, scaled by total assets. Depreciation is scaled by total assets. Additions to staff funds includes all funds that are added to staff-related liabilities, including pension funds, scaled by total assets. Provisions include all funds that are added to non-staff related provisions, including bad debts, scaled by total assets. Total discretionary accruals is the sum of depreciation, additions to staff funds, and provisions. All data are taken from Van Oss Effectengids, Van Nierop en Baak, and the Financieel Jaarboek.

Source: Authors' calculations.

6 per cent of total assets. Leverage, which is total debt scaled by total assets, develops predictably. It is fairly constant with a minor drop towards the end of the war, and then increases. This result is consistent with the use of debt as a tax shield. We will investigate this effect later in detail.

Table 3 allows us to observe earnings management. The development of depreciation costs over time has a U-shaped pattern. Costs made for staff and pension funds increase largely monotonically throughout the full period, with the main exception again being the two final years of the war. These cost categories remain very small throughout the full period. We refer to the sum of



depreciation, staff and pension funds, and bad debt provisions as 'discretionary accruals'. This sum remains very small throughout the full period, and is particularly small during the war itself. The tax effects on earnings management, if any, are therefore unlikely to have been of any economic importance.

The introduction of the 1942 corporate tax may have also induced firms to change their capital structure. In the modern finance literature, firms are considered to make a trade-off between the benefits of the debt tax shield and the costs of increased bankruptcy risks from increased debt usage.⁷⁰ Furthermore, whilst increasing leverage has the benefit of increasing the value of the firm's debt tax shield, firms might also have a preference to preserve debt capacity,⁷¹ or they may prefer the use of internally generated funds.⁷² We expect that considerations of bankruptcy costs, the preservation of debt capacity, and the use of internal funds will have been relevant throughout the full 1938–48 period. However, tax shield considerations are only relevant in the period from 1942 onwards.

When examining the impact of the tax changes, ideally we would be able to identify a group of firms in the Dutch economy that were left unaffected. Unfortunately, no such group exists. However, we do not expect that all firms will be equally affected by the introduction of corporate taxes. Firms that have high leverage before the introduction of corporate taxes will benefit much less from additional debt financing for two reasons. First, the costs of more debt will be higher due to increased bankruptcy and agency costs of debt. Second, these firms will already be able to deduct interest expenses from their profits and might exhaust the deductibility through non-debt tax shields.⁷³ In other words, we expect that the tax benefit of debt will have the strongest effect on firms with relatively low leverage, whilst highly levered firms will exhibit no or a minor effect. We use this distinction to identify high-leverage firms as a quasi-control sample, and expect to observe treatment effects for the other firms, which we call 'normal leverage' firms. We define high-leverage firms as the firms whose leverage lies in the upper quartile in the period 1938–41.

An important limitation of this identification strategy is that studies into the dynamics of leverage have documented mean reversion, mainly because of target adjustment.⁷⁴ Therefore, we expect that, in the absence of the tax change, high-leverage firms will reduce debts, whilst the other firms are more likely to increase leverage. For this reason we apply a second identification approach based on firm tangibility. In the traditional Dutch literature on corporate funding, firms with more tangible assets were recommended to take more debt.⁷⁵ Although there was no theoretical basis, these practical guidelines are consistent with lower bankruptcy costs because of the

⁷⁰ Taggart, 'A model of corporate financing decisions'; Marsh, 'The choice between equity and debt'; Jalilvand and Harris, 'Corporate behaviour in adjusting'; Auerbach, 'Real determinants of corporate leverage'; T. C. Opler and S. Titman, 'The debt-equity choice'.

⁷¹ Viswanath, 'Strategic considerations'; Lemmon and Zender, 'Debt capacity and tests of capital structure theories'; X. S. Chang and S. Dasgupta, 'Financing the deficit'.

⁷² Myers, 'The capital structure puzzle'; Myers and Majluf, 'Corporate financing and investment decisions'; Lemmon and Zender, 'Debt capacity and tests of capital structure theories'.

⁷³ DeAngelo and Masulis, 'Optimal capital structure'.

⁷⁴ Flannery and Rangan, 'Partial adjustment towards target capital structures'; Byoun, 'How and when do firms adjust?'.

⁷⁵ De Jongh, *Beschouwingen*.



collateral value of the assets.^{76,77} Deloof and van Overfelt analyse a sample of 129 Belgian firms in the years 1905–9 in a setting without corporate taxes, and consistently find that asset tangibility has a positive effect on leverage.⁷⁸ Firms with high tangibility can obtain debt at favourable terms from financial institutions and in public markets, as mortgaged loans. In our setting, firms with high tangibility (in the upper quartile of tangibility) are a good quasi-control sample, under two conditions. First, before the 1942 tax revision, the debt in the control sample of high-tangible firms and the treatment sample of other firms should develop in parallel. Of course, the debt levels can differ, but this difference should not change until 1942. Second, after 1942 ideally the control sample has a stable debt ratio, whilst the treatment sample is experiencing the predicted increase in leverage. Both conditions are testable and will be discussed.

In panels B (leverage) and C (tangibility) of table 3, we present the key characteristics of the various samples, and figure 1 shows the development of leverage for our samples.

Panel B of table 3 and figure 1a reveal that the firms in the upper quartile of leverage before 1942 have around 60 per cent leverage. These firms experience a reduction in leverage in 1942–5, which bounced back to around 60 per cent after the war. This is a striking result because the expected downward adjustment is most likely compensated by the new tax benefits. The sample of normal-leverage firms shows an increase in leverage from 1945 onwards.

Panel C of table 3 and figure 1b show that the sub-sample of high-tangibility firms has higher and constant leverage in the years 1938–41 – 39.8–44.9 per cent – whilst the other sample has lower leverage – 30.1–31.7 per cent. Although leverage does not increase immediately after 1942, by 1946 the treatment sample has caught up, in comparison with the control group. In further analyses we will show that this result is economically and statistically significant and holds in a multivariate setting.

Using this control sample approach we estimate the following difference-in-differences model:

$$D_{it} = \beta_0 + \beta_1 \text{Period}_t * \text{Normal leverage}_{it} + \beta_2 \text{Period}_t * \text{High leverage}_{it} + \beta_3 X_{it} + \epsilon_{it}. \quad (5a)$$

Here, D_{it} is the leverage ratio, defined as total debt to total assets, for firm I in year t . Period_t is a dummy for a period after introduction of corporate tax. $\text{Normal leverage}_{it}$ is a dummy for the first, second, and third quartile in tangibility, whilst $\text{High leverage}_{it}$ is a dummy for the control sample of firms (firms with the highest tangibility). We hypothesize that β_1 is positive because this coefficient captures the additional change in leverage after the introduction of corporate taxes for the sample of treatment firms, compared with the control group.

⁷⁶ The approach to finance tangible fixed assets with debt has been well established in the literature about tangible assets and their collateral values (Rajan and Zingales, 'What do we know'; Rampini and Viswanathan, 'Collateral and capital structure'). Writings in the early twentieth century also point in this direction. In Burtchett's corporate finance textbook from 1934, the capital structure decision is part of a financial plan, which is firstly based on the nature of the assets (Burtchett, *Corporation finance*). The book provides simple guidelines: 'The ratio of the fixed or permanent assets to the total will be the upper limit to which the bonded debt may be raised'. (page 351). Academics in the Netherlands followed the international ideas closely, and in particular German and American writers were thought leaders. De Jongh developed influential ideas (de Jongh, *Beschouwingen*). He argues that fixed asset maturity should be matched with debt maturity. Subsequent writings refer to this work, such as the widely used textbook of Polak, *Eenige grondslagen*.

⁷⁷ Rajan and Zingales, 'What do we know'; de Jong et al., 'Capital structure around the world'; Frank and Goyal, 'Capital structure decisions'.

⁷⁸ Deloof and van Overfelt, 'Were modern capital structure theories valid?'

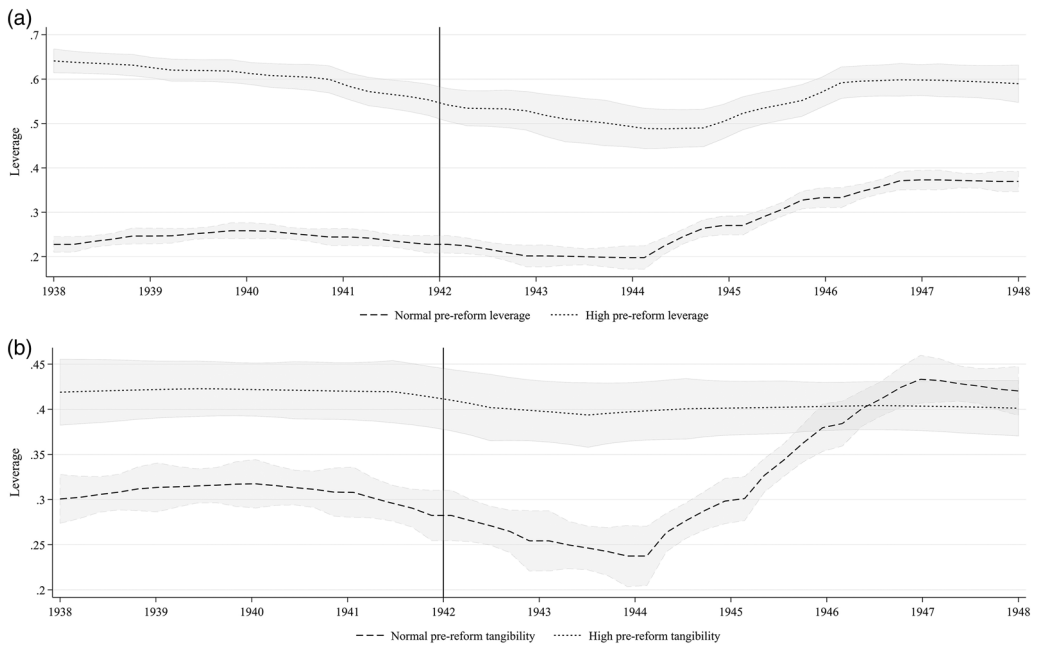


FIGURE 1 Evolution of leverage by pre-change leverage levels. This figure plots results from a univariate nonparametric local mean smoothing using kernel weighted means (see, for example, Koudijs *et al.*, ‘For richer, for poorer’). The grey shaded areas indicate the 90 per cent confidence bands. In panel A, we identify two separate groups by calculating the fourth quartile pre-tax change leverage. The firms with fourth quartile pre-tax change leverage are our control group, versus all other firms with normal pre-tax change leverage. The solid vertical line marks the change in taxation. In panel B, we identify two separate groups by calculating the fourth quartile pre-tax change tangibility. The firms with fourth quartile pre-tax change tangibility are our control group, versus all other firms with normal pre-tax change tangibility. The solid vertical line marks the change in taxation.

Source: Authors’ calculations.

We repeat this approach for tangibility:

$$D_{it} = \beta_0 + \beta_1 \text{Period}_t * \text{Normal tangibility}_{it} + \beta_2 \text{Period}_t * \text{High tangibility}_{it} + \beta_3 X_{it} + \epsilon_{it}. \quad (5b)$$

Here, tangibility determines the sample of treatment firms, and *Normal tangibility*_{it} is a dummy for the first, second, and third quartile in tangibility, whilst *High tangibility*_{it} is a dummy for the control sample of firms.

We include industry fixed effects in our models because different industries were very differently affected by the circumstances of the war, such as resource scarcity, trade restrictions, or price controls.⁷⁹ The independent variables that we include are profitability, the market-to-book ratio, firm size (the natural logarithm of total assets, deflated to 1938 prices using the CBS wholesale price index),⁸⁰ a measure of dividend policy (a dummy which equals one if a firm pays dividends),

⁷⁹ Klemann, *Nederland 1938–48*.

⁸⁰ Note that this price index reflects official prices. During the Second World War, several markets were subject to price controls. Hence, consumer prices on the black market often rose substantially above the official level (*ibid.*).



and a series of variables relating to the composition of assets: liquidity (current assets excluding inventory over total assets), depreciation (depreciation costs from the profit and loss statement over total assets), and an accounting conservatism dummy (equals one if a firm depreciates assets to a book value below $f10$, which reflects a conservative valuation policy of fixed assets, zero otherwise). This set of independent variables contains all the controls typically used in leverage models, to the extent that data are available for such variables for our sample. We winsorize all non-dummy variables at the 1st and 99th percentiles to minimize the influence of outliers. Tables 4 and 5 show the regression outcomes with the determinants of leverage.

In table 4 the full sample results show that leverage in the treatment group increases by 9.2 percentage points in 1942–5 and another 4.7 percentage points to 13.9 in 1946–8. This is an economically and statistically significant increase. In the high-leverage sample there is a decrease of 10.5 percentage points in the war years, but this is undone in 1946–8. In additional tests we show that these effects are robust. First, we exclude unpaid taxes from the debt measure because these are only found after 1942. Second, we select firms with more than six observations. Third, we exclude firms with conservative accounting policies because the measurement of financial ratios is affected by such policies. Finally we include the market-to-book ratio, for which we have missing observations, as an additional control. In all robustness analyses the results remain unchanged.

In table 5 we repeat the analyses, but use the high-tangibility group as a control sample. The first column in table 5 shows that, conditional on the values of the control variables, for firms with normal tangibility, leverage is 9.9 percentage points higher in the period after the war (1946–8) than in the period 1938–41. The average leverage ratio of 33.4 per cent for the 1938–41 period corresponds to a relative increase of around 30 per cent. There is no material effect for the control group. This shows that, in the presence of corporate taxes, firms attract substantially more debt. The additional robustness tests show similar results. In figure 2, we present annual estimates for the effects in the control and treatment groups.

Figure 2 shows that the control samples (leverage in 2-A and tangibility in 2-B) always exhibit a temporary reduction in leverage in the war years. This indicates that financial markets were distorted and access to debt was limited. However, after the end of the war, leverage returns to normal pre-war high levels. For the treatment groups, we observe that, as soon as the war ends, the leverage increases to levels that are significantly above the pre-war levels.⁸¹ In the [online appendix \(section A3\)](#) we test the assumptions underlying our quasi-control groups.

V | EFFECTS OF DEBT AND TAX ON CORPORATE INVESTMENT

When firms decide on new investments, they discount future cash flows at the firm's cost of capital. Finance theory argues that, absent of corporate taxes, the capital structure does not affect investment.⁸² However, in the presence of taxes, firms with more debt have lower costs of capital and will invest more.⁸³ In this final section we estimate investment models with our Dutch wartime data. We predict that, after 1942, leverage is positively related to investment.

⁸¹ In an additional analysis, we find that firms with normal leverage levels prior to the tax change increase their maturity by approximately 7 per cent. This effect is marginally statistically significant. When using our alternative control group (high tangibility), we do not find similar effects because the high-tangibility firms already have a long maturity owing to the nature of the assets financed with the debt. We provide these results in the online table A3.

⁸² Modigliani and Miller, 'The cost of capital'.

⁸³ Modigliani and Miller, 'Corporate income taxes'.

**TABLE 4** Determinants of leverage (high leverage control)

	Leverage		Leverage	Excluding	Including
	Full	(excluding	(<i>N</i> > 6)	conservatism	market-to-book
	sample	unpaid taxes)		firms	
[42–45] × normal pre-change leverage	0.092*** (3.724)	0.088*** (3.582)	0.086*** (3.342)	0.075*** (3.043)	0.078*** (2.829)
[46–48] × normal pre-change leverage	0.139*** (5.251)	0.135*** (5.000)	0.137*** (4.769)	0.123*** (4.603)	0.134*** (4.899)
[42–45] × high pre-change leverage	−0.105*** (−4.783)	−0.103*** (−4.614)	−0.104*** (−4.543)	−0.089*** (−4.071)	−0.107*** (−3.885)
[46–48] × high pre-change leverage	−0.015 (−0.617)	−0.014 (−0.564)	−0.011 (−0.401)	0.005 (0.221)	−0.012 (−0.466)
High pre-change leverage	−0.360*** (−19.640)	−0.358*** (−19.446)	−0.350*** (−16.890)	−0.347*** (−19.215)	−0.353*** (−18.831)
Profitability	−0.156** (−2.037)	−0.177** (−2.339)	−0.173* (−1.857)	−0.233*** (−3.008)	−0.172** (−2.087)
Market-to-book					0.009 (0.861)
Firm size (log)	0.022*** (3.088)	0.022*** (3.096)	0.025*** (3.020)	0.027*** (3.400)	0.021** (2.586)
Dividends (0/1)	0.018 (1.435)	0.016 (1.250)	0.015 (1.128)	0.013 (0.973)	0.015 (1.141)
Liquidity	−0.044 (−1.269)	−0.049 (−1.392)	−0.049 (−1.260)	−0.076** (−2.056)	−0.041 (−1.117)
Depreciation	−0.191 (−0.729)	−0.154 (−0.590)	−0.067 (−0.222)	−0.200 (−0.744)	−0.188 (−0.691)
Accounting conservatism	−0.090*** (−3.318)	−0.090*** (−3.301)	−0.089*** (−2.812)		−0.088*** (−3.160)
Observations	1762	1762	1560	1614	1608
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted <i>R</i> ²	0.514	0.511	0.510	0.514	0.510

Notes: This table shows a regression model explaining leverage following Equation (5a) with industry-fixed effects and firm-level clustered standard errors. *t*-Values are in parentheses (***, **, and * indicate 1%, 5%, and 10% significance, respectively). Leverage is total debt scaled by total assets. Profitability is net profits scaled by total assets. Market-to-book is the ratio of the market and book values of equity (per 31 December). Firm size is the logarithm of total assets in constant 1938 guilders. The dummy ‘dividends’ has a value of one if the firm pays dividends and zero otherwise. Liquidity is cash holdings scaled by total assets and depreciation is also scaled by total assets. Accounting conservatism is dummy variable with value of one if the firm has fixed assets with a value below 10 guilders in the balance sheet, and zero otherwise. Non-dummy variables are winsorized at the 2% level. All data are taken from Van Oss Effectengids, Van Nierop en Baak, and the Financieel Jaarboek. The first model uses the full sample. The second model excludes unpaid taxes from the leverage definition. The third model only includes firms in the sample that have more than six observations during our sample period. In the fourth model we exclude firms with conservative depreciation policies. The fifth model includes our market-to-book measure.

Source: Authors’ calculations.

**TABLE 5** Determinants of leverage (high tangibility control)

	Full sample	Leverage (excluding unpaid taxes)	Leverage (N > 6)	Excluding conservatism firms	Including market-to- book
[42–45] × normal pre-change tangibility	−0.017 (−0.670)	−0.017 (−0.691)	0.002 (0.097)	−0.024 (−0.931)	−0.032 (−1.043)
[46–48] × normal pre-change tangibility	0.099*** (3.640)	0.095*** (3.525)	0.065** (2.208)	0.089*** (3.192)	0.086*** (3.227)
[42–45] × high pre-change tangibility	−0.023 (−1.091)	−0.022 (−1.036)	−0.038* (−1.791)	−0.012 (−0.594)	−0.026 (−0.943)
[46–48] × high pre-change tangibility	0.015 (0.582)	0.016 (0.627)	0.044 (1.639)	0.034 (1.351)	0.021 (0.782)
High pre-change tangibility	0.138*** (3.538)	0.136*** (3.504)	0.154*** (3.521)	0.129*** (3.269)	0.125*** (3.080)
Profitability	−0.279** (−2.407)	−0.299*** (−2.609)	−0.245* (−1.711)	−0.375*** (−3.565)	−0.306** (−2.397)
Market-to-book					0.020 (1.057)
Firm size (log)	0.034*** (3.099)	0.035*** (3.107)	0.040*** (2.968)	0.041*** (3.488)	0.032** (2.532)
Dividends	0.020 (1.145)	0.018 (1.020)	0.018 (0.958)	0.015 (0.778)	0.016 (0.844)
Liquidity	−0.047 (−0.913)	−0.052 (−1.004)	−0.054 (−0.944)	−0.108* (−1.956)	−0.046 (−0.886)
Depreciation	0.089 (0.272)	0.123 (0.379)	0.372 (1.000)	0.136 (0.407)	0.040 (0.117)
Accounting conservatism	−0.067* (−1.670)	−0.067* (−1.672)	−0.052 (−1.134)		−0.070* (−1.795)
Observations	1762	1762	1560	1614	1608
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.193	0.192	0.211	0.202	0.186

Notes: This table shows a regression model explaining leverage following Equation (5b) with industry-fixed effects and firm-level clustered standard errors. *t*-Values are in parentheses (***, **, and * indicate 1%, 5%, and 10% significance). Leverage is total debt scaled by total assets. Profitability is net profits scaled by total assets. Market-to-book is the ratio of the market and book values of equity (per 31 December). Tangibility is fixed assets scaled by total assets. Firm size is the logarithm of total assets in constant 1938 guilders. The dummy 'dividends' has a value of one if the firm pays dividends and zero otherwise. Liquidity is cash holdings scaled by total assets and depreciation is also scaled by total assets. Accounting conservatism is dummy variable with value of one if the firm has fixed assets with a value below 10 guilders in the balance sheet, and zero otherwise. Non-dummy variables are winsorized at the 2% level. All data are taken from Van Oss Effectengids, Van Nierop en Baak, and the Financieel Jaarboek. The first model uses the full sample. The second model excludes unpaid taxes from the leverage definition. The third model only includes firms in the sample that have more than six observations during our sample period. In the fourth model we exclude firms with conservative depreciation policies. The fifth model includes our market-to-book measure.

Source: Authors' calculations.

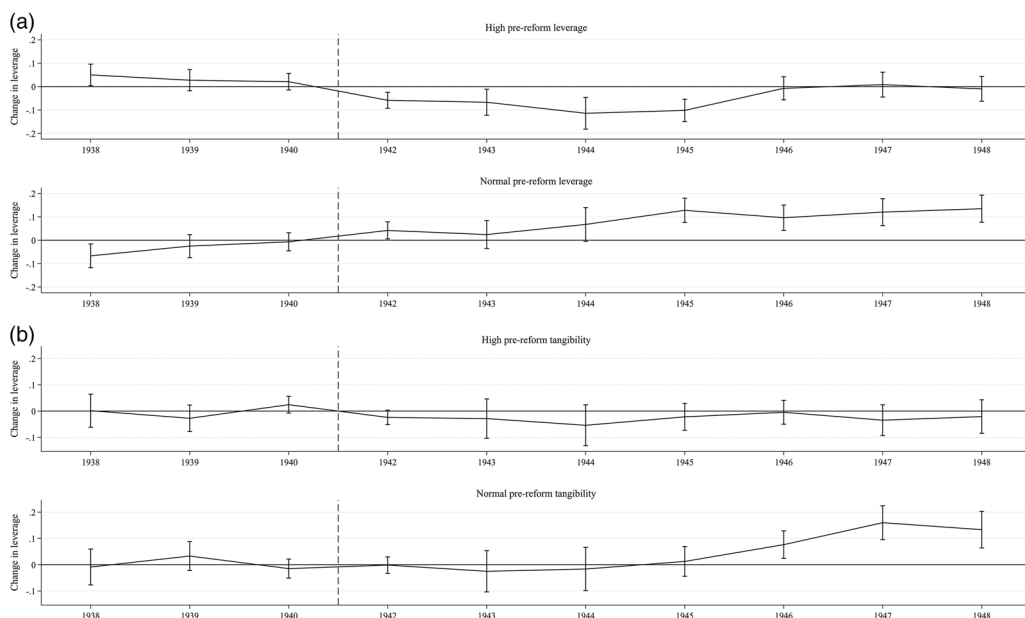


FIGURE 2 Difference in leverage 1938–48 relative to 1941. Depicted is the difference in leverage in the period 1938–48 relative to 1941. Panel A shows the change in leverage for the control group (high pre-change leverage) and depicts the change in leverage for all other firms. Panel B shows the change in leverage for the control group (high pre-change tangibility) and depicts the change in leverage for all other firms. Estimates are derived from a variation to model 1 of tables 4 and 5, where rather than showing interaction effects using period indicators, we use year indicators. In other words, this is based on our model which explains leverage following Equation (5a, 5b) with industry-fixed effects, all control variables, and firm-level clustered standard errors and using year indicators. We depict 90 per cent confidence intervals. This figure shows the development over the 1938–48 period of estimated leverage coefficients relative to 1941. The dashed vertical line marks the year before the introduction of the corporate tax (1941).

Source: Authors' calculations.

In neo-classical investment models, firms' investment opportunities determine investment, and Tobin's Q measures these opportunities. Empirical models normally approximate Q by the market-to-book ratio of total assets and add a measure for cash flows.⁸⁴ The cash flow measure in these studies is included to capture relaxed financial constraints, even though others have argued that the variable measures future profitability.⁸⁵ We estimate a basic regression model, controlling for Q and cash flow, to measure the effect of leverage. For our purpose it is important to control for future and current profits, which Q and cash flow are expected to do. We do so by estimating the following model:

$$I_{it} = \beta_0 + \beta_1 Q_{it} + \beta_2 CF_{it} + \beta_3 D_{it} + \beta_4 D_{it} * Period_t + \epsilon_{it} \quad (6)$$

Here, I_{it} is the annual investment, Q_{it} is the market-to-book ratio, and CF_{it} is the cash flow. We include leverage and interact this with period dummies to identify changes in the leverage effect.

⁸⁴ Fazzari et al., 'Investment, financing decisions and tax policy'.

⁸⁵ Kaplan and Zingales, 'Investment-cash flow sensitivities'; Erickson and Whited, 'Measurement error and the relationship between investment and q'.

**TABLE 6** Determinants of investment

	(1)	(2)	(3)	(4)
Leverage			0.498*** (3.411)	0.396*** (2.603)
Leverage × [42–45]				−0.101 (−0.841)
Leverage × [46–48]				0.412** (2.258)
Market-to-book	0.102*** (3.247)	−0.112 (−1.627)	−0.060 (−0.836)	−0.056 (−0.772)
Cash flow		0.766*** (3.551)	0.744*** (3.535)	0.748*** (3.570)
Effect size				
<i>Leverage</i>			24%	19%
<i>Leverage</i> × [42–45]				−5%
<i>Leverage</i> × [46–48]				20%
Observations	1267	1243	1243	1243
Firm fixed effects	No	Yes	Yes	Yes
Period fixed effect	Yes	Yes	Yes	Yes
Adjusted R ²	0.120	0.145	0.161	0.195

Notes: This table presents investment models. The explained variable is capital expenditure. All regressions include period fixed effects. *t*-Values are in parentheses (***, **, and * indicate 1%, 5%, and 10% significance). Capital expenditure is the annual change in fixed assets, scaled by fixed assets. Market-to-book is the ratio of the market and book values of equity (per 31 December). Cash flow is net profits plus depreciation scaled by total assets. Leverage is total debt scaled by total assets. [42–5] and [46–8] are dummy variables denoting these periods from 1942 to 1945 and 1946 to 1948, whilst the benchmark is 1938–41. Non-dummy variables are winsorized at the 2% level. All data are taken from Van Oss Effectengids, Van Nierop en Baak, and the Financieel Jaarboek. Effect sizes are denoted as a one standard deviation increase in leverage leading to an *x*% level standard deviation increase in investments. *Source:* Authors' calculations.

We start with a simple ordinary least squares (OLS) model and then introduce firm-fixed effects in our panel estimations. The results are presented in table 6.

In column (1) we test the basic neo-classical investment model with year fixed effects and show that *Q* has a positive and significant effect on investment. In column (2) we run the standard specification in the investment–cash flow literature, with *Q*, cash flow, and firm and year fixed effects. The firm fixed effects now absorb the effect of *Q*, and the cash flow measure shows the expected positive effect. Profitable firms invest more, which may be driven by their future profitability or access to internal funds.

Our emphasis is on the models in column (3) and (4). Leverage has a positive and statistically significant effect on investment, which holds for the full period (column 3). However, as shown in column (4), in the years 1946–8, there is an additional effect that is statistically and economically significant. The effect in 1938–41 of (0.396) does not change much in 1942–5 (−0.101), but increases by 0.412 in the years after the war (column 4). This positive effect confirms that the lower after-tax cost of debt induces higher-levered firms to invest more. We find that a one-standard-deviation increase in leverage after the tax reform induces a 17–20 per cent of a standard deviation increase in the average firm's investment.



The ability to invest may have been driven by the ability to buy the required machines and other capital goods. In table A5 of the online appendix we control for industry-period fixed effects and investigate these effects for industrial companies (i.e. those companies that might be most affected by capital scarcity and rationing). We find that, relative to the period 1938–41, industrial firms invested approximately 21 per cent more. By 1946–8, this was reduced to approximately 15 per cent (and not statistically significant). This finding suggests that after the war the ability of Dutch industrials to invest increased.

The results in table 6 raise two questions. First, why is the effect of the tax reform through leverage effect only observable from 1946 onwards? As shown in tables 3, 4, and 5, the increase in leverage is most prominent from 1946 onwards. Moreover, after the war had ended, firms were investing more and had more discretion in their investment policies. The explanation is relatively straightforward. During the war, capital goods available for investments were scarce. Only after the Netherlands was liberated, the market for corporate investments gradually picked up again.⁸⁶ The second question is whether alternative explanations drive the leverage–investment relation from 1946 to 1948, such as financial constraints due to rationing in equity markets. In the online appendix (section A4) we show that capital markets picked up rapidly after 1945.

VI | CONCLUSION

The early years of the Nazi occupation saw far-reaching changes to the Dutch corporate tax code, many of which were unforeseen before the war and unrelated to the performance of the Dutch economy. This paper discusses in detail the nature of corporate tax changes that took place during the Second World War and the context in which these changes were implemented. The paper then quantitatively studies the effects of the changes on corporate taxation on stock market valuations, financing strategies and capital expenditures.

We estimate the amount of firm value lost by studying stock price reactions to two key announcements of tax increases. We find that investors lost more than 300 million guilders, an amount that equals roughly 5 per cent of Dutch GDP at the time. Other approaches and a series of robustness checks indicate even higher amounts. We hereby contribute to the literature on the expropriation of the Netherlands during the Nazi occupation.⁸⁷

Next, we find that debt tax shields played an important role, testified to by the development of capital structures in the period 1938–48. Conditional on a constant relation between leverage and other firm characteristics and using high-tangibility firms as our control group, we find that leverage increases by 10 percentage points from 1942 onwards. This is consistent with theories of capital structure that assign an important role to the tax deductibility of interest costs.⁸⁸ We also find that the tax shield induced a large effect of leverage on firm investment.

The corporate profit tax was not abolished after the war. Our paper demonstrates how (tax) policies enacted during the war have had lasting effects on business financing. Overall, our results show that the introduction of corporate taxes in the occupied Netherlands induced significant and economically relevant losses for shareholders, and prompted firms to use more leverage. Ultimately, those firms that used more debt significantly increased their investments. Similar to the

⁸⁶ de Jong, 'De Nederlandse industrie, 1913–65'.

⁸⁷ Klemann and Kudryashov, *Occupied economies*.

⁸⁸ Modigliani and Miller, 'Corporate income taxes'.



findings of Deloof and Van Overfelt for Belgian firms before the First World War, we demonstrate that capital structure models are valid in explaining firm financing policies in times with different institutional arrangements.⁸⁹ In fact, our paper demonstrates that, even in dramatic times such as the Second World War, fiscal motives played a first-order role in firms and investors' financial choices.

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REFERENCES

- Aalders, G., *Roof: de ontvreemding van joods bezit tijdens de Tweede Wereldoorlog* (Den Haag, 1999).
- Adriani, P. J. A., *De grondbeginselen der wetten op de inkomsten-, vermogens- en dividend- en tantiëmebelasting* (Zwolle, 1931).
- Adriani, P. J. A., *Fiscale ervaringen in bezettingstijd, 1940–1945* (Amsterdam, 1946).
- Armstrong, C. S., Barth, M. E., Jagolinzer, A. D., and Riedl, E. J., 'Market reaction to the adoption of IFRS in Europe', *Accounting Review*, 85 (2010), pp. 31–61.
- Auerbach, A. J., 'Real determinants of corporate leverage', in B. M. Friedman, ed., *Corporate capital structures in the United States* (Chicago, 1985), pp. 301–24.
- Baudhuin, F., *L'économie belge sous l'occupation, 1940–1944* (Brussels, 1945).
- van den Brand, B. R. C. J., 'Financial reporting, environmental factors and their relationship in Belgium and the Netherlands' (unpub. Ph.D. thesis, Tilburg University, 2005).
- Buisseret, A., *Manuel théorique et pratique des impôts sur les revenus* (Brussels, 1943).
- Burtchett, F.F., *Corporation finance* (New York, 1934).
- Burgstahler, D. and Dichev, I., 'Earnings management to avoid earnings decreases and losses', *Journal of Accounting and Economics*, 24 (1997), pp. 99–126.
- Byoun, S., 'How and when do firms adjust their capital structures toward targets?', *Journal of Finance*, 53 (2008), pp. 3069–96.
- Centre d'étude des sociétés, *La taxe professionnelle et la taxe mobilière à charge des sociétés (Arrêté du 22 septembre 1941)* (Brussels, 1941).
- Chang, X. S. and Dasgupta, S., 'Financing the deficit: Debt capacity, information asymmetry, and the debt-equity choice' (unpub. working paper SSRN 431460, 2003).

⁸⁹ Deloof and van Overfelt, 'Were modern capital structure theories valid?'



- DeAngelo, H. and Masulis, R. W., 'Optimal capital structure under corporate and personal taxation', *Journal of Financial Economics*, 8 (1980), pp. 3–29.
- Dechow, P. M., Sloan, R. G., and Sweeney, A. P., 'Detecting earnings management', *Accounting Review*, 70 (1995), pp. 193–225.
- Deloof, M. and van Overfelt, W., 'Were modern capital structure theories valid in Belgium before World War I?', *Journal of Business Finance & Accounting*, 35 (2008), pp. 491–515.
- Dijker, R. A., 'De strijd tegen het voortbestaan van de naamlooze vennootschappen', in P. J. A. Adriani, ed., *Fiscale ervaringen in bezettingstijd, 1940–1945* (Amsterdam, 1946), pp. 30–36.
- Doidge, C. and Dyck, A., 'Taxes and corporate policies: Evidence from a quasi natural experiment', *Journal of Finance*, 70 (2015), pp. 45–89.
- Erickson, T. and Whited, T. M., 'Measurement error and the relationship between investment and q ', *Journal of Political Economy*, 108 (2000), pp. 1027–57.
- Essers, P. H. J., *Belast verleden: het Nederlandse belastingrecht onder nationaalsocialistisch regime* (Deventer, 2012).
- Faccio, M. and Xu, J., 'Taxes and capital structure', *Journal of Financial and Quantitative Analysis*, 50 (2015), pp. 277–300.
- Faccio, M. and Xu, J., 'Taxes, capital structure choices, and equity value', *Journal of Financial and Quantitative Analysis*, 53 (2018), pp. 967–95.
- Fazzari, S., Hubbard, R. G., and Petersen, B., 'Investment, financing decisions, and tax policy', *American Economic Review*, 78 (1988), pp. 200–205.
- Flannery, M. J. and Rangan, K. P., 'Partial adjustment toward target capital structures', *Journal of Financial Economics*, 79 (2006), pp. 469–506.
- Fliers, P. T., de Jong, A., and van Stiphout-Kramer, B. S. Corporate taxes, leverage, and investment: Evidence from Nazi-occupied Netherlands. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2024-01-17. <https://doi.org/10.3886/E197541V3>.
- Frank, M. Z. and Goyal, V. K., 'Capital structure decisions: Which factors are reliably important?', *Financial Management*, 38 (2009), pp. 1–37.
- Givoly, D., Hayn, C., Ofer, A. R., and Sarig, O., 'Taxes and capital structure: Evidence from firms' response to the Tax Reform Act of 1986', *Review of Financial Studies*, 5 (1992), pp. 331–55.
- Graham, J. R., 'Do personal taxes affect corporate financing decisions?', *Journal of Public Economics*, 73 (1999), pp. 147–85.
- Graham, J. R., Leary, M. T., and Roberts, M. R., 'A century of capital structure: The leveraging of corporate America', *Journal of Financial Economics*, 118 (2015), pp. 658–83.
- Grewal, J., Riedl, E. J., and Serafeim, G., 'Market reaction to mandatory nonfinancial disclosure', *Management Science*, 65 (2019), pp. 3061–84.
- Hamstra Pik, J. D., *Practische Handleiding voor Belastingplichtigen. Deel 1C: de Vennootschaps- en de Vermogensbelasting* (Terneuzen, 1943).
- Harmsen, E. E., 'Belastingheffing van de Naamlooze Vennootschap', in P. J. A. Adriani, ed., *Fiscale ervaringen in bezettingstijd, 1940–1945* (Amsterdam, 1946), pp. 3–30.
- Healy, P. M. and Wahlen, J. M., 'A review of the earnings management literature and its implications for standard setting', *Accounting Horizons*, 13 (1999), pp. 365–83.
- Hennessy, C. A., Kasahara, A., and Strebulaev, I. A., 'Empirical analysis of corporate tax reforms: What is the null and where did it come from?', *Journal of Financial Economics*, 135 (2020), pp. 555–76.
- Jalilvand, A. and Harris, R. S., 'Corporate behavior in adjusting to capital structure and dividend targets: An econometric study', *Journal of Finance*, 39 (1984), pp. 127–145.
- de Jong, A., Fliers, P. T., and Van Beusichem, H., 'Catering and dividend policy: Evidence from the Netherlands over the twentieth century', *Financial History Review*, 26 (2019), pp. 321–58.
- de Jong, A., Kabir, R., and Nguyen, T. T., 'Capital structure around the world: The roles of firm- and country-specific determinants', *Journal of Banking & Finance*, 32 (2008), pp. 1954–69.
- de Jong, H. J., 'De Nederlandse industrie 1913–1965: Een vergelijkende analyse op basis van de productiestatistieken', unpub. PhD, thesis, *Rijksuniversiteit Groningen*, (1999).
- de Jongh, B. H., *Beschouwingen over eenige effecten- en credietvormen in hun beteekenis voor de financiering der onderneming* (The Hague, 1922).



- Kaplan, S. N. and Zingales, L., 'Investment-cash flow sensitivities are not valid measures of financing constraints', *Quarterly Journal of Economics*, 115 (2000), pp. 707–12.
- Klemann, H. A. M., *Nederland 1938–1948: Economie en samenleving in jaren van oorlog en bezetting* (Amsterdam, 2002).
- Klemann, H. A. M. and Kudryashov, S., *Occupied economies: An economic history of Nazi-occupied Europe, 1939–1945* (2012).
- Koudijs, P., Salisbury, L., and Sran, G., 'For richer, for poorer: bankers' liability and bank risk in New England, 1867 to 1880', *Journal of Finance*, 76 (2021), pp. 1541–99.
- Lemmon, M. and Zender, J., 'Debt capacity and tests of capital structure theories', *Journal of Financial and Quantitative Analysis*, 45 (2010), pp. 1161–87.
- Lewis, C. and Verwijmeren, P., 'Cash-settled convertible bonds and the value relevance of their accounting treatment', *Journal of Corporate Finance*, 24 (2014), pp. 101–11.
- MacKinlay, A. C., 'Event studies in economics and finance', *Journal of Economic Literature*, 35 (1997), pp. 13–39.
- Marsh, P., 'The choice between equity and debt: An empirical study', *Journal of Finance*, 37 (1982), pp. 121–44.
- Meihuizen, J., *Noodzakelijk kwaad: de bestrafing van economische collaboratie in Nederland na de Tweede Wereldoorlog* (Amsterdam, 2003).
- Meij, J. L., *Weerstandsvermogen en financieele reorganisatie van ondernemingen* (Amsterdam, 1946).
- Modigliani, F. and Miller, M. H., 'The cost of capital, corporation finance and the theory of investment', *American Economic Review*, 48 (1958), pp. 261–97.
- Modigliani, F. and Miller, M. H., 'Corporate income taxes and the cost of capital: A correction', *American Economic Review*, 53 (1963), pp. 433–43.
- Myers, S. C., 'The capital structure puzzle', *Journal of Finance*, 39 (1984), pp. 574–92.
- Myers, S. C. and Majluf, N. S., 'Corporate financing and investment decisions when firms have information that investors do not have', *Journal of Financial Economics*, 13 (1984), pp. 187–221.
- Nachtigall, W., 'Konstruktion und Analyse eines Aktienindex für den Zeitraum 1931 bis 1959', (unpub. Ph.D. thesis, Julius-Maximilians-Universität Würzburg, 1996).
- Nogaro, B., *Le financement des dépenses publiques et la liquidation des dépenses de guerre* (Paris, 1945).
- Occhino, F., Oosterlinck, K., and White, E. N., 'How occupied France financed its own exploitation in World War II', (NBER working paper, SSRN 896210, 2010).
- Opler, T. C., and Titman, S., 'The debt-equity choice: An analysis of issuing firms', (unpub. working paper, SSRN 5909, 1994).
- Polak, J. C. W., *Besluit op de Winstbelasting 1940; Gids voor de praktijk* (Den Haag, 1940).
- Polak, N. J., *Eenige grondslagen voor de financiering der onderneming* (Haarlem, 4th edn., 1930).
- Rajan, R. G., and Zingales, L., 'What do we know about capital structure? Some evidence from international data', *Journal of Finance*, 50, (1995), pp. 1421–60.
- Rampini, A. A. and Viswanathan, S., 'Collateral and capital structure', *Journal of Financial Economics*, 109 (2013), pp. 466–92.
- Schipper, K. and Thompson, R., 'The impact of merger-related regulations on the shareholders of acquiring firms', *Journal of Accounting Research*, 21 (1983), pp. 184–221.
- Spoerer, M., 'Window-dressing in German inter-war balance sheets', *Accounting, Business & Financial History*, 8 (1998), pp. 351–69.
- Taggart, R. A., Jr., 'A model of corporate financing decisions', *Journal of Finance*, 32 (1977), pp. 1467–84.
- van Tielhof, M., *Banken in bezettingstijd; De voorgangers van ABN AMRO tijdens de Tweede Wereldoorlog en in de periode van rechtsherstel* (Amsterdam, 2003).
- Tooze, A., *The wages of destruction: The making and breaking of the Nazi economy* (New York, 2006).
- Treub, M. W. F. and Wibaut, F. M., *Prae-adviezen, Vereeniging voor de Staatshuishoudkunde en de Statistiek* ('s-Gravenhage, 1924).
- Viswanath, P. V., 'Strategic considerations, the pecking order hypothesis, and market reactions to equity financing', *Journal of Financial and Quantitative Analysis*, 28 (1993), pp. 213–34.

OFFICIAL PUBLICATIONS

Centraal Bureau voor de Statistiek, *Jaarcijfers voor Nederland 1943–1946* (1948).



Centraal Bureau voor de Statistiek, *Statistisch zakboek* (1924–1988, annual editions).
Financieel Jaarboek, De Nederlandsche Financier (1912–1944, annual issues).
Gids bij de Prijscourant van de Vereeniging voor den Effectenhandel (1890–1982, annual issues).
Tabellen van laagste en hoogste koersen en dividenden over de jaren 1939 tot en met 1949 met tal van aantekeningen, Hendrik Sijthoff's Financieele Bladen (1949).
Van Nierop en Baak's Naamlooze Vennootschappen (Zwolle, 1882–1946, annual issues).
Van Oss' Effectenboek (Groningen, 1903–1978, annual issues).

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