Antitakeover Provisions and Debt Maturity Structure

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ABSTRACT

Using comprehensive samples of dual-class and staggered board firms spanning the period 2000–2019, we examine the impact of dual-class shares and staggered boards on the maturity structure of corporate debt. We observe that dual-class firms maintain higher levels of debt than single-class firms, while staggered board firms maintain lower levels of debt than unitary board firms. With respect to debt maturity, we document a greater propensity among dual-class firms to fund themselves with shorter maturity debt, while staggered board firms show a preference for longer maturity debt. However, the picture changes when we examine research-intensive firms. The preference for shorter-term debt is less pronounced in dual-class firms with high R&D intensities, while staggered board firms exhibit a reduction in debt maturities as R&D increases. The former effect may be explained by a maturity matching argument, while the latter effect may be due to the impact of R&D on information asymmetry. Overall, our results show that different antitakeover provisions have distinctively different implications for corporate debt maturities.

Keywords: Dual-class shares, staggered boards, debt maturity structure, information asymmetry, R&D

JEL Codes: G32, G34, K22

Introduction

Dual-class shares and staggered boards are prominent antitakeover defences that are intended to encourage the pursuit of long-term growth strategies by shielding managers from short-term shareholder pressure. However, in both cases, that benefit comes at the cost of weaker governance, increased managerial entrenchment, and higher agency costs. Despite these similarities, there are important differences between dual-class shares and staggered boards.

The most important difference concerns the mechanism by which insiders are shielded from outside shareholder pressure. Dual-class shares do this by separating the voting rights and cash flow rights of a firm's shareholders, with founders and insiders typically holding superior voting shares. Consequently, outside shareholders, with inferior voting shares, cannot exert meaningful pressure on the firm's managers. By contrast, staggered boards protect insiders from outside shareholder pressure by partitioning a firm's directors into different cohorts that serve different terms. This makes it hard for a block of shareholders to gain sufficient control of the board to exert meaningful pressure on the firm's managers.

Another difference between dual-class shares and staggered boards concerns information asymmetry and analyst following. These two things are related. For example, O'Brien and Bhushan (1990) and Lang and Lundholm (1996) found that analysts tend to follow firms in regulated industries that require good information disclosure, and they prefer to follow firms with sound disclosure policies. Similarly, Healy, Hutton, and Palepu (1999) found that analysts are attracted to firms with good disclosure, while the evidence in Lang, Lins, and Miller (2004) established that they tend to follow firms without incentives to withhold or manipulate information.

With respect to information asymmetry, dual-class firms are widely considered to lack transparency. Banerjee (2006) suggested that this feature helps them reduce the cost of underinvestment. Based on a theoretical model, he argued that fully revealing information about investments to outside shareholders is costly and inefficient. The model suggests that dual-class shares allow managers to make investment decisions without communicating all information to shareholders, thereby improving the efficiency of investment decision-making. Lim (2016) examined the effect of dual-class shares on information disclosure and found that information asymmetry is higher in dual-class firms than in single-class firms. That study also showed that dual-class firms improve disclosure when they need external financing. Consistent with the evidence that dual-class firms have poorer information environments than single-class firms, Jordan, Kim, and Liu (2016) found that they have lower analyst followings.

Jiraporn, Chintrakarn, and Kim (2012) considered the impact of staggered boards on information environments and analyst coverage. Compared with unitary board firms, they found that staggered board firms have significantly higher levels of analyst coverage and less information asymmetry. They interpreted this finding by arguing that staggered boards shield managers from takeover threats, which reduces their career concerns about the consequences of information disclosure. Better information disclosure, in turn, means that staggered board firms attract more analysts. Jiraporn, Chintrakarn, and Kim (2012) also documented that staggered board firms with higher analyst followings enjoy higher valuations, since analysts mitigate agency problems by reducing information asymmetry.

Several studies point to a negative relationship between information asymmetry and debt maturity. This was predicted by the theoretical models of Flannery (1986) and Diamond (1991a), but it has also been established empirically. For example, Barclay and Smith (1995) examined the determinants of corporate debt maturity and reported that large and highly regulated firms are more likely to issue long-term debt. They also found that firms with more information asymmetry issue shorter-term debt. Along similar lines, Berger, Espinosa-Vega, Frame, and Miller (2005) showed that low-risk firms are more likely to issue short-term debt when information asymmetry is high and that debt maturity increases in low-risk firms as information asymmetry decreases.

In this paper we examine the debt maturity structures of dual-class firms and staggered board firms. Our first contribution is to compare the debt maturities of firms with these two antitakeover provisions in light of the differences in their information environments. Consistent with the high levels of information asymmetry in dual-class firms, we find that they issue shorter-term debt than single-class firms. By contrast, staggered board firms, which generally have better information environments than their unified board counterparts, issue less short-term debt.

Our second contribution is to uncover the impact of R&D expenditure on the debt maturity structures of dual-class firms and staggered board firms. Here we have to deal with two competing hypotheses. First, based on well-established theoretical arguments by Myers (1977), Jensen (1986), and Diamond (1991b), firms should try to match the maturity structures of their debt with the maturities of their investments, in order to manage liquidity risk. Applying this principle to R&D projects, which are generally very long-term investments with uncertain payoffs, we expect research-intensive firms to be less reliant on short-term debt. On other other hand, R&D increases information asymmetry, as documented by Aboody and Lev (2000) and Barron, Byard, Kile, and Riedl (2002), for example. Hence, the negative relationship between information asymmetry and debt maturity implies that increased R&D expenditures may in fact reduce debt maturities. We find that although dual-class firms generally fund themselves with more short-term debt than long-term debt, this pattern is more pronounced in dual-class firms with fewer R&D investments, consistent with the maturity matching hypothesis. For staggered board firms, we find that R&D investments are associated with higher levels of debt in aggregate, but without a significant change in debt maturities.

An important empirical contribution of our study is the construction of a more extensive and accurate dual-class indicator variable than the dual-class variable constructed by Gompers, Ishii, and Metrick (2010) and used by much of the subsequent literature on dual-class shares. Our variable extends the sample period of the dual-class dummy variable in Gompers, Ishii, and Metrick (2010) and improves its accuracy where the sample periods overlap.[1] We also use a new comprehensive staggered board indicator variable recently constructed by Guernsey, Sepe, and Serfling (2022) and Guernsey, Guo, Liu, and Serfling (2022).

The remainder of the paper is organised as follows. Section I discusses the relevant literature on dual-class shares, staggered boards, information asymmetry, analyst coverage, and debt maturity, while Section II uses that literature to extract our hypotheses. In Section III we delve into sample selection, variable construction, and empirical methodology. Section IV presents our empirical results, and Section V concludes.

I. Literature Survey

Dual-class shares are common stock with different levels of voting rights for different share classes. The owners of so-called superior shares have greater voting rights than the owners of other classes of shares. Dual-class shares are frequently used in founder-led companies, where the superior voting shares are usually held by company founders. This allows them to maintain

[1]See Panel B in Table I for a comparison of the two variables over the overlapping sample period.

control of their firms, even if they sell the majority of the cash flow rights to outside shareholders.

Gompers, Ishii, and Metrick (2010) drew attention to the *wedge* between shareholders' voting rights and cash-flow rights in dual-class firms, by showing that it weakens governance and leads to managerial entrenchment and agency problems. Along similar lines, Li and Zaiats (2018) found that dual-class firms tend to introduce more shareholder rights protections and have less board independence than single-class firms, and shareholder rights in dual-class firms decrease with the size the wedge. Furthermore, they showed that firm value is negatively related to the size of the wedge, but positively related to shareholder protections in dual-class firms.

The weaker governance in dual-class firms leads to higher agency costs. For example, Amoako-Adu, Baulkaran, and Smith (2011) examined the impact of dual-class shares on managerial compensation. Compared to single-class firms with matching levels of control concentration, they found that dual-class firms pay more in terms of executive compensation. They attributed the agency problems in dual-class firms to unbalanced voting rights. In a study of the dividend policies of dual-class firms, Amoako-Adu, Baulkaran, and Smith (2014) found that the wedge between voting rights and cash flow rights in dual-class forms has a negative effect on cash distributions to shareholders via dividend payments and share repurchases.

While dual-class shares separate voting rights and cash flow rights, staggered boards separate the board of directors of a firm into different cohorts that serve different terms. This makes it more difficult for a block of shareholders to gain control of the firm's board, which in turn reduces the likelihood of a takeover. Compared with dual-class shares, which are quite sticky, firms can easily switch between staggered boards and unitary boards, with the recent trend being away from staggered boards.[2] Guo, Kruse, and Nohel (2008) claim that outside shareholders

[2]Several studies mention the decline of staggered boards in recent decades, due to the negative association with firm values (see e.g. Faleye (2007) and Zhao and Chen (2008)). Recently, Guernsey, Sepe, and Serfling (2022) and Guernsey, Guo, Liu, and Serfling (2022) constructed a comprehensive staggered board indicator variable that

play an important role in driving this *destaggering* process, motivated by the negative impact of staggered boards on firm values.

Like dual-class shares, staggered boards also weaken governance and facilitate entrenchment. Bebchuk and Cohen (2005) reported that staggered board firms have significantly lower firm values than unitary board firms. Moreover, the reduction in firm values is more pronounced when staggered boards are established by corporate charters rather than company bylaws, since corporate charters are harder to amend. They interpreted the lower firm values of staggered board firms as an entrenchment cost. Faleye (2007) argued that staggered boards reduce firm values because entrenchment decreases managerial efficiency. That study confirmed that staggered board firms have significantly lower firm values than unitary board firms, and found that managers of staggered board firms experience less market discipline. Finally, Jiraporn and Chintrakarn (2009) observed that managerial entrenchment and agency problems are prominent in staggered board firms. They argued that staggered board firms pay larger dividends in order to mitigate agency conflicts with outside shareholders.

On the plus side, dual-class shares and staggered boards are known to shield managers from myopic shareholders and allow them to pursue long-term projects. For example, Jordan, Kim, and Liu (2016) found that, compared with single-class firms, dual-class firms face less myopic market pressure, have better growth opportunities, and enjoy higher valuations. Moreover, after unifications of dual-class shares, myopic market pressure increases and growth opportunities decrease in the newly minted single-class firms. Related results were reported by Baran, Forst, and Tony Via (2023), who suggested that dual-class firms provide an ideal environment for innovation. They presented detailed evidence showing that the concentrated control in dual-

includes firms outside the S&P 1500. They found that the fraction of S&P 1500 firms with staggered boards decreased from 58% to 30% over the period from 1996 to 2020, while the fraction of staggered board firms outside the S&P 1500 increased from 40% to 53% over the same period.

class firms has a positive effect on the quality of patents and the efficiency of R&D spending.

Similar results have been obtained for staggered board firms. For example, Duru, Wang, and Zhao (2013) found that staggered boards are helpful for reducing takeover pressure and managerial myopia in opaque firms. As a result, opaque firms with staggered boards enjoy higher valuations than opaque firms with unitary boards. Moreover, firms with staggered boards invest more in R&D and enjoy higher pay-performance sensitivities than unitary board firms. Cremers, Litov, and Sepe (2017) argued that staggered boards alleviate pressure from short-term myopic investors and allow firms to invest more in long-term projects. They found that staggered boards increase firm values by encouraging firms to undertake long-term projects.

Despite their similarities in terms of facilitating managerial entrenchment and increasing agency costs, on the one hand, and mitigating shareholder myopia and encouraging long-term investment, on the other hand, there are important differences between dual-class shares and staggered boards, with information asymmetry and analyst coverage being two prominent examples. Jiraporn, Chintrakarn, and Kim (2012) documented a significant positive relationship between staggered boards and analyst coverage. They interpreted this result by arguing that managers of staggered board firms are protected from shareholder discipline and thus less likely to worry about information disclosure. This in turn makes staggered board firms more attractive to analysts and reduces information asymmetry.

By contrast, dual-class firms exhibit higher levels of information asymmetry and are followed by fewer analysts than single-class firms. Banerjee (2006) argued that fully revealing investment information to outside shareholders is costly and inefficient. In his theoretical model, the efficiency of investment decision-making is improved by dual-class shares because managers are not compelled to disclose as much information to external shareholders. From an empirical perspective, Lim (2016) found that information asymmetry is higher in dual-class firms than single-class firms, and that dual-class firms only improve disclosure when they need external financing. Finally, the empirical evidence in Jordan, Kim, and Liu (2016) shows that dual-class firms are followed by fewer analysts than single-class firms.

The information environment of a firm plays an important role in determining its cost of debt and its debt maturity structure. Since information asymmetry increases uncertainty about default risk, lenders are cautious about the long-term debt of firms with poor information environments. The relationship between debt maturity and information asymmetry has been explored in several theoretical and empirical papers. In the signalling model of Flannery (1986), firms have private information about their quality that prevents investors from distinguishing between good firms and bad firms. As a result, good firms will consider their long-term debt to be underpriced and will prefer to issue short-term debt. Conversely, bad firms will prefer to sell long-term debt, which they consider to be overpriced. Rational investors are aware of these incentives and price risky corporate debt accordingly. In the pooling equilibrium without transaction costs, both good and bad firms end up issuing short-term debt. In a related theoretical study, Diamond (1991a) considered that debt maturity is not a monotonic function of credit ratings, but also depends on private information. In his model, borrowers with private information favour short-maturity debt.

The empirical study of Barclay and Smith (1995) examined the determinants of debt maturity. They found that large, low-growth, highly regulated firms issue debt with longer maturities. Such firms naturally exhibit low levels of information asymmetry. Berger, Espinosa-Vega, Frame, and Miller (2005) examined the impact of information asymmetry on the choice of debt maturity and found that low-risk firms with high information asymmetry are significantly more likely to issue short-term debt and that debt maturities increase significantly as information asymmetry decreases. Wittenberg Moerman (2009) investigated the impact of information asymmetry on the cost of debt and the choice of debt maturity. She found that information asymmetry increases the cost of debt and reduces debt maturity. Finally, Daniels, Diro Ejara, and Vijayakumar (2010) studied the determinants of municipal debt maturity. As is the case for corporate bonds, they established that municipal bond maturities are positively related to credit quality and negatively related to information asymmetry.

The relationship between information asymmetry and the cost of debt has also been studied extensively. Sengupta (1998) found that firms with better disclosure and lower information asymmetry enjoy a lower cost of debt because detailed disclosure reduces a lender's assessment of default risk. Similarly, Mansi, Maxwell, and Miller (2011) found that increased analyst coverage reduces a firm's cost of debt. Finally, Derrien, Kecskés, and Mansi (2016) observed that increased information asymmetry is associated with a higher cost of debt and a higher rate of credit events. They argued that information asymmetry should be recognised as a risk factor for debt holders.

Overall, the literature agrees that firms with high levels of information asymmetry and poor information disclosure have a higher cost of debt and shorter debt maturities, since lenders are less inclined to invest in the long-term debt of such firms. Since dual-class firms have higher levels of information asymmetry and lower levels of analyst coverage than single-class firms, while staggered board firms are more transparent than unitary board firms, with higher levels of analyst coverage, we expect to see different debt maturity structures for dual-class firms and staggered board firms, with the latter issuing more long-term debt and the former relying more on short-term debt.

Another interesting aspect of debt is that it can serve as an additional source of external monitoring. Since dual-class shares and staggered boards are associated with higher agency costs, due to increased managerial entrenchment, firms with these two antitakeover defences may issue debt in order to improve external monitoring. The literature offers some support for this idea, showing that the monitoring power of debt can reduce agency costs and benefit shareholders. In an early theoretical study, Diamond (1991b) explored the idea that borrowers can exploit the monitoring role of debt to acquire a good reputation when moral hazard is widespread. In his model, borrowers seek external monitoring to obtain favourable records that will be useful for predicting future actions without monitoring.

The monitoring role of debt has been investigated empirically. Harvey, Lins, and Roper (2004) examined whether debt, regarded as an additional source of monitoring, can mitigate agency conflicts. They found that debt creates incremental benefits for firms with agency problems and increases shareholder value in companies with higher expected agency costs. Moreover, shareholders benefit from the monitoring feature of debt when information asymmetry is significant, since debt holders monitor the behaviour of a firm's managers to limit default risk. This results in better investment decisions, especially for firms in financial distress. Jensen (1986) argued that debt acts as a governance mechanism that could reduce the extraction of private benefits by insiders. In this regard, short-term debt is more effective. Myers (1977) described how short-term debt could alleviate the underinvestment problem for firms with high agency costs. Along similar lines, Stulz (2000) argued that short maturity debt is an effective device for monitoring managerial decisions and disciplining managers. Finally, the recent paper by Dey, Nikolaev, and Wang (2016) investigated the role of debt in dual-class firms. They found that dual-class firms are more leveraged and more likely to issue private debt than single-class firms. This result was more significant for dual-class firms with higher agency conflicts. They argued that debt acts as a supplementary governance mechanism to discipline the managers of dual-class firms, and that it helps mitigate agency conflicts between managers and outside shareholders.

Some studies suggest that analyst coverage or institutional ownership could substitute for the monitoring role of debt for firms with high agency costs. For example, Chang, Dasgupta, and Hilary (2006) found that a higher level of analyst following decreases the likelihood of issuing debt, while Knyazeva (2007) suggested that analyst following can replace other forms of monitoring. The same is true for the monitoring role of institutional ownership. Bathala, Moon, and Rao (1994), Grier and Zychowicz (1994), and Chung and Wang (2014) found that higher levels of institutional ownership are associated with lower levels of debt, since institutional ownership plays a similar monitoring role as debt, in terms of mitigating agency conflicts.

Considering that dual-class firms have lower levels of analyst following and institutional ownership than single-class firms, while staggered board firms have higher levels of analyst coverage than unitary board firms, higher levels of short-term debt among dual-class firms is consistent with the idea that they use short-term debt to mitigate agency conflicts. By contrast, staggered board firms, with their higher levels of analyst coverage, already enjoy better external monitoring and do not need to issue debt for this purpose.

II. Hypothesis Development

The theoretical models of Flannery (1986) and Diamond (1991a) highlight the role of information asymmetry as a determinant of debt maturity, predicting that firms with poorer information environments should be more reliant on short-maturity debt. In a similar vein, the theoretical model of Diamond and Verrecchia (1991) shows that better disclosure reduces liquidity risk, which allows firms to issue debt with longer maturities.

The relationship between information asymmetry and debt maturity has been tested extensively. Barclay and Smith (1995) presented evidence that information asymmetry affects debt maturity choices, with higher levels of information asymmetry associated with shorter debt maturities. Guedes and Opler (1996) found that firm size and bond rating play an important role in the issuance of long-dated debt. Since disclosure is generally better for large firms with sound bond ratings, this finding links improved disclosure with longer debt maturities. Finally, Berger, Espinosa-Vega, Frame, and Miller (2005) found that information asymmetry plays an important role in explaining a firm's debt maturity, especially for firms with low risk. Other empirical studies documenting a negative relationship between information asymmetry and debt maturity include Goswami (2000), Danisevska (2002), Wittenberg Moerman (2009) and Daniels, Diro Ejara, and Vijayakumar (2010).

Analyst coverage also has an impact on debt maturity, although it may be mediated by information asymmetry because analysts tend to follow firms with better information environments. Khoo and Adrian (2022) investigated the relationship between managerial ability and debt maturity choice. They reported that firms with high-ability managers tend to issue debt with shorter maturities, with the effect intensifying as information asymmetry increases. They also observed that high-ability managers reduce the use of short-maturity debt as analyst coverage increases, which can be interpreted as a consequence of the negative relationship between analyst coverage and information asymmetry.

Dual-class firms have higher levels of information asymmetry and are followed by fewer analysts than single-class firms. For example, Lim (2016) documented that information environments are poorer in dual-class firms than single-class firms, while Jordan, Kim, and Liu (2016) reported that fewer analysts follow dual-class firms. Consequently, the results cited above suggest that dual-class firms should issue debt with shorter maturities. By contrast, Jiraporn, Chintrakarn, and Kim (2012) documented that staggered board firms are more transparent than unitary board firms and enjoy greater analyst coverage. Hence, staggered board firms should issue longer maturity debt, all else being equal. Putting these observations together, we expect the debt of dual-class firms to be significantly shorter dated than the debt of staggered board firms.

Hypothesis 1. *The debt maturities of dual-class firms are shorter than those of staggered board firms.*

Aboody and Lev (2000) found that insider trading gains are higher for R&D-intensive firms than for firms that do not engage in R&D investments. They interpreted this to mean that R&D increases information asymmetry. Empirical evidence from the analyst literature, such as Barron, Byard, Kile, and Riedl (2002) and Jones (2007), also identifies R&D as a source of information asymmetry. Due to the well-established negative relationship between information asymmetry and debt maturity, it follows that R&D-intensive firms should exhibit shorter debt maturities. We shall refer to this as the information asymmetry hypothesis.

On the other hand, short-maturity debt is not an ideal source of funds for R&D. Stohs and Mauer (1996) found strong evidence in favour of the textbook maturity matching principle, which asserts that firms should match the maturities of their liabilities with the maturities of their assets in order to reduce liquidity risk. Myers (1977) also argued that firms should match the maturities of their assets and liabilities in order to manage the agency cost of conflicts between shareholders and debt holders. Since R&D payoffs are typically long-dated and uncertain, the maturity matching principle suggests that R&D projects should be funded with long-term debt or equity. We shall refer to this as the maturity matching hypothesis.

In summary, although R&D-active firms should be more reliant on short-term debt, since R&D increases information asymmetry, short-term debt is an inappropriate source of funds for R&D investments because it violates the maturity matching principle. Taking the different information environments of dual-class firms and staggered board firms into account, it is hard to assess the tradeoff between these competing hypotheses when considering the differential effect of R&D intensity on debt maturity for dual-class firms and staggered board firms. So, based on the strong empirical evidence supporting the information asymmetry hypothesis in the previously cited literature, we surmise that it dominates the maturity matching hypothesis, when it comes to the impact of R&D expenditure on debt maturity. This leads us to formulate the following tentative hypothesis.

Hypothesis 2. *R&D intensity is negatively related to debt maturity for dual-class firms and staggered board firms.*

III. Data and Empirical Methodology

The main objective of our research is to investigate how dual-class shares and staggered boards affect the debt maturity structures of firms. For this purpose, we constructed a new comprehensive indicator variable to identify firms with dual-class shares. We also used a new comprehensive staggered board indicator variable recently introduced by Guernsey, Sepe, and Serfling (2022) and Guernsey, Guo, Liu, and Serfling (2022). The variables describing the debt maturity structures and other characteristics of the firms in our sample were downloaded from *Compustat* and *CRSP*. Since *Compustat* does not provide debt maturities for financial firms, we limited our sample to firms with SIC codes in the range 2000–5999. We did not winsorize the dataset, since the results were not affected by winsorization. The sample period for our study is 2000–2019.

A. Antitakeover Provision Dummy Variables

The first important contribution of our study is the construction of a more comprehensive and accurate dual-class indicator variable than the one used by other empirical studies on dual-class shares, which rely exclusively on the dual-class dummy variable published by Gompers, Ishii, and Metrick (2010). Our dual-class indicator variable extends the sample period of their variable and improves its accuracy over the overlapping sample period.

The variable construction methodology employed by Gompers, Ishii, and Metrick (2010) used two steps to identify dual-class firms. First, candidate dual-class firms were identified as those with more than a 1% difference in shares outstanding between Compustat and CRSP. Second, manual textual analysis of the 10-K filings of the candidate companies was performed to confirm whether they truly had dual-class shares. Our dual-class indicator variable (*DCS*) was constructed as follows:

1. We generated a temporary firm-year level indicator variable (*Diff_True*) to identify candidate dual-class companies as those with more than a 1% difference in shares outstanding between Compustat and CRSP.
2. We downloaded the entire 10-K filings of all firms in our sample from SEC Edgar and performed an exhaustive textual analysis on them. This allowed us to construct a second temporary firm-year level indicator variable (*10k_True*), which identified all firms whose 10-K filings contained the terms “class a”, “class b”, “class c” or “class d”.

3. Since dual-class shares are sticky, we manually checked all available 10-K filings of companies for which *Diff_True* changed more than once, to confirm their dual-class status.
4. For companies for which *Diff_True* remained constant, we manually checked all available 10-K filings, if *Diff_True* differed from *10K_True*.
5. Finally, we double-checked all available 10-K filings of companies for which *Diff_True* did not equal *10K_True* in any year of its life.

After all the checks above, our dual-class indicator variable (*DCS*) was set equal to *Diff_True*. It improves on the dual-class dummy variable used by Gompers, Ishii, and Metrick (2010) for several reasons.

- First, by downloading the entire 10-K filings from SEC Edgar, we performed textual analysis on all companies, rather than only the candidate companies identified by comparing the numbers of shares outstanding in Compustat and CRSP. This allowed us to identify the dual-class companies with no obvious differences in outstanding shares between Compustat and CRSP.
- Second, in order to identify a candidate dual-class firm based on a disparity between its number of outstanding shares recorded by CRSP and Compustat, we checked its entire time series in those two databases, rather than only comparing the number of outstanding shares in a given year. We included a company in our universe of candidate dual-class firms if the difference in shares outstanding between Compustat and CRSP exceeded 1% for at least one year.
- Finally, we manually checked a large sample of 10-K filings to verify the results of the automated textual analysis. This assured us about the correctness of our variable construction process.

In addition to constructing a more reliable dual-class dummy variable than Gompers, Ishii, and Metrick (2010), we extended the sample period of their variable from 1995–2002 to 1990–2019. Over that period we identified 310.4 dual-class firms each year, on average, with a maximum of 408 in 1999 and a minimum of 159 in 2019. Panel A in Table I illustrates the distribution of dual-class and single-class firms for each year in our sample, while Panel B compares our dual-class indicator variable with the one used by Gompers, Ishii, and Metrick (2010), over the overlapping sample period. During the entirety of that period we identified 551 firm-year instances of dual-class companies that were missed by Gompers, Ishii, and Metrick (2010), while 219 instances of dual-class companies recorded by their variable were rejected by our identification process.

To identify firms with staggered boards, the identifier provided by the Institutional Shareholder Services (ISS) Corporate Governance database provides the most widely used staggered board indicator variable.[3] However, the ISS database has two important deficiencies. First, it only includes firms in the S&P 1500 index and it does not provide data for the years before and after a firm belonged to the index. Second, ISS only collected data every two or three years between 1990 and 2006.

Recently, Guernsey, Sepe, and Serfling (2022) and Guernsey, Guo, Liu, and Serfling (2022) constructed a more comprehensive staggered board dummy variable covering the period from 1996 to 2020, by combining machine learning with textual analysis and manual inspection. We use their staggered board indicator variable (*SB*) in this paper.

[3] It has been used by Zhao and Chen (2008), Jiraporn and Chintrakarn (2009), Jiraporn, Chintrakarn, and Kim (2012), Cohen and Wang (2013), Duru, Wang, and Zhao (2013) and Cremers, Litov, and Sepe (2017).

B. Debt Maturity Variables

The dependent variables in our study describe the debt maturities of the firms in our sample. Barclay and Smith (1995) and Datta, Iskandar-Datta, and Raman (2005) constructed debt maturity variables that measure the percentage of a firm's total debt maturing in more than 1 through 5 years, while Brockman, Martin, and Unlu (2010) used the complements of those variables. We followed the latter approach, by constructing debt maturity variables that quantify a firm's debt maturing in less than 1 through 5 years. We constructed two sets of variables of this type. First, *DMD_1–DMD_5* were calculated as current liabilities plus all debt maturing within the corresponding number of years, divided by current liabilities plus total long-term debt. Second, *DMA_1–DMA_5* were calculated as current liabilities plus all debt maturing within the corresponding number of years, divided by total assets. The data used to construct these variables was downloaded from Compustat, but we excluded all observations for which Compustat erroneously recorded a value for debt maturing within some number of years that was negative or exceeded the total debt of the firm.

Panels A and B in Table II present summary statistics for *DMD_1–DMD_5* and *DMA_1–DMA_5*. According to Panel A, 26% of the debt issued by firms in our sample matured within one year, on average, while 49% matured within three years, and 68% matured within five years. Compared with Datta, Iskandar-Datta, and Raman (2005), our summary statistics indicate that average debt maturities have reduced since 2000. In their sample, covering the period from 1992 to 1999, 22%, 39% and 57% of corporate debt matured within one, three and five years, respectively. For comparison, 40% of the debt issued by firms in the sample of Brockman, Martin, and Unlu (2010) matured within three years, while 58% matured within five years, over the period from 1992 to 2005.

C. Variables Describing Firm Characteristics

The following variables were obtained from CRSP, Compustat and FRED, for our sample period from 2000 to 2019:

- Leverage ($LEVMK$), measured as total long-term debt divided by the market value of equity.
- Firm size ($SIZE$), measured as the market value of equity plus the book value of total assets minus the book value of equity.
- Market-to-book ratio (MTB), defined as firm size divided by the book value of total assets.
- Abnormal earnings ($ABEARN$), calculated as the change in earnings between the current year and the previous year divided by the market value of equity.
- Fixed assets ratio ($FIXAT$), defined as net property, plant and equipment divided by total assets.
- Asset return standard deviation ($ARSTD$), defined as the standard deviation of monthly stock returns over the fiscal year multiplied by the ratio of the market value of equity to the market value of assets.
- Profitability ($PROFIT$), measured as operating income before depreciation divided by total assets.
- Asset maturity ($ATMAT$), defined by the formula

$$ATMAT = \frac{PPEGT}{AT} \times \frac{PPEGT}{DP} + \frac{ACT}{AT} \times \frac{ACT}{COGS},$$

  where $PPEGT$ is gross property, plant and equipment, AT is total assets, DP is depreciation and amortisation, ACT is total current assets, and $COGS$ is cost of goods sold. (These auxiliary variables were all downloaded from Compustat.)

- Term structure (*TERMSTR*), measured as the average monthly spread between the yields on 10-year and 6-month government bonds.
- Operating loss carryforward dummy variable (*OLC*), taking the value 1 if a firm has operating loss carryforwards, and 0 otherwise.
- Investment tax credit dummy variable (*ITC*), taking the value 1 if a firm has an investment tax credit, and 0 otherwise
- Z-score dummy variable (*ZSCORE*), taking the value 1 if Altman's Z-score exceeds 1.81, and 0 otherwise. Altman's Z-score is given by

$$\textit{Z-score} = 3.3 \times \frac{OIADP}{AT} + 1.2 \times \frac{ACT - LCT}{AT} + 0.6 \times \frac{PRCC\_F \times CSHO}{DLTT + DLC} + 1.4 \times \frac{RE}{AT},$$

  where *OIADP* is operating income after depreciation, *AT* is total assets, *ACT* is total current assets, *LCT* is current liabilities, *PRCC_F* is the closing stock price at the end of the fiscal year, *CSHO* is the number of common shares outstanding, *DLTT* is long-term debt, *DLC* is total debt in current liabilities, and *RE* is retained earnings. (These auxiliary variables were all downloaded from Compustat.)
- R&D intensity (*R&D*), measured as the fraction of R&D expenditure divided by total assets.
- Debt-to-equity ratio (*D/E*), measured as book value of debt divided by the book value of equity.

Finally, to capture the impact of research expenditure on the debt maturity structure of dual-class firms and staggered board firms, we constructed the interaction variables $DCS \times R\&D$ and $SB \times R\&D$.

Panel C in Table II presents summary statistics of the variables described above for our sample. Average firm size was 6.72, with a standard deviation of 2.28, while average R&D intensity was 0.10, with a standard deviation of 0.16. In addition, the average market-to-book ratio for the firms in our sample was 2.03, the average asset maturity was 10.3, and the mean value of the term structure variable was 1.63. Compared with the samples in Datta, Iskandar-Datta, and Raman (2005) and Brockman, Martin, and Unlu (2010), the firms in our sample had higher market-to-book ratios and shorter asset maturities. Moreover, it is evident that spreads between the yields on 10-year and 6-month government bonds widened after 2000.

D. Empirical Methodology

Stohs and Mauer (1996) noted that leverage is identified as an important determinant of debt maturity structure by several theories of capital structure. Barclay, Marx, and Smith Jr (2003) recognised that this introduces an econometric problem, however, since the leverage and debt maturity of a firm are jointly determined by the same financing decisions. This implies that leverage is endogenous to debt maturity, which means that OLS regressions of debt maturity against leverage (and other variables) will produce biased coefficients on leverage.

To overcome this problem, Datta, Iskandar-Datta, and Raman (2005) and Brockman, Martin, and Unlu (2010) estimated two-stage least squares (2SLS) regression models for debt maturity, in which leverage is treated as an endogenous variable. In the first stage, leverage is regressed against variables controlling for firm characteristics, while in the second stage, debt maturity is regressed against predicted leverage from the first stage and variables controlling for other firm characteristics. We follow their approach, by estimating the 2SLS model

$$
\begin{aligned}
LEVMK_t = &\alpha_0 + \alpha_1 ATP_t + \alpha_2 SIZE_t + \alpha_3 MTB_t + \alpha_4 ABEARN_t \\
&+ \alpha_5 FIXAT_t + \alpha_6 ARSTD_t + \alpha_7 PROFIT_t + \alpha_8 OLC_t \\
&+ \alpha_9 ITC_t + \epsilon_t
\end{aligned} \tag{1}
$$

$$
\begin{aligned}
DMD_t = &\beta_0 + \beta_1 ATP_t + \beta_2 LEVMK_t + \beta_3 SIZE_t + \beta_4 SIZE_t^2 \\
&+ \beta_5 ATMAT_t + \beta_6 MTB_t + \beta_7 TERMSTR_t + \beta_8 ABEARN_t \\
&+ \beta_9 ARSTD_t + \beta_{10} ZSCORE_t + \delta_t,
\end{aligned} \tag{2}
$$

where the debt maturity measures *DMD_1–DMD_5* are the dependent variables in equation (2) and the antitakeover provision indicator variable *ATP* is either *DCS* or *SB*. Statistical significance for the second-stage coefficient estimates is based on White (1980) heteroskedasticity-consistent z-statistics.

Consistent with Brockman, Martin, and Unlu (2010), Datta, Iskandar-Datta, and Raman (2005) and Barclay and Smith (1995), we expect a negative relationship between leverage (*LEVMK*) and debt maturity (*DMD*). Following Myers (1977), Stohs and Mauer (1996), and Johnson (2003), we expect a positive relationship between asset maturity (*ATMAT*) and debt maturity (*DMD*), based on the maturity matching hypothesis that firms match the maturities of their assets liabilities. We also expect a positive relationship between market-to-book ratios (*MTB*) and debt maturity (*DMD*).

If information asymmetry is indeed an important determinant of debt maturity, we expect the β_1 coefficients in equation (2) to be positive and decreasing as the dependent variable ranges through *DMD_1–DMD_5* when *ATP* is the dual-class dummy variable *DCS*, due to the high levels of information asymmetry in dual-class firms. Moreover, if Hypothesis 1 is true, we expect the β_1 coefficients to be larger when *ATP* is the dual-class dummy variable *DCS* than when it is the staggered board dummy variable *SB*. This would be consistent with our prediction that since dual-class firms have poorer information environments than staggered board firms, a greater proportion of their debt has short maturities.

Since the debt maturity variables *DMD_1–DMD_5* describe the proportions of a firm's total debt that matures within 1–5 years, they are indifferent to the proportion of equity on its balance sheet. The debt maturity variables *DMA_1–DMA_5* get around this problem to some extent, by including the effect of (the book value of) equity in the measurement of debt maturity. As an alternative to the model specified by equations (1)–(2), use these variables as the second-stage dependent variables for the 2SLS model

$$\begin{aligned} \mathit{LEVMK}_t = &\alpha_0 + \alpha_1 \mathit{DCS}_t + \alpha_2 \mathit{SIZE}_t + \alpha_3 \mathit{MTB}_t + \alpha_4 \mathit{ABEARN}_t \\ &+ \alpha_5 \mathit{FIXAT}_t + \alpha_6 \mathit{ARSTD}_t + \alpha_7 \mathit{PROFIT}_t + \alpha_8 \mathit{OLC}_t \\ &+ \alpha_9 \mathit{ITC}_t + \epsilon_t \end{aligned} \tag{3}$$

$$\begin{aligned} \mathit{DMA}_t = &\beta_0 + \beta_1 \mathit{DCS}_t + \beta_2 \mathit{LEVMK}_t + \beta_3 \mathit{SIZE}_t + \beta_4 \mathit{SIZE}_t^2 \\ &+ \beta_5 \mathit{ATMAT}_t + \beta_6 \mathit{MTB}_t + \beta_7 \mathit{TERMSTR}_t + \beta_8 \mathit{ABEARN}_t \\ &+ \beta_9 \mathit{ARSTD}_t + \beta_{10} \mathit{ZSCORE}_t + \delta_t. \end{aligned} \tag{4}$$

Statistical significance is once again determined by White (1980) heteroskedasticity-consistent z-statistics. Based on Hypothesis 1, we expect the coefficient β_1 in equation (4) to be negative, implying that dual-class firms issue shorter-term debt.

To test Hypothesis 2, we extend the model (2)–(2) by including the interaction variables

$DCS \times R\&D$ and $SB \times R\&D$. The resulting model is

$$
\begin{aligned}
LEVMK_t = & \alpha_0 + \alpha_1 ATP_t + \alpha_2 SIZE_t + \alpha_3 MTB_t + \alpha_4 ABEARN_t \\
& + \alpha_5 FIXAT_t + \alpha_6 ARSTD_t + \alpha_7 PROFIT_t + \alpha_8 OLC_t \\
& + \alpha_9 ITC + \epsilon_t
\end{aligned} \tag{5}
$$

$$
\begin{aligned}
DMD_t = & \beta_0 + \beta_1 ATP_t + \beta_2 ATP_t \times R\&D_t + \beta_3 R\&D_t + \beta_4 LEVMK_t \\
& + \beta_5 SIZE_t + \beta_6 SIZE_t^2 + \beta_7 ATMAT_t + \beta_8 MTB_t \\
& + \beta_9 TERMSTR_t + \beta_{10} ABEARN_t + \beta_{11} ARSTD_t \\
& + \beta_{12} ZSCORE_t + \delta_t,
\end{aligned} \tag{6}
$$

where the dependent variables in equation (2) are *DMD_1*–*DMD_5* and the antitakeover provision indicator variable *ATP* is either *DCS* or *SB*. As before, statistical significance is based on White (1980) heteroskedasticity-consistent z-statistics. If Hypothesis 2 is true, the coefficient β_2 in equation (2) should be negative for both antitakeover dummy variables.

IV. Empirical Results

A. Univariate Test Results

Table III presents the results of two-sample *t*-tests for all variables, where the samples are determined by the dual-class and staggered board dummy variables. According to the results in Panel A, dual-class firms have higher leverage (*LEVMK*) than single-class firms, which agrees with the evidence presented by Dey, Nikolaev, and Wang (2016), Baran, Forst, and Tony Via (2023), and Gompers, Ishii, and Metrick (2010). We also see that dual-class firms have lower R&D intensities (*R&D*) than their single-class counterparts. This agrees with the results of

Dey, Nikolaev, and Wang (2016). However, it is inconsistent with the evidence presented by Jordan, Kim, and Liu (2016), whose two-sample t-tests indicated that R&D intensities were higher in dual-class firms, based on their 1994–2011 sample.

Dual-class firms are generally larger (*SIZE*) than single-class firms in our sample, with a lower average market-to-book ratio (*MTB*), consistent with the results in Gompers, Ishii, and Metrick (2010) and Jordan, Kim, and Liu (2016). We also observe a higher average asset maturity ratio (*ATMAT*), a higher average fixed assets ratio (*FIXAT*), and a higher average profitability ratio (*PROFIT*) among dual-class firms.

Two-sample t-test results for firms separated by the staggered board dummy variable are presented in Panel B of Table III. We do not see a significant difference between staggered board firms and unitary board firms with respect to leverage (*LEVMK*). However, staggered board firms are generally larger than unitary board firms (*SIZE*), which agrees with the evidence in Bebchuk and Cohen (2005), Faleye (2007), and Guernsey, Guo, Liu, and Serfling (2022).

Average R&D intensities (*R&D*) for staggered boards are higher than those for unitary board firms, but the difference is not significant. This provides lukewarm support for the argument in Duru, Wang, and Zhao (2013), Cremers, Litov, and Sepe (2017), and Nguyen, Vu, and Yin (2021) that staggered boards encourage corporate innovation by reducing pressure from myopic shareholders. Finally, we note that staggered board firms have lower average market-to-book ratios (*MTB*) and fixed asset ratios (*FIXAT*) than unitary board firms, but average profitability ratios (*PROFIT*) are higher.

B. Results on Debt Maturity

To examine Hypothesis 1, we first estimate the 2SLS model (1)–(2) for dual-class firms, by setting *ATP* equal to *DCS*. Predicted leverage (*LEVMK*) is determined in the first stage regression by estimating equation (1). It is then used to estimate equation (2) in the second stage regression, where the dependent variables *DMD_1*–*DMD_5* are the fractions of a firm's total debt maturing in 1–5 years.

The coefficients β_1 on the dual-class indicator variable (*DCS*) are used to evaluate Hypothesis 1. Based on that hypothesis, we expect those coefficients to be positive and larger for shorter term debt maturities, indicating that dual-class firms are more likely to issue shorter-term debt when they do issue debt. Following Smith and Watts (1992) and Barclay and Smith (1995), we also expect the coefficient β_2 on predicted leverage (*LEVMK*) to be negative. Stohs and Mauer (1996) found that larger firms with lower risk favour debt with longer maturities. Consequently, we expect the coefficient β_3 on firm size (*SIZE*) to be negative. With reference to the reasoning and evidence in Myers (1977) and Johnson (2003), we expect the coefficient β_5 on asset maturity (*ATMAT*) to be positive, indicating that firms match the maturities of their debt with the maturities of their assets. We also expect the coefficient β_6 on market-to-book ratios (*MTB*) to be positive, based on the evidence in Brockman, Martin, and Unlu (2010) and Datta, Iskandar-Datta, and Raman (2005) that firms use short-term debt to alleviate the underinvestment problem.

Table IV presents the second-stage regression results from estimating equation 2. In each of columns (1)–(5) the corresponding debt maturity variable *DMD_1*–*DMD_5* is the dependent variable. We observe that the coefficients on *DCS* are positive and monotonically decreasing as we run from column (1) to column (5), and are statistically significant in the first three columns. This is consistent with Hypothesis 1. In particular, it suggests that a significantly larger portion of the debt issued by dual-class firms matures in less than three years, than is the case for single-class firms.

The coefficient on *DCS* in column (1) is 0.063 and is significant at the 1% level. This can be interpreted to mean that dual-class firms have about 6.3% more debt (expressed as a fraction of total debt) maturing in less than 1 year, compared with single-class firms. Similarly, the coefficient on *DCS* in column (2) implies that dual-class firms have about 4.5% more debt maturing in less than 2 years, compared with single-class firms. As we move to the right along the columns, the coefficient on *DCS* becomes progressively insignificant, both economically and statistically. For example, when we consider the fraction of total debt maturing within five years, there is essentially no difference between dual-class firms and single-class firms. The fact that the coefficient on *DCS* decreases monotonically from column (1) to column (5) is very suggestive, because it points to a real economic effect rather than a vagary in the data.

So far we have provided evidence on half of Hypothesis 1, by showing that dual-class firms exhibit lower debt maturities than firms in the overall sample. For the other half of the hypothesis, it is sufficient to demonstrate that debt maturities are higher among staggered board firms than firms in the overall sample. Once again, we estimate the 2SLS model (1)–(2), but this time the dummy variable *ATP* is set to *SB*. As before, predicted leverage (*LEVMK*) is determined in the first-stage regression by estimating equation (1). That variable is then used in the second stage regression to estimate equation (2), with dependent variables *DMD_1*–*DMD_5*.

Table V presents the second-stage regression results from estimating equation (2). The dependent variables in columns (1)–(5) are the fractions *DMD_1*–*DMD_5* of total debt maturing in 1–5 years. We begin by observing that the coefficients on *SB* are negative and statistically significant at the 1% level in all columns. For example, the coefficient -0.02 in column (1) indicates that staggered board firms issue about 2% less debt (measured as a fraction of total debt) maturing within 1 year than unitary board firms. This pattern holds for all maturities up to 5 years, indicating that staggered board firms generally issue longer-maturity debt (as a fraction of total debt) than unitary board firms. Combining this with the evidence in Table IV showing that dual-class firms have shorter debt maturities than single-class firms, and bearing in mind that there is minimal overlap between dual-class firms and staggered board firms, we conclude that the debt maturities of dual-class firms are generally shorter than those of staggered board firms, in line with Hypothesis 1.

In terms of control variables, our coefficients broadly agree with previous literature, such as Barclay and Smith (1995), Datta, Iskandar-Datta, and Raman (2005), and Brockman, Martin, and Unlu (2010). Consistent with those studies, we observe negative coefficients on leverage (*LEVMK*) in table IV and V. In accordance with the literature, we also obtain negative coefficients on firm size (*SIZE*) in both tables. This result agrees with the theoretical prediction of Diamond (1991a) that firm size and debt maturity should be positively correlated. Consistent with Myers (1977), who argued that firms should match the maturities of their assets and liabilities, we obtain negative coefficients on *ATMAT*. The positive coefficients on *MTB* also agree with the literature, since firms with more growth opportunities have higher levels of information asymmetry, which implies that they should issue debt with shorter maturities. With respect to term structure, our results are consistent with the evidence presented in Barclay and Smith (1995), Datta, Iskandar-Datta, and Raman (2005), and Brockman, Martin, and Unlu (2010), since the coefficients on *TERMSTR* are positive.[4]

[4]Barclay and Smith (1995) noted that their results on the impact of term structure on debt maturity do not support the tax hypothesis of Brick and Ravid (1991), but agree instead with the prediction by Lewis (1990) that tax is irrelevant for debt maturity. The tax hypothesis of Brick and Ravid (1991) claims that firms should

The results in Tables IV and V lend additional empirical support to the importance of information asymmetry as a determinant of debt maturity. The theoretical models of Flannery (1986) and Diamond (1991a) predict that debt maturities should decrease as information asymmetry increases, since poor information environments increase concerns about default risk among lenders, which reduces their willingness to invest in long-dated debt. A negative relationship between debt maturity and information asymmetry has been established empirically by several studies, including Barclay and Smith (1995), Guedes and Opler (1996), Goswami (2000), Danisevska (2002), Berger, Espinosa-Vega, Frame, and Miller (2005), Wittenberg Moerman (2009), and Daniels, Diro Ejara, and Vijayakumar (2010).[5] Our results provide interesting new evidence for this relationship. To begin with, the empirical evidence presented by Lim (2016), Jordan, Kim, and Liu (2016), and Li and Zaiats (2018) shows that dual-class firms exhibit high levels of information asymmetry. By contrast, Jiraporn, Chintrakarn, and Kim (2012) showed that staggered board firms provide good information environments. We may therefore interpret the lower debt maturities of dual-class firms in Table IV and the higher debt maturities of staggered board firms in Table V as novel evidence on the importance of information asymmetry as a determinant of debt maturity.

Baulkaran (2014) noted that equity is likely a more attractive source of external funding for dual-class firms than single-class firms, because controlling shareholders can maintain a voting block of superior voting shares. This resonates with the evidence in Casavecchia, Hulley, and Yang (2024) that dual-class firms appear to fund R&D projects by issuing equity, while the same

issue longer maturity debt when the term structure has an upward slope, in order to reduce their excepted tax liabilities. Lewis (1990), on the other hand, predicted that taxes do not affect debt maturities because firms make their leverage decisions before they decide on debt maturity.

[5] See also the related empirical evidence presented by Sengupta (1998), Mansi, Maxwell, and Miller (2011), and Derrien, Kecskés, and Mansi (2016), who documented a negative association between information asymmetry and cost of debt.

is not true for single-class firms. Given the apparent difference in appetite for equity financing between dual-class firms and single-class firms, we introduced the debt maturity variables *DMA_1*–*DMA_5*, which scale debt maturing within 1–5 years by a firm's total assets.

To assess the impact of dual-class shares on these measures of debt maturity, we estimate the 2SLS model (3)–(4). As before, predicted leverage (*LEVMK*) is determined in the first stage regression by estimating equation (3). It is then used to estimate equation (4) in the second-stage regression, where the equity-inclusive debt-maturity variables *DMA_1*–*DMA_5* are the dependent variables. The results of the second-stage regression are presented in Table VI. The coefficients on the dual-class dummy variable *DCS* are negative and significant in all columns and increase monotonically from column (2) to column (5).

When comparing Tables IV and VI, we observe that the signs of the coefficients on *DCS* change from negative to positive. Since the same independent variables are present in equations (2) and (4), this change of sign is entirely due to the change in the scaling factor (i.e. the denomintor) in the definition of the debt maturity variables used in the two tables, from total debt to total assets (which is the same as total debt plus equity). The new scaling factor sheds light on the debt-maturity preferences of dual-class firms in a way that takes their overall debt-to-equity ratios into account. For example, the coefficient on *DCS* in column (1) of Table VI indicates that dual-class firms issue 1% less debt maturing in under one year, expressed as a fraction of total assets, than single-class firms. By contrast, our analysis of Table IV showed that dual-class firms issue 6.3% more debt maturing in under one year, expressed as a fraction of total debt, than single-class firms. The apparent contradiction is resolved by the evidence on debt-to-equity ratios in Panel A of Table III, which suggests that dual-class firms have substantially higher proportions of equity in their capital structures than single-class firms.[6] Consequently, short-term debt can be a larger proportion of total debt for dual-class firms (according to Table IV), even if it is a smaller proportion of total capital (according to Table VI).

In summary, our results indicate that dual-class firms tend to issue shorter maturity debt than single-class firms when they issue debt, but they appear to issue less debt overall. We also see that dual-class firms issue more short maturity debt than staggered board firms, as a fraction of total debt, in line with Hypothesis 1.

C. Results on the Impact of R&D on Debt Maturity

To examine the effect of R&D on the debt-maturity structures of dual-class firms and staggered board firms, we use 2SLS regression to estimate equations (5)–(6), where the antitakeover dummy variable *ATP* is either the dual-class indicator variable *DCS* or the staggered board indicator variable *SB*. Table VII presents the results of the second-stage regression, for the case of dual-class firms. We observe that the coefficients on the dual-class dummy variable (*DCS*) are positive and significant in all columns, while the coefficients on the interaction variable ($DCS \times R\&D$) are negative and significant in columns (2)–(5). These results show that although dual-class firms generally issue more short-term debt than single-class firms (expressed as a fraction of total debt), the debt maturities of dual-class firms increase as their R&D intensities increase. According to column (2), for example, a one standard deviation increase in R&D intensity corresponds with a reduction in the expected fraction of debt maturing within 2 years of $0.386 \times {}^{0.16}/_{0.39} = 15.8\%$, for a dual-class firm with average R&D intensity.[7]

[6]According to Table III, the economic difference between the debt-to-equity ratios of dual-class firms and single-class firms is massive, with dual-class firms having half as much debt as equity on their balance sheets, on average, and single-class firms having almost twice as much debt as equity. However, we do note that the difference is statistically insignificant.

[7]In Table II we see that the average fraction of debt maturing in less than 2 years (*DMD_2*) is 0.39 and the standard deviation of R&D intensity (*R&D*) is 0.16.

Table VIII presents the second-stage regression results from estimating equations (5)–(6) for staggered board firms. The coefficients on the staggered board dummy variable (*SB*) are negative and significant in all columns, while the coefficients on the interaction variable ($SB \times R\&D$) are positive and significant in all columns. This indicates that although staggered board firms tend to issue less short-maturity debt than unitary board firms (expressed as a fraction of total debt), their debt maturities decrease as they spend more on R&D. According to column (2), for example, a one-standard deviation increase in R&D intensity is associated with an increase in debt maturing within 2 years of $0.122 \times {}^{0.16}/_{0.39} = 5.0\%$, for a staggered board firm with average R&D intensity.[8]

With respect to the reaction of a firm's debt maturity to an increase in R&D expenditure, we recall that there are two competing hypotheses. Under the information asymmetry hypothesis, R&D increases information asymmetry, which reduces debt maturities. On the other hand, since R&D projects are long-term investments, an increase in R&D expenditure should increase debt maturity, according to the maturity matching hypothesis. The results in Table VII suggest that the maturity matching hypothesis is more applicable to dual-class firms, while the results in Table VIII show that the information asymmetry hypothesis is more appropriate for staggered board firms.

V. Conclusions

This paper examines how dual-class shares and staggered boards affect corporate debt maturities. A significant empirical contribution is that we use new dual-class and staggered board indicator variables that are more comprehensive and more accurate than the widely-used dummy

[8]In Table II we see that the average fraction of debt maturing in less than 2 years (*DMD_2*) is 0.39 and the standard deviation of R&D intensity (*R&D*) is 0.16.

variables in the existing literature. Another important contribution is that we run side-by-side tests on dual-class firms and staggered board firms. This facilitates a unique direct comparison of the debt maturity structures of firms with these two antitakeover provisions.

Although dual-class shares and staggered boards are both antitakeover mechanisms, dual-class firms and staggered board firms differ substantially with respect to information asymmetry and analyst coverage. To wit, dual-class firms exhibit much higher levels of information asymmetry than staggered board firms, and are followed by fewer analysts, in general. This has significant implications for the debt maturity structures of dual-class firms and staggered board firms, due to the well-established negative relationship between information asymmetry and debt maturity. In particular, it implies that the debt of dual-class firms should be biased towards shorter maturities, compared with the debt of staggered board firms. Our empirical tests confirm this prediction.

We also examine the differential impact of R&D investment on the debt maturities of dual-class firms and staggered board firms. Here we obtain mixed results. For dual-class firms, we find that debt maturities increase as R&D expenditure increases. Given the long-term nature of R&D investments, this result is consistent with the maturity matching hypothesis, according to which firms should match the maturities of their liabilities with the maturities of their assets. By contrast, for staggered board firms, we observe a reduction in debt maturities as R&D expenditure increases. This is consistent with the information asymmetry hypothesis, according to which R&D should reduce debt maturities because it contributes to information asymmetry.

The previous result raises an interesting question: Is the reduction in short-maturity debt among R&D-active dual-class firms driven by the substitution of short-term debt for equity, or are such firms genuinely shifting their debt maturity structures by switching from short-term debt into long-term debt? This is an intriguing question, because in Casavecchia, Hulley, and Yang (2024) we already establish that dual-class firms use equity as the primary financing channel for R&D projects. We intend to investigate this question in future research.

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Table I
The Dual-Class Indicator Variable

Panel A presents the distribution of dual-class and single-class firms for each year of our sample period 1991–2019. Panel B compares our dual-class dummy variable (*DCS*) with the dual-class dummy variable ($DCS^{\dagger}$) constructed by Gompers, Ishii, and Metrick (2010).

Panel A: Distribution of Dual-Class and Single-Class Firms

Year	$DCS = 1$	$DCS = 0$
1991	245	3364
1992	269	3704
1993	287	4015
1994	327	4232
1995	346	4380
1996	386	4618
1997	400	4657
1998	398	4424
1999	408	4225
2000	399	4091
2001	359	3777
2002	337	3540
2003	316	3331
2004	305	3275
2005	282	3189
2006	266	3097
2007	251	2997
2008	239	2843
2009	221	2709
2010	220	2623
2011	218	2524
2012	216	2443
2013	219	2441
2014	223	2510
2015	228	2473
2016	225	2408
2017	213	2273
2018	206	2138
2019	159	1758
Total	8168	94059

Panel B: Comparison of DCS and $DCS^{\dagger}$

Year	$DCS = 1$	$DCS^{\dagger} = 1$	$DCS = 1$ & $DCS^{\dagger} = 0$	$DCS = 0$ & $DCS^{\dagger} = 1$
1995	346	318	61	30
1996	386	335	82	28
1997	400	361	71	30
1998	398	368	66	35
1999	408	360	77	29
2000	399	357	66	24
2001	359	324	61	26
2002	337	287	67	17
Total	3033	2710	551	219

Table II
Descriptive Statistics

This table describes the descriptive statistics for dependent and main independent variables in our sample from 2000 to 2019. The variable descriptions are listed in Section III. Panel A illustrates the debt maturities scaled by total liability, Panel B shows the debt maturities scaled by total asset, and Panel C list all main independent variables.

	Obs	Mean	Std. Dev.	1%	5%	Median	95%	99%
Panel A: Scaled by Total Liability								
DMD_1	47213	0.26	0.32	0.00	0.00	0.12	1.00	1.00
DMD_2	39466	0.39	0.36	0.00	0.00	0.26	1.00	1.00
DMD_3	38071	0.49	0.36	0.00	0.00	0.41	1.00	1.00
DMD_4	36644	0.58	0.35	0.00	0.01	0.58	1.00	1.00
DMD_5	34616	0.68	0.32	0.00	0.06	0.77	1.00	1.00
Panel B: Scaled by Total Asset								
	Obs	Mean	Std. Dev.	1%	5%	Median	95%	99%
DMA_1	56929	0.04	0.09	0.00	0.00	0.01	0.20	0.44
DMA_2	49377	0.07	0.11	0.00	0.00	0.02	0.28	0.50
DMA_3	49050	0.09	0.13	0.00	0.00	0.04	0.35	0.59
DMA_4	48775	0.12	0.15	0.00	0.00	0.07	0.41	0.65
DMA_5	47884	0.14	0.16	0.00	0.00	0.09	0.47	0.72
Panel C: Firm Character Variables								
	Obs	Mean	Std. Dev.	1%	5%	Median	95%	99%
DCS	44590	0.09	0.28	0.00	0.00	0.00	1.00	1.00
LEVMK	56802	0.46	1.05	0.00	0.00	0.12	2.02	7.37
SIZE	56908	6.72	2.28	2.14	3.13	6.65	10.66	12.03
MTB	56905	2.03	1.62	0.52	0.76	1.48	5.23	10.32
ATMAT	54706	10.30	11.07	0.41	0.99	6.29	33.67	59.94
TERMSTR	57080	1.63	1.11	-0.20	-0.20	1.67	2.97	3.02
ABEARN	53864	0.02	0.30	-1.07	-0.29	0.00	0.35	1.79
FIXAT	57024	0.26	0.23	0.00	0.01	0.19	0.75	0.88
ARSTD	55981	0.09	0.09	0.01	0.02	0.07	0.25	0.43
PROFIT	56934	0.01	0.30	-1.51	-0.61	0.10	0.26	0.37
R&D	38824	0.10	0.16	0.00	0.00	0.04	0.41	0.73

Table III
Univariate Tests for All Variables by Antitakeover Provision Dummies

This table presents two-sample t-tests for all variables, where the samples are determined by the dual-class indicator variable (*DCS*) or staggered board indicator variable (*SB*). Statistical significance for the differences is signified at the 1%, 5% and 10% levels by ***, **, and *, respectively.

Variables	Obs.(0)	Mean(0)	Obs.(1)	Mean(1)	Diff.(0-1)	t-value
			Panel A: Dual-Class Dummy			
LEVMK	27992	0.277	1753	0.427	-0.150***	-8.029
SIZE	27992	6.418	1753	6.912	-0.494***	-9.202
MTB	27992	2.245	1753	1.873	0.373***	9.005
ATMAT	27992	7.958	1753	9.147	-1.189***	-5.573
TERMSTR	27992	1.650	1753	1.626	0.023	0.845
ABEARN	27992	0.018	1753	0.019	-0.001	-0.143
FIXAT	27992	0.194	1753	0.247	-0.052***	-12.498
ARSTD	27992	0.108	1753	0.083	0.025***	11.056
PROFIT	27992	-0.014	1753	0.092	-0.105***	-13.780
R&D	27992	0.096	1753	0.043	0.053***	14.933
D/E	27992	1.897	1753	0.531	1.366	0.386
			Panel B: Staggered Board Dummy			
LEVMK	17782	0.343	16967	0.328	0.014	0.87
SIZE	17782	6.17	16967	6.331	-0.161***	-6.878
MTB	17782	2.355	16967	2.225	0.129***	5.321
ATMAT	17782	9.104	16967	9.556	-0.451	-0.616
TERMSTR	17782	1.448	16967	1.468	-0.020*	-1.78
ABEARN	17782	0.024	16967	0.027	-0.003	-0.407
FIXAT	17782	0.208	16967	0.216	-0.008***	-4.324
ARSTD	17782	0.11	16967	0.106	0.004***	3.959
PROFIT	17782	-0.006	16967	-0.005	-0.002	-0.320
R&D	17782	0.088	16967	0.09	-0.002	-1.140
D/E	17782	3.816	16967	0.621	3.195	1.131

Table IV
Second Stage Regression Coefficients for the Percentage of Total Debt Maturing in 1–5 Years, for Dual-Class Firms

This table presents the results from the second-stage regression model (2). The dependent variables *DMD_1—DMD_5* are the fractions of total debt maturing in 1–5 years. The dual-class dummy variable (*DCS*) is the primary independent variable of interest. Predicted leverage (*LEVMK*) is obtained from the first-stage regression (1), where it is the dependent variable. Statistical significance is based on White (1980) heteroskedasticity-consistent z-statistics and is signified at the 1%, 5% and 10% levels by ***, **, and *, respectively.

Variables	(1) *DMD_1*	(2) *DMD_2*	(3) *DMD_3*	(4) *DMD_4*	(5) *DMD_5*
DCS	0.063**	0.045***	0.027**	0.014	0.004
	(2.52)	(2.92)	(2.07)	(1.21)	(0.38)
LEVMK	-0.118***	-0.156***	-0.118***	-0.103***	-0.099***
	(-7.73)	(-7.47)	(-6.81)	(-6.37)	(-6.42)
SIZE	-0.119***	-0.142***	-0.146***	-0.100***	-0.030***
	(-12.11)	(-14.12)	(-16.94)	(-12.30)	(-3.86)
$SIZE^2$	0.005***	0.005***	0.005***	0.002***	-0.002***
	(6.59)	(7.29)	(8.29)	(3.58)	(-3.90)
ATMAT	-0.000*	0.000	-0.001***	-0.001***	-0.001***
	(-1.93)	(-1.36)	(-4.46)	(-4.12)	(-4.02)
MTB	0.003*	0.006***	0.007***	0.007***	0.005***
	(1.90)	(3.00)	(4.47)	(4.24)	(3.22)
TERMSTR	0.000	0.005*	0.011***	0.013***	0.011***
	(0.05)	(1.77)	(4.70)	(5.74)	(5.14)
ABEARN	-0.001	-0.001	0.000	0.000	0.000
	(-0.96)	(-0.91)	(-0.86)	(-0.31)	(-0.48)
ARSTD	-0.126**	-0.130	-0.115	-0.173**	-0.244***
	(-1.98)	(-1.61)	(-1.52)	(-2.42)	(-3.59)
ZSCORE	-0.161***	-0.191***	-0.121***	-0.103***	-0.116***
	(-6.95)	(-5.70)	(-4.15)	(-3.71)	(-4.36)
Observations	33,361	28,638	27,720	26,675	25,222

Table V
Second Stage Regression Coefficients for the Percentage of Total Debt Maturing in 1–5 Years, for Staggered Board Firms

This table presents the results from the second-stage regression model (2). The dependent variables *DMD_1*—*DMD_5* are the fractions of total debt maturing in 1–5 years. The staggered board dummy variable (*SB*) is the primary independent variable of interest. Predicted leverage (*LEVMK*) is obtained from the first-stage regression (1), where it is the dependent variable. Statistical significance is based on White (1980) heteroskedasticity-consistent z-statistics and is signified at the 1%, 5% and 10% levels by ***, **, and *, respectively.

Variables	(1) *DMD_1*	(2) *DMD_2*	(3) *DMD_3*	(4) *DMD_4*	(5) *DMD_5*
SB	-0.020***	-0.025***	-0.023***	-0.022***	-0.020***
	(-4.14)	(-4.14)	(-4.09)	(-4.37)	(-4.40)
LEVMK	-0.059***	-0.126***	-0.098***	-0.076***	-0.050***
	(-3.72)	(-5.43)	(-4.59)	(-4.45)	(-3.49)
SIZE	-0.137***	-0.153***	-0.154***	-0.116***	-0.062***
	(-16.10)	(-13.06)	(-14.45)	(-13.01)	(-7.75)
$SIZE^2$	0.006***	0.006***	0.006***	0.003***	0.000
	(10.61)	(7.14)	(7.41)	(4.92)	(-0.14)
ATMAT	-0.000***	0.000	0.000	0.000	0.000
	(-3.18)	(-1.33)	(-1.20)	(-1.26)	(-1.37)
MTB	0.006***	0.007***	0.009***	0.010***	0.010***
	(3.66)	(3.23)	(4.80)	(5.46)	(6.04)
TERMSTR	0.003*	0.007***	0.013***	0.015***	0.012***
	(1.86)	(3.27)	(6.14)	(7.30)	(6.58)
ABEARN	-0.021*	-0.034	-0.023	-0.016	-0.014
	(-1.80)	(-1.43)	(-1.24)	(-1.11)	(-1.04)
ARSTD	0.126*	0.016	0.014	0.006	0.050
	(1.84)	(0.18)	(0.16)	(0.08)	(0.77)
ZSCORE	-0.050*	-0.123***	-0.064**	-0.029	0.006
	(-1.86)	(-3.62)	(-2.01)	(-1.13)	(0.26)
Observations	31,972	27,642	26,831	25,908	24,569

Table VI
Second Stage Regression Coefficients for Debt Maturing in 1–5 Years Scaled by Total Assets, for Dual-Class Firms

This table presents the results from the second-stage regression model (2). The dependent variables *DMA_1*—*DMA_5* are the ratios of debt maturing in 1–5 years relative to total assets. The dual-class dummy variable (*DCS*) is the primary independent variable of interest. Predicted leverage (*LEVMK*) is obtained from the first-stage regression (1), where it is the dependent variable. Statistical significance is based on White (1980) heteroskedasticity-consistent z-statistics and is signified at the 1%, 5% and 10% levels by ***, **, and *, respectively.

Variables	(1) *DMA_1*	(2) *DMA_2*	(3) *DMA_3*	(4) *DMA_4*	(5) *DMA_5*
DCS	-0.010**	-0.010**	-0.015***	-0.019***	-0.025***
	(-2.07)	(-2.54)	(-2.99)	(-3.22)	(-3.45)
LEVMK	0.021***	0.043***	0.061***	0.082***	0.101***
	(9.53)	(10.63)	(11.43)	(11.87)	(12.06)
SIZE	-0.031***	-0.041***	-0.039***	-0.029***	-0.015***
	(-20.01)	(-21.14)	(-16.77)	(-10.70)	(-4.81)
$SIZE^2$	0.002***	0.002***	0.002***	0.002***	0.001***
	(14.49)	(17.29)	(13.01)	(7.75)	(3.29)
ATMAT	-0.000**	0.000	0.000	0.000	0.000
	(-2.18)	(-0.57)	(-0.14)	(0.13)	(0.28)
MTB	0.002***	0.004***	0.004***	0.005***	0.004***
	(3.73)	(3.44)	(3.34)	(3.25)	(3.10)
TERMSTR	-0.001**	-0.001*	-0.001	-0.001	-0.002
	(-2.47)	(-1.82)	(-0.77)	(-0.94)	(-1.51)
ABEARN	0.000	0.000	0.000	0.001	0.001
	(0.77)	(0.63)	(0.88)	(1.23)	(1.18)
ARSTD	-0.046***	-0.033**	-0.044***	-0.049**	-0.052**
	(-4.49)	(-2.44)	(-2.61)	(-2.41)	(-2.22)
ZSCORE	0.018***	0.038***	0.052***	0.062***	0.071***
	(8.29)	(13.57)	(14.59)	(14.90)	(14.62)
Observations	40,470	35,992	35,896	35,734	35,177

Table VII
Second Stage Regression Coefficients for the Percentage of Total Debt Maturing in 1–5 Years with Interaction Effect, for Dual-Class Firms

This table presents the results from the second-stage regression model (6). The dependent variables *DMD_1*—*DMD_5* are the fractions of total debt maturing in 1–5 years. The variable *DCS* × *R&D* interacting the dual-class dummy variable (*DCS*) with R&D intensity (*R&D*) is the primary independent variable of interest. Predicted leverage (*LEVMK*) is obtained from the first-stage regression (5), where it is the dependent variable. Statistical significance is based on White (1980) heteroskedasticity-consistent z-statistics and is signified at the 1%, 5% and 10% levels by ***, **, and *, respectively.

Variables	(1) *DMD_1*	(2) *DMD_2*	(3) *DMD_3*	(4) *DMD_4*	(5) *DMD_5*
DCS	0.045***	0.072***	0.064***	0.052***	0.049**
	(2.74)	(3.19)	(3.11)	(2.63)	(2.50)
DCS × *R&D*	-0.200	-0.386**	-0.493***	-0.384**	-0.357*
	(-1.46)	(-2.09)	(-2.75)	(-2.07)	(-1.96)
R&D	-0.100***	-0.034	-0.042	-0.082**	-0.140***
	(-2.94)	(-0.81)	(-1.06)	(-2.04)	(-3.73)
LEVMK	-0.186***	-0.225***	-0.188***	-0.172***	-0.165***
	(-7.19)	(-6.54)	(-6.24)	(-5.72)	(-5.80)
SIZE	-0.115***	-0.145***	-0.143***	-0.097***	-0.031***
	(-15.00)	(-15.36)	(-16.57)	(-11.18)	(-3.78)
$SIZE^2$	0.004***	0.005***	0.005***	0.002***	-0.002***
	(8.86)	(8.66)	(8.48)	(3.27)	(-3.74)
ATMAT	-0.000**	0.000	-0.001***	-0.001***	-0.000***
	(-2.31)	(-1.21)	(-2.97)	(-2.59)	(-2.62)
MTB	0.002	0.004**	0.006***	0.005***	0.004***
	(1.24)	(2.25)	(3.58)	(3.36)	(2.87)
TERMSTR	-0.002	0.003	0.008**	0.010***	0.010***
	(-0.76)	(0.76)	(2.51)	(3.16)	(3.35)
ABEARN	0.000	0.000	0.000	0.000	0.000
	(-0.68)	(-0.83)	(-0.76)	(-0.71)	(-0.89)
ARSTD	-0.049	-0.032	-0.063	-0.140**	-0.179***
	(-0.96)	(-0.55)	(-1.01)	(-2.26)	(-3.19)
ZSCORE	-0.124***	-0.143***	-0.110***	-0.116***	-0.136***
	(-4.18)	(-3.52)	(-3.02)	(-3.15)	(-3.92)
Observations	23,551	19,947	19,202	18,397	17,404

Table VIII
Second Stage Regression Coefficients for the Percentage of Total Debt Maturing in 1–5 Years with Interaction Effect, for Staggered Board Firms

This table presents the results from the second-stage regression model (6). The dependent variables *DMD_1—DMD_5* are the fractions of total debt maturing in 1–5 years. The variable *SB* × *R&D* interacting the staggered board dummy variable (*SB*) with R&D intensity (*R&D*) is the primary independent variable of interest. Predicted leverage (*LEVMK*) is obtained from the first-stage regression (5), where it is the dependent variable. Statistical significance is based on White (1980) heteroskedasticity-consistent z-statistics and is signified at the 1%, 5% and 10% levels by ***, **, and *, respectively.

Variables	(1) *DMD_1*	(2) *DMD_2*	(3) *DMD_3*	(4) *DMD_4*	(5) *DMD_5*
SB	-0.032***	-0.032***	-0.028***	-0.026***	-0.024***
	(-4.70)	(-3.92)	(-3.56)	(-3.49)	(-3.41)
SB × *R&D*	0.127***	0.122**	0.107**	0.118**	0.095**
	(3.03)	(2.57)	(2.34)	(2.57)	(2.24)
R&D	-0.170***	-0.119***	-0.118***	-0.143***	-0.181***
	(-4.58)	(-2.59)	(-2.74)	(-3.29)	(-4.55)
LEVMK	-0.180***	-0.212***	-0.175***	-0.150***	-0.135***
	(-6.91)	(-6.22)	(-5.91)	(-5.28)	(-5.30)
SIZE	-0.108***	-0.144***	-0.143***	-0.101***	-0.038***
	(-13.33)	(-14.62)	(-15.76)	(-11.24)	(-4.65)
$SIZE^2$	0.004***	0.005***	0.005***	0.002***	-0.002***
	(7.54)	(8.13)	(7.93)	(3.52)	(-2.76)
ATMAT	-0.000**	0.000	-0.000**	-0.000**	-0.000**
	(-2.15)	(-1.08)	(-2.41)	(-2.20)	(-2.37)
MTB	0.001	0.004**	0.007***	0.007***	0.006***
	(0.75)	(2.06)	(3.91)	(3.97)	(3.99)
TERMSTR	0.001	0.006	0.011***	0.013***	0.012***
	(0.26)	(1.58)	(3.13)	(3.95)	(3.96)
ABEARN	-0.032	-0.048	-0.042	-0.025	-0.026
	(-1.29)	(-1.27)	(-1.29)	(-0.88)	(-0.96)
ARSTD	-0.022	-0.009	-0.048	-0.102	-0.127**
	(-0.39)	(-0.13)	(-0.72)	(-1.58)	(-2.20)
ZSCORE	-0.116***	-0.128***	-0.090**	-0.085**	-0.100***
	(-3.84)	(-3.16)	(-2.52)	(-2.46)	(-3.19)
Observations	21,027	17,855	17,195	16,484	15,596