

Income Smoothing with Unlimited Liability Firms^{*}

Jochen Bigus^{**}, Philipp Schorn and Nadine Georgiou

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Abstract

We analyze income smoothing with private small and medium sized enterprises (SMEs) in Germany. We find that unlimited liability firms smooth income less than corporations. Levels of income smoothing are lower by 10-20%. Unlimited liability mitigates agency problems of debt and thus reduces the need for income smoothing in debt contracting. Further, income smoothing is positively related to the level of bank debt, but not to the level of total debt. With unlimited liability the association between income smoothing and bank debt is weaker. Finally, income smoothing is positively associated with stronger tax avoidance incentives, regardless of the liability status.

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^{**}Corresponding author: Prof. Jochen Bigus, University of Bern, Institute of Accounting and Control, Engehaldenstrasse 4, 3012 Bern, Switzerland, bigus@iuc.unibe.ch. Nadine Georgiou is a Ph.D. candidate at University of Bern, Institute of Accounting and Control, Dr. Philipp Schorn is with Pricewaterhouse Coopers, Düsseldorf, Germany.

1 Introduction

It is quite striking that certainly more than 98% of all financial accounting research papers deal with publicly listed firms even though in many countries they probably represent less than 0.1% of all enterprises. For instance, in Germany in 2006 there were roughly 400 listed corporations whereas there is a total of about 3'100'000 firms (Federal Statistics Agency of Germany, 2008). However, there are about 2'600'000 *unlimited* liability firms, such as sole proprietorships or partnerships, and we were not able to find any empirical accounting research explicitly related to such enterprises.

Private firms face less strict disclosure requirements in many countries, such as in the United Kingdom, in Hong Kong, New Zealand, Canada, Switzerland or in Germany (Nobes and Parker, 2006: 276). Generally, disclosure requirements are even lower with unlimited liability firms. Lower disclosure requirements might be considered as a compensation for shareholder's unlimited liability. The basic assumption is that creditors care less about financial accounting with unlimited liability firms.

If this assumption is right we should observe that unlimited liability firms try less to convey low default risk via income smoothing. Since private firms have limited access to the capital market, debt financing is relatively important. This paper deals with three questions: (1) Do unlimited liability firms smooth income less or more than limited liability firms? (2) Is income smoothing related to the importance of debt financing even controlling for tax avoidance incentives? (3) If so, is there a difference between unlimited liability firms and limited liability firms?

There is evidence that *publicly* listed firms smooth income for several reasons (Bao and Bao, 2004, Tucker and Zarowin, 2006, Gassen et al., 2006). Income smoothing better allows to pay a relatively constant level of dividends in the course of time. Further, a stable positive

income might signal a low default risk to (potential) creditors and thus may reduce the cost of debt. Managers may use income smoothing as an instrument to reveal private information about future earnings (e.g., Tucker and Zarowin, 2006). Finally, income smoothing lowers the present value of tax obligations if there is a strong link between financial accounting and tax accounting reports and if the income tax rate increases with income. There might also be a cost to income smoothing. Some studies interpret income smoothing as a way to hide information on real firm's performance (e.g., Leuz et al., 2003 and Burgstahler et al., 2006).

Do private unlimited liability firms have the same motives for income smoothing as publicly listed firms do? Unfortunately, there is much less evidence on income smoothing with *private corporations*. Burgstahler et al. (2006) report that private corporations smooth income much more than public firms do. However, they explicitly exclude small privately held firms and more importantly, they neglect unlimited liability firms.² Other studies that focus on private firms do not address income smoothing but conditional conservatism (Peek et al., 2010) or the propensity to disclose low positive earnings for tax reasons (Goncharov and Zimmermann, 2006).

There is hardly any evidence on accounting choices and income smoothing, in particular, with private *unlimited* liability firms. This is mainly due to the fact that in some countries unlimited liability firms are not required to disclose their financial reports. The closest to our paper is a study by Gassen and Fülbier (2010) on income smoothing with private European firms. However, their paper primarily investigates the link between the costs of debt renegotiation and income smoothing whereas we focus on the role of unlimited liability.

² Burgstahler et al. (2006), p. 992. Van Tendeloo and Vanstraelen (2008) show that Big4 auditors restrict earnings management with private firms more in high tax alignment countries arguing that audit failure is more likely to be detected there.

We have access to a database run by the German central bank, which contains standardized non-consolidated financial statements of private German firms. Firms had to provide financial accounting data when they sold bills of exchange to the central bank. Since unlimited firms are relatively small we limited our analysis to small and medium sized firms (SMEs). This allows us to better separate the differences in legal form from differences in size and agency problems related to size. According to the European Commission, a firm qualifies as a SME when there are less than 250 employees and additionally, either sales do not exceed 40 million Euro and/or total assets do not exceed 27 million Euro.³ Our final sample consists of more than 17'000 firm-year observations on SMEs, about 6'400 of them correspond to unlimited liability firms for the time period 1993-2004.

We claim that firms with unlimited liability have different incentives for earnings management than limited liability firms (corporations) do. There are at least two reasons for this claim. First, since the German Commercial Code requires unlimited liability firms to be run by their owners, agency problems of equity are generally more limited than with corporations. Second and possibly more importantly, unlimited liability mitigates agency problems of debt as well. With unlimited liability creditors are less interested in evaluating the default risk and hence, they are less interested in financial statements than with corporations. Consequently, unlimited liability firms have less need to signal a low default risk in the financial report by stable earnings over time. We expect that income smoothing is more important for debt contracting in corporations because limited liability makes agency problems of debt more severe.

Overall, we may reasonably assume that with German unlimited liability firms financial accounting serves less for contracting purposes but to achieve other goals such as minimizing

³ European Commission (1996), a (slightly) updated version was published by European Commission (2003).

the present value of tax payments. In contrast, corporations have to pursue additional information-related goals, especially towards creditors. In Germany, bank debt is very important to SMEs (Agarwal and Elston, 2001, Franks and Mayer, 1998). Consequently, we should observe that income smoothing is tied to bank debt and that this association is stronger for corporations.

We obtain the following results. First we observe that unlimited liability firms smooth income less than corporations. Hence, unlimited liability might serve as a signal thus reducing the need for earnings management in the financial statement. Second, income smoothing is positively associated with bank debt but not with debt financing in general. This association is stronger for limited liability firms. Third, income smoothing is positively associated with stronger tax avoidance incentives independently of the legal form of the SME.

There are several contributions to the literature. First and most importantly, we show that private unlimited liability firms use significantly less income smoothing than private corporations. Second, we stress the positive association between bank debt and income smoothing. Third, we contribute to the small literature on financial accounting choices of private firms. However, this literature rather looks at bigger private firms and does not investigate the effect of unlimited liability (Coppens and Peek, 2005, Goncharov and Zimmermann, 2006, 2007, Burgstahler et al., 2006, Peek et al., 2010).

Our findings do not advocate a complete harmonization of accounting standards for private and public firms, not even between private firms with different legal status. The reason is that financing patterns differ considerably. The efforts of the IASB to introduce a common set of fair value accounting rules for private firms (IASB, 2009) may have adverse effects on the debt financing of private firms since fair value accounting allows for less income smoothing.

The paper is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology used. Section 4 presents the results of the regression analyses on income smoothing. Section 5 concludes.

2 Literature review and hypotheses

2.1 Income smoothing: findings for publicly listed firms

Income smoothing represents managers' attempts to use reporting discretion to "intentionally dampen the fluctuations of their firms' earnings realizations" (Beidleman 1973: 653). We focus on artificial smoothing which is the result from choosing accounting methods in a way that intentionally allocates earnings over time (Bao and Bao, 2004).⁴ In contrast to accounting conservatism income smoothing does not increase or decrease the book value of equity in the long run. Income smoothing tends to reduce the variability of the income stream whereas accounting conservatism rather effects the skewness of income.

From an economics perspective income smoothing can be both beneficial or costly. Let us first look at the benefits. If firm distributions are linked to earnings and the beneficiaries are risk-averse income smoothing is a rational contracting device (Gassen et al., 2006). This argument applies to risk-averse shareholders who receive dividends that are tied to earnings and who are not perfectly diversified. It also applies to risk-averse managers⁵ when

⁴ Management may also smooth earnings over time by timing real business decisions or by using financial derivatives (Huang et al., 2009) which is also referred to real smoothing. We do not have the data to consider real smoothing in this paper. Note that besides intentionally artificial or real smoothing there is also natural smoothing which is the result from an income generating process that produces a smooth stream of income but which is not related to managers' manipulation.

⁵ Managers' wealth is usually assumed not to be perfectly diversified.

compensation is directly or indirectly tied to income (Lambert, 1984). Due to their concave pay-off function creditors may also have a preference for lower variance of earnings. A higher variance of earnings may be considered to increase the probability of firm bankruptcy (Carlson and Bathala, 1997) and makes the violations of debt covenants more likely (Smith and Warner, 1979). Income smoothing can also be beneficial if it lowers the present value of tax payments (Smith and Stulz, 1985). This requires both that taxable income is based on the financial statement and that there is no flat tax rate.

Managers may also want to reduce income volatility to mitigate the information asymmetry between themselves and investors. Managers have private information on future earnings and income smoothing may be an instrument to publicly disclose this information (Trueman and Titman, 1988, Tucker and Zarowin, 2006). Firms with future losses will find it difficult to smooth earnings on a positive level.

However, there might also be costs to income smoothing in the context of moral hazard. Managers may have an incentive to smooth income in order to protect their job (Fudenberg and Tirole, 1995). In this context income smoothing delays the disclosure of bad management performance. This argument holds true if management performance cannot be evaluated sufficiently reliably in other ways such as by efficient stock prices. Healy (1985) provides evidence that income smoothing makes it easier for managers to meet the bonus targets. DeFond and Park (1997) find that controlling shareholders may have a similar interest to understate the volatility of income in order to derive their private control benefits. The cross-country study by Leuz et al. (2003) suggests that firm insiders benefit from income smoothing in those countries with weak investor protection.

In what follows we evaluate these arguments for small private firms and distinguish between corporations and unlimited liability firms, such as sole proprietorships or partnerships.

2.2 Distribution of net profits (Dividends)

Risk-averse shareholders may prefer to adjust dividend payments to (changes to) their current consumption plans. With regard to unlimited liability firms the German Commercial Code contains no restrictions on the distribution of dividends. Manager-owners are relatively free to distribute as little or as much dividends as they want to. With limited liability firms, dividend distributions are restricted by law and must not exceed accumulated net income. Given this legal restriction risk-averse shareholders may prefer to reduce volatility of the income stream, especially since the equity market for private firms is not perfect (Ronen and Yaari, 2008). In particular, shareholders may find it difficult to hedge or diversify their risk of changing dividend income. Unlimited liability firms face less dividend restrictions, however, many of the unlimited liability firms are sole proprietorships where the owner cannot share the risk. Overall, it is an empirical question whether limited liability firms have a stronger or less need for income smoothing than unlimited liability firms.

2.3 Debt financing and bank financing

Income smoothing is beneficial when it conveys valuable information to creditors on future performance (Ronen and Yaari, 2008). Further, for a given positive income level creditors might prefer lower volatility of earnings. Due to their concave pay-off function creditors prefer lower firm risk. Lower income volatility makes it less likely that the firm cannot pay interest or principal on time. An important figure to evaluate credit risk is interest coverage which is related to income. Income smoothing allows to show stable income that exceeds interest payment obligations. More specifically, income smoothing helps to hide losses. Losses might be a signal of financial distress. In bankruptcy prediction models losses are often considered to increase the likelihood of financial distress (Ohlson, 1980). With long-

term debt and asymmetric information, the benefits of income smoothing are more pronounced.

Private firms often receive most (long-term) financing from one main creditor such as commercial banks (Berger and Udell, 1995). With small and medium-sized German firms, bank debt is the single most important source of outside financing (Elsas and Krahen, 2004). Banks are experts in collecting information and evaluating credit risks and in writing and enforcing covenants (Boot, 2000). Income smoothing might be more necessary to meet the covenants. The existence of a well-informed lender also signals creditworthiness to other potential creditors such that they pay less attention to financial reports (Boot, 2000). Therefore, we expect that income smoothing is rather associated with bank debt than with non-bank debt.

We also expect that the association between income smoothing and (bank) debt is stronger for corporations than for unlimited liability firms since agency problems of debt differ. When creditors know that the owners of the firm can be held liable with their private assets agency problems of debt are less pronounced and there is less need for financial information in order to evaluate the default risk. Consequently, there is *less* benefit to use income smoothing as a debt contracting device.⁶

Other things being equal, we expect more income smoothing (1) with corporations than with unlimited liability firms, (2) with high levels of long-term bank debt and – to a weaker extent – (3) with high levels of long-term debt. Finally, we also expect the association between income smoothing and long-term bank debt (long-term debt) to be stronger with corporations than with unlimited liability firms.

⁶ Still, there might be a benefit to income smoothing when owners of unlimited liability firms have *limited assets*.

2.4 Taxes

Income smoothing is beneficial when it lowers the present value of tax payments. In principle this argument might be relevant in the German context since taxable income is based on the net income of the financial statement. Both the owners of corporations and of limited liability firms are taxed on their personal income.⁷ With low and medium income levels the tax rate increases in income. For sufficiently high income levels the tax rate turns flat. With a flat tax rate there is generally no tax benefit to income smoothing since it does not systematically shift income to the future as it is the case with accounting conservatism. Thus, for sufficiently high income levels individuals do not have an incentive to smooth income over time whereas for lower income levels they might have. Whether there is a tax-based incentive on income smoothing might not be affected by the legal form but rather depends on the actual net taxable income of the firm and the share of the individual owners and their other opportunities to influence personal taxable income. While we are able to observe the net income we lack data both on the owners' shares and on the opportunities to manage personal taxable income.

In 2002, there was a significant change in tax law for corporations in Germany. Before 2002 50% of the dividends were accounted for the taxable personal income even though the firm's net income was also taxed. Since 2002, the shareholders of corporations pay taxes on dividends according to their tax rate, the taxes paid on dividends on the firm level are offset against the personal tax obligation. With unlimited liability firms the tax law does not distinguish between the firm level and the personal level.

⁷ Owners of corporations can deduct the tax paid on the firm level.

We predict that income smoothing is positively associated to tax avoidance incentives. Further, we expect that before 2002 corporations had less incentives to distribute dividends and hence, there was less need for income smoothing.

2.5 Separation of ownership and control

With unlimited liability firms, the German commercial code (Section 114) requires the owner(s) to run the firm. With sole proprietorships the owner is the manager by definition. With corporations, ownership and control are allowed to be separated and separation is more likely with increasing size. Consequently, with unlimited liability firms managers as owners there is no need to mask firm performance towards shareholders or to smooth income to signal a stable income. With bigger corporations, there might be an incentive to do so, though.

2.6 Expropriation of minority investors

One should also expect that expropriation of outside shareholders is easier with bigger corporations than with unlimited liability firms since with the latter legal form all owners are *required* to run the business. Those problems might not be too relevant with German private corporations. Even though we lack data on the ownership structure, the database Amadeus shows that the single largest shareholder of a corporation directly holds more than 90% of the shares (see also Burgstahler et al., 2006: 997). We therefore do not think that income smoothing is related to conflicts between majority and minority shareholders.

2.7 Business characteristics

Firm Size. Even though we construct the sample such that unlimited and limited liability firms do not differ too much in size, size still probably matters. Larger firms might show higher levels of income smoothing since they are expected to have a wider array of discretionary expenditures. Since problems of asymmetric information are more pronounced with larger firms signaling via income smoothing is supposed to be more beneficial.

Firm Profitability and Losses. Firms that experience several years of poor performance, i.e. losses, will tend to find fewer instruments available to smooth income (Carlson and Bathala, 1997). Moreover, firms with good performance have less need to impress investors and creditors and therefore less need to smooth income. We should therefore expect that higher firm profitability implies less income smoothing. Firms that report losses have fewer instruments but might have more need to impress investors and creditors. On the other hand, firms which experienced losses may have already suffered from impaired reputation. Overall, the sign of the association between income smoothing and losses is not clear.

Operating Risk. Operating risk is likely to determine earnings attributes and also income smoothing. Greater operating risk implies that income smoothing becomes more costly since it requires higher accruals (Gassen et al., 2006).⁸ With higher operating risk there might be more need to smooth income in order to smooth dividend payouts. Since income smoothing is technically related to measures of operating risk we expect a positive association also by definition. Our proxy for operating risk is the standard deviation of cash flows from operations.

⁸ Litigation risk increases with firms in risky environments and hence, there is less incentive for income smoothing when it is considered as earnings management. However, litigation risk seems to be less important with German private firms because the incentives for litigation are quite limited.

Growth. High growth firms usually have higher accruals, e.g. due to higher investment levels. Since accruals provide more discretion for income smoothing growth might be positively associated with income smoothing. However, high growth firms in general also show higher levels of operating risk which implies more need for income smoothing. We therefore expect a positive sign.

Audit. With small corporations and unlimited liability firms, there is no legal requirement for statutory audits but there is with medium-sized corporations. Accounting standards are similar, though. We expect that auditors are supposed to restrict income smoothing. However, with German GAAP the prudence principle is considered to be more important than faithful presentation (Nobes and Parker, 2006) such that auditors may not mind income smoothing when it serves the prudence principle. The sign of the association is not clear a priori.

To sum up, we derive the following hypotheses:

Hypothesis 1:

Private firms with unlimited liability show lower levels of income smoothing than private firms with limited liability (corporations).

Hypothesis 2:

(a)The level of income smoothing increases with the level of total non-current liabilities.

(b)This association is stronger for corporations than for unlimited liability firms.

Hypothesis 3:

(a)The level of income smoothing increases with the level of non-current liabilities towards banks. (b)This association is stronger for corporations than for unlimited liability firms.

Hypothesis 4:

(a)The level of income smoothing increases with stronger tax avoidance incentives. (b)With regard to this association there is no significant difference between limited and unlimited liability firms.

3 Data and research methodology

3.1 Data

We use the database *Unternehmensbilanzstatistik* that is run by the Deutsche Bundesbank and which contains financial accounting data – balance sheets and income statements – with about 178,000 firm-year observations for the years 1993-2004. We did not have complete financial accounting data for the years after 2004. Before fiscal year 1996, the database did not contain data on the number of employees which is necessary for the distinction of SMEs and Non-SMEs.

In our analysis we focus on SMEs only. Unlimited liability firms are usually very small. In order to be better able to compare the effects of legal form, we want unlimited and limited liability firms not to differ too much in size. Size affects financial accounting choices directly, but also indirectly since agency problems of debt and equity tend to become more pronounced with increasing size.

We defined SMEs according to the European Commission. A firm qualifies as a SME when first there are less than 250 employees and second either sales do not exceed 40 million Euro and/or total assets do not exceed 27 million Euro. Additionally to the three size criteria, a SME has to be independent in the sense, that another firm does not hold more than 25% of the shares. Since we do not have data on the shares and shareholders we assumed dependence

on another firm if at least one of the following criteria was met: (1) There is an obligation for consolidated statements, (2) there is a contractual obligation to transfer losses or profits to another firm, (3) there are liabilities or account receivables with regard to group firms. Consequently, we lost almost about one half of the firm-year observations. By the SME criteria, we automatically excluded publicly traded firms and financial institutions.

The database is unbalanced for three reasons. First, larger firms might be overrepresented compared to the *total* population of German private firms. Second, the number of balance sheets decreases over time because financing via bills of exchange became less important in recent years. Third, we might expect a selection bias, indicating that economically sound firms are overrepresented.

The first bias would be relevant if the number of small firms was too small. This is not the case. The median firm in our sample has total assets of less than 1.4 million Euro. Even after different adjustments about 98,000 firm-years qualify for the SME-definition according to the European Commission (1996), and about 29,000 firm-years are related to unlimited liability firms. There is no database that contains the financial accounting data of the total firm population. The only alternative would be the Amadeus database which has only a few thousand observations until 2008 and much less detailed financial accounting data on unlimited liability firms.

The second bias might not be relevant for our study since the research questions are defined independently of time constraints.

The third bias only hardly affects our results since we are mainly interested in the differences between unlimited liability firms and corporations. We might even expect that the differences (and the results of our study) are more pronounced for firms in a weaker financial condition

since the agency problems get worse then and hence, the issue of unlimited liability firms becomes more important.

The final sample of our study contains 17,193 observations. We lost most of the observations due to our research design since the dependent variables on income smoothing are measured over a five-year horizon. We also had to exclude firms which switched the legal form or audit status within this five-year period or where data on equity, sales or total assets were (partly) missing or had negative values. In order to account for outliers, all variables are winsorized at the 1% and 99% percentile.

3.2 Measurement of variables

Income smoothing

Following the literature, we measure income smoothing by dividing the variability of earnings over time by the variability of income in economic terms, as, for instance, the variability of cash flow from operations or of sales (e.g., Leuz et al., 2003, Bao and Bao, 2004, Burgstahler et al., 2006):⁹

⁹ Other papers assess whether discretionary accruals are aimed to align with earnings over time (e.g., DeFond and Park, 1997, Garcia Lara et al., 2005, Huang et al., 2009). We do not adopt these measures. The models on estimating discretionary accruals are subject to serious criticism (McNichols, 2000). First, there are significant estimation problems with models determining discretionary accruals. Second, these models are likely to be misspecified since they do not account for the implications of income smoothing. Third, the Jones model was developed based on US GAAP data, we are not aware of any study related to German GAAP. Finally, our dataset is quite small such that it will be difficult to estimate the parameters of, e.g., a modified Jones model with sufficient reliability.

$$(1) \quad \text{SMTH}_{i,t} = \frac{\text{SD}(\text{operating income}_{i,t} / \text{total assets}_{i,t-1})}{\text{SD}(\text{operative cash flow}_{i,t} / \text{total assets}_{i,t-1})} \cdot (-1)$$

SD stands for standard deviation. Standard deviations are computed on the basis of financial data for five fiscal years. We multiply by (-1) to make sure that higher smoothing (lower volatility of operating income relatively to sales) implies higher values. We scale by total assets as, e.g., LaFond et al. (2007) do. We test the following measures as well:

$$(2) \quad \text{SMTH1}_{i,t} = \frac{\text{SD}(\text{operating income}_{i,t})}{\text{SD}(\text{sales}_{i,t})} \cdot (-1)$$

$$(3) \quad \text{SMTH2}_{i,t} = \frac{\text{SD}(\text{operating income}_{i,t} / \text{total assets}_{i,t-1})}{\text{SD}(\text{sales}_{i,t} / \text{total assets}_{i,t-1})} \cdot (-1)$$

$$(4) \quad \text{SMTH3}_{i,t} = \rho \Delta \text{TACC}_{i,t}; \Delta \text{oCF}_{i,t} \cdot (-1)$$

$$(5) \quad \text{SMTH4}_{i,t} = \frac{\text{SD}(\text{operating income}_{i,t})}{\text{SD}(\text{oCF}_{i,t})} \cdot (-1)$$

Variables are defined as follows (see Daske et al., 2006):

TACC: total accruals = Δ Inventory (or: Δ current assets - Δ cash and cash equivalents) - Δ current liabilities + Δ short term debt included in current liabilities - depreciation and amortization - Δ provisions

oCF: operative cash flow = net income – total accruals.

Whereas LaFond et al. (2007) suggest scaled measures such as (1) and (3), Gassen et al. (2006), Leuz et al. (2003) and Burgstahler et al. (2006) consider both scaled measures and unscaled measures such as (2). Measure (2) is similar to (3). Measures (1) to (5) are computed for a time period of five years, index t stands for the time period. In contrast to Burgstahler et al. (2006) we adopt Pearson correlation instead of Spearman correlation due to the limited number of firm-year observations.

Control variables

Table 1 depicts the control variables which in previous studies have shown to affect the level of income smoothing as well. The variables LGDEBT, SIZE, ROA, GROWTH, OPCYCLE, CAPNEED are computed on a five years average since the variable on income smoothing requires five years as well.

Table 1: Definition of independent variables

LIM	Dummy variable: 1, if limited liability firm in year t and the four preceding years, 0 if unlimited liability firm in year t and the four preceding years. Other firms have been excluded from the sample.
LGDEBT	Ratio of lagged non-current liabilities to lagged total assets (average over five years).
LGBANK	Dummy variable: 1, if lagged non-current bank debt to total assets (averaged over five years) exceeds median, 0 otherwise.
TAX	Dummy variable: 1, if net firm income in year t and in the four preceding years is less than three times the threshold individual income that triggers a flat tax rate, 0 if net firm income in year t and in the four preceding years equals or exceeds three times the threshold individual income that triggers a flat tax rate. Other firms have been excluded from the sample.
SIZE	$\ln(\text{total assets, averaged over five years})$.
ROA	Ratio of EBIT / lagged total assets, averaged over five years.
LOSS	Dummy variable: 1, if there was a loss in t or the four preceding years; 0 otherwise.
GROWTH	Annual percentage change in revenue, averaged over five years.
OPCYCLE	Length of operating cycle in months according to Burgstahler et al. (2006): $(\text{yearly average accounts receivable})/(\text{total revenue}/360) + (\text{yearly average inventory})/(\text{cost of goods sold}/360)$, averaged over five years.
RISKSALLES	Standard deviation of (sales / lagged total assets), computed over five years.
RISKCFD	Standard deviation of (cash flow from operations / lagged total assets), computed over five years.
CAPNEED	$(\Delta \text{long term assets} + \text{depreciation}) / \text{lagged total assets}$.
AUDIT	Dummy variable: 1, if there is a legal obligation for audited statements in t and the four preceding years (for medium-sized corporations); 0, there is no legal obligation for audited statements in t and the four preceding years (for small corporations and unlimited liability firms). Other firms have been excluded from the sample.

We adopt a dummy variable LGBANK because banks might be more likely to write and enforce covenants in debt contracts when their stake is sufficiently large (Berger and Udell, 1995). In the relationship banking literature it is quite common to proxy the influence of banks by a dummy variable (e.g., Elsas, 2005). In our sample, the mean ratio of debt to total assets is 80% and the mean bank debt ratio is 29%.

It was quite difficult to specify tax-avoidance incentives. As argued above, with low and medium income levels the effective tax rate increases in income whereas with high income levels the tax rate is flat. Hence, there is a stronger tax avoidance incentive for low and medium income levels. We run pre-tests to figure out the threshold level on the firm's net income that weakens tax avoidance incentives.

However, for taxation concerns the individual's income matters, not the firm income. We were not able to observe individual's income but only firm income. The individual tax obligation depends on several factors which we are not able to observe such as the proportion of shares held, the taxable income from other sources and the losses from other investments which reduce overall taxable income.

We roughly assumed that the individual's income is the firm income divided by a certain *number* of shareholders. Other things being equal, the higher the assumed number of shareholders is, the more likely the shareholders earn a small or medium income where there are high tax avoidance incentives. We run pre-test to figure out which assumed number of shareholders separates low and high tax avoidance incentives. Independent of the firm's legal form, a threshold level defined as three times the firm income turns out to separate high tax avoidance incentives (due to non-flat tax rates) from low tax avoidance incentives (flat tax rate) quite well.

4 Results

4.1 Univariate test statistics

In a first step, we divide the total sample into two subsamples where we compare income smoothing between the two subsamples. The subsamples are divided by (1) legal form, (2) tax avoidance incentives, (3) importance of long-term bank debt. We measure income smoothing according to (1) and discuss robustness of results with other measures later on. In order to qualify whether the level of income smoothing is significantly different between the two subsamples we performed a two-sample t-test with unequal variances and a two-sample Wilcoxon rank-sum test. Table 2 provides an overview.

Table 2: Mean levels of income smoothing with limited and unlimited liability firms, with strong and weak tax avoidance incentives and with long-term bank debt exceeding the mean and without

Group	Mean (Group Variable = 1)	Mean (Group Variable = 0)	Difference (t-value)
LIM	- 0.3226	- 0.4309	0.1083*** (21.28)
TAX	- 0.3452	- 0.5098	0.1646*** (19.17)
LGBANK	- 0.3409	- 0.3846	0.0437*** (9.25)

For definition of variables see Table 1.

The statistics strongly suggests that income smoothing is significantly stronger with (1) corporations than with unlimited liability firms and (2) stronger with firms that have a strong incentive for tax avoidance. For instance, with corporations the volatility of operating income amounts to only 32% of the volatility in operative cash flow whereas it is 43% for unlimited liability firms. That is, that the level of income smoothing is lower by about 25% with

unlimited liability firms – in the absence of control variables. Firms with strong tax avoidance incentives and with a lot of bank debt show levels of income smoothing which are higher by about 33% and 11%, respectively.

We run the parametric test also for the other measures of income smoothing which always confirm the above results at a highly significant level. We also run the analysis for other group criteria such as total bank debt (long-term and short term bank debt), total debt and total long-term debt. We separated the groups by the mean values. It turns out that firms with high debt levels or with high levels of long-term debt do not show significantly higher or lower levels of income smoothing than their counter group. Only firms with higher levels of bank debt show more income smoothing, however, at a lower significance level. In the following, we focus on long-term bank debt.

4.2 Multiple regression analysis

4.2.1 Regression and summary statistics

We expect that limited liability firms show higher levels of income smoothing. We also expect a positive association between income smoothing and the level of long-term bank debt. Further, we expect a positive sign for the variables on tax avoidance. The regression on hypotheses 1-4 is reflected by:

$$\begin{aligned}
 6 \quad SMTH_{i,t} = & \beta_0 + \beta_1 LIM_{i,t} + \beta_2 LGDEBT_{i,t-1} + \beta_3 LGBANK_{i,t-1} + \beta_4 TAX_{i,t} \\
 & + \beta_5 RISKCFO_{i,t} + \beta_6 SIZE_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 LOSS_{i,t} \\
 & + \beta_9 GROWTH_{i,t} + \beta_{10} OPCYCLE_{i,t-1} + \beta_{11} RISKSALES_{i,t} \\
 & + \beta_{12} CAPNEED_{i,t-1} + \beta_{13} AUDIT_{i,t} + IND_i + YEAR_t + \varepsilon_i
 \end{aligned}$$

Table 3 depicts summary statistics on the dependent and independent variables.

Table 3: Summary statistics (N = 17,193, definition of variables in Table 1)

Variable	mean	median	standard deviation	minimum	maximum
SMTH	-0.3628	-0.2695	0.3103	-1.6681	-0.0289
SMTH1	-0.1440	-0.0890	0.1649	-0.9975	-0.0077
SMTH2	-0.1988	-0.1238	0.2278	-1.3607	-0.0092
SMTH3	0.7713	0.7948	0.0683	0.3469	0.8000
SMTH4	-0.3305	-0.2391	0.2929	-1.5975	-0.0239
LIM	0.6283				
LGDEBT	0.1851	0.1504	0.1659	0	0.6455
LGBANK	0.4992				
TAX	0.8930				
RISKCFO	0.1500	0.1256	0.0985	0.0239	0.5331
SIZE: ln(total assets in 1,000 €)	7.2252	7.2038	0.9995	4.7558	9.6900
SIZE: total assets in 1,000 €	1,373.6	1,344.5		116.3	16,155.2
ROA	0.1015	0.0736	0.0951	-0.0234	0.5357
LOSS	0.4221				
GROWTH	0.0051	0.0021	0.0900	-0.1930	0.3482
OPCYCLE	107.72	83.32	88.02	0.2556	578.44
RISKSALES	0.5101	0.3732	0.4846	0.0293	3.1095
CAPNEED	0.0480	0.0273	0.0654	-0.0436	0.3407
AUDIT	0.1185				

For definition of variables see Table 1. With binary variables, we only report the mean.

The smoothing variable SMTH (SMTH1) indicates that on average the standard deviation of scaled operating income is 36% (14%) of the standard deviation of scaled operative cash flows (scaled operating income). About 63% of the firms in the sample are limited liability firms. According to the above definition, about 89% have strong tax incentives for income smoothing. The average firm has a ratio of long-term debt to total assets of about 19%. The statistics on total assets show that we have quite small firms in our sample with a mean total assets of € 1.37 million. The average ROA (EBIT/lagged total assets) is about 10%. About 42% of the five-year period observations show a loss in at least one year. Net investments to lagged total assets are 4.8% on average. Slightly less than 12% of all financial statements are

audited. This is because, in Germany, there is no legal obligation for statutory audits neither for unlimited liability firms nor for small limited liability firms.

4.2.2 Multivariate analysis without interaction variables

Table 4 reports Pearson pair-wise correlations among the variables for our lead measure of income smoothing SMTH. Correlation coefficients are similar with other measures on income smoothing.

Table 4: Pearson correlations (p-values in brackets)

	pred. sign	SMTH3	LIM	LG DEBT	LG BANK	TAX	RISK CFO	SIZE	ROA	LOSS	GROW TH	OPCY- CLE	RISK SALES	CAP NEED	AUDIT
SMTH3		1													
LIM	+	0.1686 (0.0000)***	1												
LGDEBT	+	-0.0236 (0.0020)***	-0.1846	1											
LGBANK	+	0.0703 (0.0000)***	-0.1320	0.4359	1										
TAX	+	0.1640 (0.0000)***	0.1994	0.0502	0.1059	1									
RISK CFO	+	0.3204 (0.0000)***	0.1842	-0.2944	-0.2051	0.0149	1								
SIZE	?	0.0988 (0.0000)***	0.0781	0.1232	0.1460	-0.4472	-0.2494	1							
ROA	-	-0.2952 (0.0000)***	-0.2780	-0.1018	-0.1595	-0.4850	0.1902	-0.1357	1						
LOSS	?	-0.0590 (0.0000)***	0.2665	0.0428	0.1063	0.2959	-0.0053	-0.0084	-0.4723	1					
GROWTH	?	0.0478 (0.0000)***	0.1138	-0.0201	-0.0110	-0.0648	0.1012	0.0842	0.1167	-0.1129	1				
OPCYCLE	+	0.0143 (0.0614)*	-0.1115	0.0553	0.0879	0.0785	-0.1480	0.0264	-0.1467	0.0601	-0.1134	1			
RISK- SALES	+	0.0107 (0.1600)	0.1502	-0.2508	-0.1632	0.0564	0.4391	-0.2349	0.1361	-0.0083	0.1028	-0.2832	1		
CAPNEED	?	-0.0090 (0.2404)	0.0373	0.1509	0.0683	-0.0317	0.0829	0.0250	0.0869	-0.0384	0.2499	-0.2428	0.0425	1	
AUDIT	-	0.0477 (0.0000)***	0.2820	-0.0492	-0.0044	-0.1909	-0.0652	0.5485	-0.0208	0.0367	0.0745	-0.0480	-0.0650	0.0268	1

*, **, *** indicate significance at the 10%-, 5%-, 1%- level, using a two-tailed test. For definition of variables see Table 1.

The univariate analysis suggests that income smoothing increases with limited liability firms, with strong tax avoidance incentives, with higher levels of bank debt and total debt. Correlation coefficients are significantly negative with ROA and the AUDIT variable and significantly positive with the volatility of cash flows and the firm's size. Correlation coefficients do not indicate severe multicollinearity.

The following table depicts the results of the multiple regression analysis. We run the model with the different specifications on the income smoothing variable.

Table 5: Pooled OLS regression, dependent variable: various indicators for income smoothing (N=17,193)

Dependent variable	SMTH		SMTH1		SMTH2		SMTH3		SMTH4	
	Coeff.	t-value (p-value)								
Intercept	-0.8277	-17.23 (0.000)***	-0.3130	-10.61 (0.000)***	-0.3586	-8.47 (0.000)***	0.6778	55.38 (0.000)***	-0.7863	-16.85 (0.000)***
LIM	0.0324	4.34 (0.000)***	0.0236	5.77 (0.000)***	0.0270	4.27 (0.000)***	0.0199	11.06 (0.000)***	0.0141	1.92 (0.055)*
LGDEBT	0.0336	1.57 (0.117)	-0.0367	-2.93 (0.003)***	-0.0444	-2.58 (0.010)***	-0.0035	-0.66 (0.509)	0.0395	1.89 (0.059)*
LGBANK	0.0517	8.01 (0.000)***	0.0208	6.76 (0.000)***	0.0274	5.94 (0.000)***	0.0071	5.04 (0.000)***	0.0493	7.87 (0.000)***
TAX	0.0952	6.79 (0.000)***	0.0582	6.68 (0.000)***	0.0711	5.54 (0.000)***	0.0091	2.45 (0.014)**	0.0830	5.94 (0.000)***
RISKCFO	1.6052	40.33 (0.000)***	-0.0355	-1.86 (0.063)*	-0.0705	-2.39 (0.017)**	0.1804	22.40 (0.000)***	1.3669	37.62 (0.000)***
SIZE	0.0511	10.39 (0.000)***	0.0199	6.70 (0.000)***	0.0233	5.23 (0.000)***	0.0097	7.70 (0.000)***	0.0476	10.04 (0.000)***
ROA	-1.3409	-25.97 (0.000)***	-0.4060	-13.96 (0.000)***	-0.5293	-12.56 (0.000)***	-0.1659	-9.90 (0.000)***	-1.0755	-20.56 (0.000)***
LOSS	-0.1852	-27.47 (0.000)***	-0.0641	-17.71 (0.000)***	-0.0848	-16.15 (0.000)***	-0.0316	-20.53 (0.000)***	-0.1839	-28.16 (0.000)***
GROWTH	0.1628	4.20 (0.000)***	0.0905	4.21 (0.000)***	0.2852	10.78 (0.000)***	0.0103	1.17 (0.242)	0.1046	2.76 (0.006)***
OPCYCLE	-0.0018	-1.34 (0.179)	-0.0060	-6.54 (0.000)***	-0.0068	-4.94 (0.000)***	0.0008	3.06 (0.002)***	-0.0005	-0.41 (0.678)
RISKSALES	-0.0985	-12.63 (0.000)***	0.1065	20.61 (0.000)***	0.1089	18.40 (0.000)***	-0.0048	-3.49 (0.000)***	-0.0642	-9.03 (0.000)***
CAPNEED	-0.0808	-1.64 (0.101)	0.0524	1.80 (0.072)*	-0.1125	-2.64 (0.008)***	0.0121	0.99 (0.320)	-0.1027	-2.12 (0.034)**
AUDIT	-0.0059	-0.52 (0.604)	-0.0155	-2.59 (0.010)***	-0.0060	-0.67 (0.502)	-0.0067	-2.62 (0.009)***	0.0025	0.23 (0.816)
IND _t		included								
YEAR _t		included								
Adj. R ² in %		36.14		36.74		26.03		16.45		31.40
F-Stat.		111.58		85.85		69.32		45.16		104.27
Prob(F-Stat.)		0.0000		0.0000		0.0000		0.0000		0.0000

*, **, *** indicate significance at the 10%-, 5%-, 1%- level, using a two-tailed test. T-statistics are based on standard errors which are adjusted for heteroscedasticity and clustering at the firm level. For definition of variables see Table 1.

Regardless of the measure on income smoothing limited liability firms show significantly higher levels of income smoothing. The economic impact is considerable. Note that the mean

level of income smoothing with variables SMTH and SMTH1 is -0.3628 and -0.1440, respectively. Limited liability firms show levels which are higher by 0.0324 and 0.0246, that is 9% and 16%, respectively. This finding supports hypothesis 1.

There is also a robust positive association between income smoothing and the level of (long-term) bank debt which is both statistically and economically highly significant. Firms with high levels of bank debt show income smoothing levels which are higher by 0.0517 and 0.0208 based on the SMTH and SMTH1 measure, respectively. Thus, the level of income smoothing is higher by about 14%. The association between income smoothing and total long-term debt is not robust, though. We expected a positive sign, but some of the regressions also show a negative sign. Thus, we find support for hypothesis 3a, but have to reject hypothesis 2a.

There is clear evidence that levels of income smoothing are higher with stronger tax avoidance incentives. The statistical and economic significance is strong. Firms with strong tax avoidance incentives show income smoothing levels which are higher by 26% and 40% based on the SMTH and SMTH1 measure, respectively.

Only the variables SIZE, ROA and LOSS show a robust and highly significant association with all measures of income smoothing. Smaller firms, firms with losses and firms with good performance show lower levels of income smoothing. Note that firms with losses and well-performing firms have less need to signal low default risk to creditors – but for different reasons. The first ones have already lost the reputation of being a sound debtor the latter ones do not need to express it in the financial statement.

With the variables RISKCFO and RISKSLES the sign is not robust which is probably due to the different specifications of the income smoothing variable. The GROWTH variable shows a positive and statistically significant sign in four out of five regressions which

suggests that high-growth firms use their discretion to smooth income. Firms with audited financial statements generally show lower levels of income smoothing, however, only in two out of five models we find this result to be statistically significant. Therefore, we cannot conclude that auditors restrict income smoothing.

4.2.3 Multivariate analysis with interaction terms

In what follows we address the question whether the positive association of the TAX and the LGBANK variable with the level of income smoothing is even stronger with limited liability firms. Consequently, we introduce an interaction term with these variables, but also with LGDEBT and RISKCFO. As we argued above we expect a weaker association between a measure of operating risk and the level of income smoothing for corporations than for unlimited liability firms. The regression is:

$$\begin{aligned}
 7 \quad SMTH_{i,t} = & \beta_0 + \beta_1 LIM_{i,t} + \beta_2 LGDEBT_{i,t-1} + \beta_3 LIM_{i,t} * LGDEBT_{i,t-1} \\
 & + \beta_4 BANK_{i,t-1} + \beta_5 LIM_{i,t} * BANK_{i,t-1} + \beta_6 TAX_{i,t} + \beta_7 LIM_{i,t} * TAX_{i,t} \\
 & + \beta_8 RISKCFO_{i,t} + \beta_9 LIM_{i,t} * RISKCFO_{i,t} + \beta_{10} SIZE_{i,t-1} + \beta_{11} ROA_{i,t-1} \\
 & + \beta_{12} LOSS_{i,t} + \beta_{13} GROWTH_{i,t} + \beta_{14} OPCYCLE_{i,t-1} + \beta_{15} RISKSALES_{i,t} \\
 & + \beta_{16} CAPNEED_{i,t-1} + \beta_{17} AUDIT_{i,t} + IND_i + YEAR_t + \varepsilon_i
 \end{aligned}$$

In order to reduce redundancies, we focus on the SMTH measure. We obtain similar qualitative results with the other measures. Table 6 depicts the results of the regression and contrasts them to the findings without interaction terms (see Table 5).

Table 6: Pooled OLS regression with interaction term (N=17,193)

Dependent variable	SMTH		SMTH	
	Coeff.	t-value (p-value)	Coeff.	t-value (p-value)
Intercept	-0.8277	-17.23 (0.000)***	-0.8796	-17.91 (0.000)***
LIM	0.0324	4.34 (0.000)***	0.1295	4.54 (0.000)***
LGDEBT	0.0336	1.57 (0.117)	0.0474	1.47 (0.141)
<i>LIM* LGDEBT</i>			-0.0074	-0.18 (0.859)
LGBANK	0.0517	8.01 (0.000)***	0.0299	2.77 (0.006)***
<i>LIM* LGBANK</i>			0.0339	2.56 (0.010)***
TAX	0.0952	6.79 (0.000)***	0.1015	6.45 (0.000)***
<i>LIM* TAX</i>			-0.0342	-1.47 (0.142)
RISKCF0	1.6052	40.33 (0.000)***	2.0505	28.73 (0.000)***
<i>LIM* RISKCF0</i>			-0.6033	-7.64 (0.000)***
SIZE	0.0511	10.39 (0.000)***	0.0522	10.67 (0.000)***
ROA	-1.3409	-25.97 (0.000)***	-1.3956	-26.25 (0.000)***
LOSS	-0.1852	-27.47 (0.000)***	-0.1879	-28.06 (0.000)***
GROWTH	0.1628	4.20 (0.000)***	0.1745	4.52 (0.000)***
OPCYCLE	-0.0018	-1.34 (0.179)	-0.0000	-1.39 (0.165)
RISKSALES	-0.0985	-12.63 (0.000)***	-0.0963	-12.14 (0.000)***
CAPNEED	-0.0808	-1.64 (0.101)	-0.1174	-2.35 (0.019)
AUDIT	-0.0059	-0.52 (0.604)	-0.0209	-1.73 (0.083)*
IND _i		included		included
YEAR _t		included		included
Adj. R ² in%		36.14		36.94
F-Stat.		111.58		102.26
Prob(F-Stat.)		0.0000		0.0000

*, **, *** indicate significance at the 10%-, 5%-, 1%- level, using a two-tailed test. T-statistics are based on standard errors which are adjusted for heteroscedasticity and clustering at the firm level. For definition of variables see Table 1.

The positive association between income smoothing and (long-term) bank debt is stronger with corporations than with unlimited liability firms. This finding supports that limited liability firms find it advantageous to reduce fluctuations in income in order to influence the bank's expectations on default risk. The legal form does not affect the association between

income smoothing and total long-term debt, though. Thus, we find support for hypotheses 1, 3a, 3b, but have to reject hypotheses 2a and 2b.

With corporations, the association of income smoothing with tax avoidance incentives is less positive than with unlimited liability firms, however, the finding is not statistically significant. This finding supports hypotheses 4a and 4b. Finally, for limited liability firms we observe a weaker positive association between a measure of operating risk (RISKCFO) and the level of income smoothing.

4.3 Other sensitivity analyses

We run the regressions considering that in 2002 there was a significant tax reform, but still obtain the same qualitative results. We also changed the threshold number of shareholders which separates firms with high tax avoidance incentives from other firms. When we set the threshold level to three times for (smaller) unlimited liability firms and to five times for larger corporations we get similar qualitative results, however, both the economic and the statistical significance of the TAX variable is weaker then. Further, we controlled for the fact whether the firm is registered in Western or in Eastern Germany. After the fall of the Berlin wall, the economic environment but also tax incentives were significantly different in Eastern Germany. It turns out, that the qualitative results are not affected by the region where the firm is registered.

We also defined unlimited liability firms in a different way. The owners of small limited liability firms that receive most financing from one bank often are asked to provide personal unlimited guarantees. This scenario is similar, however not identical, to the case of an unlimited liability firm. We run the regressions by adding very small corporations to unlimited liability firms. We define very small firms as a subgroup of SMEs which either

have total assets not exceeding 1 Mio. Euro or sales not exceeding 1.4 Mio. Euro. With this definition we obtain similar qualitative results, however, both the economic and the statistical significance of the LIM variable is weaker then.

To control for cross-sectional dependence, we also used Fama McBeth-statistics. Qualitative results remain the same, the t-values of the main variables LIM, LGBANK and TAX even increase (5.79, 12.46 and 19.13, respectively).

Finally, we should stress some limitations of our study. First, we have not proven causality, but simply a statistical association between income smoothing and the firm's liability status. It might be the case that income smoothing determines the choice of liability status. We cannot rule out this interpretation but we do not think that this argument is valid. According to German commercial law the financial accounting rules are more lenient for unlimited liability firms such that we should then observe higher levels of income smoothing with them. We find the opposite result. Second, we analyze a sample of German private firms. Even though the basic agency problems of limited and unlimited liability firms should not differ too much across countries they are also likely to be affected by the country-specific regulatory environment and financing as well as the corporate governance patterns. Therefore, even though the above results are valid for the German context they might be less or even non-relevant in other countries.

5 Summary

We analyze income smoothing with private small and medium sized enterprises (SMEs) in Germany. More specifically, we ask whether unlimited liability firms show different patterns of income smoothing as opposed to limited liability firms. From a theoretical point of view, financial accounting is less important for unlimited liability firms since agency problems of equity and debt are mitigated. With unlimited liability creditors have less need to estimate the default risk via financial statements. Liability compensates for information. As a consequence, there is less need to signal stable sufficient income to improve debt contracting.

The empirical analysis confirms that unlimited liability firms smooth income considerably less than corporations do. Levels of income smoothing are lower by about 10-20%. Further, we find that income smoothing is positively associated with tax avoidance incentives and with the importance of bank debt. Whereas the relation between income smoothing and tax avoidance incentive does not differ significantly between the legal forms, the association between income smoothing and bank debt is more pronounced with limited liability firms. There is no significant relation between income smoothing and total debt. There is non-robust evidence that firms with an audited financial statement show lower levels of income smoothing.

Overall, our results indicate that a different legal form of a private firm implies different financial accounting choices. Further, even controlling for tax concerns, financial accounting of private firms obviously is related to the specific agency problems of debt financing. Unlimited liability implied less need for income smoothing, bank debt relates to higher levels of income smoothing.

Since our results and theoretical underpinning suggest that financing patterns and the nature and severity of agency problems differ considerably across private firms, our findings do not

advocate a complete harmonization of accounting standards for private and public firms, not even between private firms with different legal status. The efforts of the IASB to introduce a common set of fair value accounting rules for private firms (IASB, 2009) may have adverse effects on the debt financing of private firms since fair value accounting allows for less income smoothing. It needs more research to justify this effort.

Our results are in line with the observation, that in some jurisdictions, unlimited liability firms face less restrictive rules on financial accounting, disclosure and auditing than limited liability firms do, e.g. in Switzerland. Our analysis suggests that the legislator is right to do so since agency problems are less severe such that informative financial accounting is less warranted.

There are some limitations of our study. We have not proven causality, but simply a statistical association between income smoothing and the firm's liability status. Second, our findings relate to German private firms. Even though the basic agency problems of limited and unlimited liability firms should not differ too much across countries they are also likely to be affected by the country-specific regulatory environment and financing as well as the corporate governance patterns.

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