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The Relationship between Bankruptcy Risk and Growth for Non-listed Firms*

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Abstract

We investigate the relationship between bankruptcy risk and expected future sales growth for Norwegian non-listed firms for the period 1988-2007. We find that firms with high bankruptcy risk also have high expected future growth. Financial ratios characterizing firms with high bankruptcy risk also characterize firms with high future expected growth. Small firms, firms with low levels of equity and retained earnings, firms with low profitability and low levels of sales per unit of capital, have all higher expected future growth rates than other firms. These findings suggest a tradeoff between the upside potential of high growth and the downside risk of bankruptcy.

JEL Codes: G10, G30, G33

Keywords: Non-listed firms, growth, bankruptcy risk

*The opinions expressed here are solely those of the authors and do not necessarily reflect the views of Norges Bank or The Ministry of Trade and Industry. We thank Faaroq Akram for useful comments and suggestions. All errors are, of course, ours.

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1 Introduction

Many firms aim at achieving high growth and the prices of high-growth firms can be high even though current earnings are low. High growth implies increased activity for suppliers and other business service providers as well as increased employment. Local and central authorities are therefore often keen to attract high-growth firms and to facilitate their continued growth. While high growth is considered a sign of success it is, however, not an end in itself. Growth is a means to achieve high profitability. While many firms follow a high-growth strategy, not all firms can succeed. In this paper we study the relationship between bankruptcy risk and growth. Using a large sample of financial reports for Norwegian non-listed firms for the time period 1988-2007, we investigate whether firms with high bankruptcy risk also have high expected future growth.[1] Such a positive relationship suggests that there is a tradeoff between the downside risk of bankruptcy and the upside potential of high growth. It is important for investors, managers, and other stake holders in firms to be aware of this tradeoff.

The empirical finance literature is almost exclusively based on data for listed firms. The obvious reason for this bias is lack of data on non-listed firms. Accounting data for non-listed firms are for instance not publicly available in the US. The Norwegian accounting data is exceptional in the sense that the amount of required information for listed and non-listed companies is almost identical.[2]

Our contribution is to provide evidence of a positive relationship between bankruptcy risk and sales growth for non-listed firms. This has, to our knowledge, not been directly documented before. There is a selection bias in our sample in the sense that we are left with the group of high risk firms that were actually able to grow fast (while slow growing high risk firms failed and left the sample). Hence, what we quantify is a form of "rebound-effect" for surviving firms, which is stronger the higher the bankruptcy risk.

We also investigate which firm characteristics are associated with both high bankruptcy risk and high expected growth. Lower values of the explanatory variables are all related to higher bankruptcy risk. If lower values of the variables also are related to higher future growth if no bankruptcy occurs, then the variables contribute to the positive correlation between bankruptcy risk and expected growth. We do not find that one specific factor is causing this positive

[1] We measure growth as the yearly growth rate in total sales as reported in the firms' financial statements. Sales is often less influenced than other measures by the firms' judgement, such as valuation and write-downs of assets. Sales is also less influenced by changes in accounting principles over time.

[2] Moreover, the law provides a strong incentive for providing high quality accounting information as a company is automatically liquidated if approved annual accounts are not received by the authorities within 17 months after the end of the fiscal year.

relationship. On the contrary, we find that almost all financial ratios characterizing firms with high bankruptcy risk also characterize firms with high expected growth rates. Finally, our analysis document that sales growth in general is very hard to predict. This result is in accordance with Chan et al. (2003)'s study of growth rates for US listed firms. The result is relevant for the task of valuing non-listed firms in that it suggests that investors should not expect many firms to be able to sustain high growth rates in sales over long periods of time.

Both bankruptcy and growth prediction are important topics covered in the literature. It has become customary to classify default prediction models as structural models or reduced form models, see, e.g., Duffie and Singleton (2003). The structural models are based on market values and the standard reference is Merton (1974). In this class of models default is assumed to take place if market values of assets are lower than book values of debt. Reduced form models are typically hazard-rate models. The seminal article for this class of models is the Z-score of Altman (1968), where financial ratios are used to identify firm with highest default risk. Default prediction is particularly important when pricing debt.[3] There is also a literature on the relationship between default risk and equity returns. Here the main research question is whether the Fama-French risk factors SMB and HML can be explained by default risk. The evidence from these studies are mixed. Dichev (1998) compute measures of default risk on a sample of US industrial firms using reduced form models and finds that bankruptcy risk is not rewarded by higher returns. On the other hand, Vassalou and Xing (2004) analyze the effect of default risk on the return of traded US stocks using Merton (1974)'s model and find that small firms with high book-to-market ratio have higher return the higher the default risk.[4]

Prediction of firm growth is related to a large body of literature on the relationship between information extracted from financial statements and capital markets. A comprehensive survey of this literature is provided by Kothari (2001). Information in financial statements are often used to find the intrinsic, or fundamental, value of stocks. The fundamental value of a firm is usually defined as the expected future net cash flow discounted by a risk-adjusted discount rate. Growth in sales is a component of net cash flow. Chan et al. (2003) examine the level and persistence of growth rates for US listed firms between 1951 and 1997. Using mainly marked based explanatory variables, and not including default or bankruptcy risk, they find that there

[3]The possibility for banks to use own internal models of default prediction when determining minimum regulatory capital under the Basel II rules, see Basel Committee on Banking Supervision (2004), has led to increased research on default prediction.

[4]Vassalou and Xing (2004) explain the different results by the choice of model. While the structural models focus on expectations about future performance and take into account the volatility of a firms's assets, the reduced form models use backward looking information from the firms' financial statements.

is no persistence in long-term growth beyond chance and that the predictability of growth is low.

Norway is a member of the European Economic Area. The country is small based on its population, however, its economic importance is not immaterial. Norway is a large exporter of oil and gas and also a significant exporter in the seafood and shipping services sectors as well as in the light metals and ship equipment sectors, see OECD (2010). Our data sample should provide interesting non-US empirical evidence.

The remaining part of the paper is organized as follows. In section 2 we present the data sample. Section 3 contains the empirical analysis where we document a positive correlation between bankruptcy risk and future growth rates, and show that the financial ratios characterizing firms with high bankruptcy risk also characterize firms with high future growth rates. In section 4 we provide a discussion of possible explanations for the relationships found between the explanatory variables and future sales growth. The final section concludes.

2 Data

Our data sample consists of financial reports for Norwegian joint-stock companies over the 20 years from 1988 to 2007. The data is provided by Norges Bank and D&B[5].

Figure 1 provides some main indicators for the Norwegian economy during the sample period. GDP growth was on average 2.9 percent and varied from -0.2 percent in 1988 to 5.4 percent in 1997. During the first years of the sample period, Norway experienced a serious banking crises. The crisis peaked in the autumn of 1991. The years 1988-1991 coincided with the deepest recession in Norway after World War II. The crisis was effectively over by late 1993[6]. After 1991, inflation rates have been close to the current 2.5 percent inflation target in most years. Norway is a large exporter of oil and gas. During the last years of the sample period, there was a strong boom in the Norwegian economy, partly driven by a doubling of the oil price.

2.1 Filter rules

The data sample consists of annual unconsolidated financial statements for Norwegian joint-stock companies. To avoid noise in our estimations from a large number of very small firms, we exclude:

[5]Earlier Dun & Bradstreet The accounts are similar to those reported to The Register of Company Accounts, see www.brreg.no/english/registers/accounts. We also have information about each company's classification according to EU's standard industry classification system (NACE Rev.1.1).

[6]See Moe et al. (2004).

- Firms with asset size below NOK 1 million.
- Firms with values below the 2.5 percentile or above the 97.5 percentile for variables used when performing empirical analysis in section three. These variables are Sales/Total assets, Working capital/Total assets, Retained earnings/Total assets, Return on assets, Equity ratio, and the growth rate in sales.
- Firms failing a logical test for the balance sheets (total assets identical to the sum of equity and liabilities)[7].

After we have estimated bankruptcy probabilities for the firms we also exclude firms with equity less than NOK 200 000.[8] We also exclude firms belonging to heavily regulated industries (finance, public administration, health, education, and international organisations[9].

Several changes in the tax system during the sample period are likely to have affected firms' financial ratios. For more details on tax and accounting issues, see the Appendix.

2.2 Descriptive statistics

Table 1 describes the industrial structure as measured by the number of firms within different industry groups. Most firms are concentrated in Domestic trade, repair of goods sector which includes all companies within wholesale and retail trade[10], Real estate and business activities (includes commercial services)[11], Manufacturing, and Construction. The relative number of companies in the different industry groups has been fairly stable over the sample period. The number of non-listed firms quadrupled during the sample period from about 15 500 in 1988 to 62 600 in 2007.

We study growth in sales as measured by the growth rate. Descriptive statistics for sales growth over the years 1989-2007 are reported in Table 2. With the exception of the banking crises ending in 1993 and the years 2001-2003, median sales growth has mostly been above 5 percent.

Table 3 shows descriptive statistics for a selection of financial items and ratios. The ratios are defined in Table 4. The typical firm is quite small (5.4 mill NOK), however, the much higher

[7]We included the companies if the discrepancy was not larger than NOK 10 000.

[8]The reasone why we exclude firms only after the estimation of bankruptcy probabilities is that we want to keep many observations of bankruptcies in the sample. Firms with low levels of equity have typically a high bankruptcy risk.

[9]NACE codes 64, 65, 66, 84, 85, 86, 87, 88 and 99.

[10]The sector also includes repair of motor vehicles, motorcycles and personal and household goods.

[11]The Real estate and business activities sector includes real estate activities, renting of machinery, equipment, personal goods, and household goods, computers and related activities, research and development, and different business activities (legal, accounting, book keeping activities, tax consultancy, market research.etc).

mean of 46.6 mill NOK tells us that there are also some large firms in the sample. The mean and median Equity/Debt ratio is around 0.53 and 0.34 respectively.

3 Empirical analysis

3.1 Modeling approach

We start by estimating the direct relationship between firm-specific bankruptcy risk and growth. The regression equation is (we drop the subscript referring to specific firms in order to ease notation)

$$GSALES_{t+1} = \alpha_0 + \alpha_1 PB_t + \alpha_2 GSALES_t + \alpha_3 GASSETS_t + \alpha_4 \Delta AT_t + \epsilon_{t+1} \ , \qquad (1)$$

where $GSALES_{t+1}$ is the growth rate in sales between time t and $t+1$, PB_t is the estimated bankruptcy risk at time t, $GASSETS_t$ is the growth rate in total assets between $t-1$ and t, ΔAT_t is the change in the ratio of sales to total assets between time $t-1$ and t, and ϵ_{t+1} is the error term. Higher bankruptcy risk is positively related to higher expected growth if the coefficient α_1 is positive. $GSALES_t$ is included in order to account for possible persistence in sales growth. The persistence may depend on whether the growth is negative or positive. We therefore also perform regressions with separate variables for negative ($GSALES_t^-$) and positive ($GSALES_t^+$) sales growth. Asset growth $GASSETS_t$ is a proxy for recent investments that may increase future sales. The change in asset turnover ΔAT_t reflects recent changes in the earnings capacity of capital that may influence future growth. For listed firms, several variables reflecting market prices, such as book-to-market ratios, could have been relevant for explaining future growth.[12] More specific information relevant to growth at the firm level, such as market outlooks, product characteristics, information about the firms' management teams, or information about the owners, may also help to make predictions about expected growth for specific firms. Such information is, however, not available for this set of data.

The firm-specific bankruptcy probabilities PB_t are estimated in a separate logit estimation. We use the variables in the Z-score model of Altman (1968). These variables are asset turnover AT_t, working capital $WCAP_t$, return on assets ROA_t, retained earnings RE_t, and the equity

[12] In an analysis of growth rates for listed firms in the US, Chan et al. (2003) used the following 9 variables: 1) the growth rate over the 5 previous years, 2) the ratio of income before extraordinary items (EBEI) to the market value of equity, 3) the product of return on equity and the ratio of EBEI not paid as dividends, 4) the ratio of research and development expenditures to sales, 5) a dummy variable for firms in the technology sector, 6) the book-to-market ratio, 7) the stock's previous 6 month compounded rate of return, 8) the IBES consensus forecast for long term growth, and 9) the dividend yield.

ratio EQ_t. In addition we use a size variable $SIZE_t$ and indicator variables I_k for firms belonging to a specific industry k. Except for the indicator variables, higher values for all of these variables imply lower bankruptcy risk. The relationship between these variables and future growth will determine the relationship between bankruptcy risk and growth. In order to investigate the effect of these variables on future growth we therefore estimate the equation

$$\begin{aligned} GSALES_{t+1} &= \beta_0 + \beta_1 GSALES_t + \beta_2 GASSETS_t + \beta_3 \Delta AT_t + \beta_4 ROA_t + \beta_5 AT_t \\ &\quad + \beta_6 WCAP_t + \beta_7 RE_t + \beta_8 EQ_t + \beta_9 SIZE_t + \beta_{10} I_k + ... + u_{t+1} \ , \end{aligned} \tag{2}$$

where u_{t+k} is the error term. Equation (2) is similar to (1), except that the bankruptcy probability is replaced by the variables used to estimate the bankruptcy risk.

We follow the approach of Chan et al. (2003) and Fama and French (2000) and estimate by OLS the coefficients in the cross section separately for every year in the sample. We then take the average of the yearly coefficient estimates as our estimate for the coefficient values. The standard errors for the time-series of estimated coefficients are used to draw inferences about the mean of the yearly coefficients. With this approach, possible cross-correlation between firm residuals are reflected in the yearly cofficient estimates. The fact that bankruptcy risk is observed with errors in (1) may potentially influence the estimated coefficients. Measurement errors may induce a bias towards zero in parameter estimates.[13] We therefore use both (1) and (2), which does not include any model-generated variables, when evaluating the relationship between bankruptcy risk and growth. Table 5 reports the correlation coefficients between the explanatory variables in (2). The correlation coefficients between the equity ratio and retained earnings (0.65) and between the equity ratio and working capital (0.39) are quite high. We therefore make separate regressions excluding retained earnings and working capital.

3.2 Bankruptcy risk

The total number of bankrupt firms with at least one matched financial report in the filtered sample is approximately 11 800 for the years 1991-2006. The majority of the bankrupt firms delivered their last financial report two years before the bankruptcy year (approximately 46 percent). Approximately 20 percent of the bankrupt firms delivered their last financial report the year prior to the bankruptcy year. The remaining bankrupt firms, approximately 34 percent, delivered their last financial statements more than two years before the bankruptcy year. We

[13] For a general description of the error-in-variables problem, see, e.g., pages 279-287 in Greene (1993) or Pagan (1984).

define bankruptcy as the event that the firm is registered as bankrupt in any year during the three years following the year when the prediction is made. The explanatory variables are defined in Table 4 and descriptive statistics for the variables are provided in Table 3.

Table 6 shows the result of the logit regressions. We start by using the five original Altman-variables. The signs are negative for all variables except for asset turnover AT, meaning that an increase in numerical value of the variable reduces the bankruptcy probability. In the second specification we add the size variable. The coefficient is negative meaning that large firms have lower bankruptcy risk than small firms. When size is included the sign of asset turnover AT becomes negative. When we include indicator variables for industries we see that bankruptcy risk increases for firms in Manufacturing (I_4), Construction (I_6), and Domestic trade, repair of goods (I_7). Firms in Real estate, business activities (I_{10}) have lower bankruptcy risk. We use the model including indicator variables for industries to estimate expected growth in (1).

3.3 Growth

We start by estimating the coefficients in equation (1), see Model I in Table 7. We use three different samples in the estimation; all firms, small firms, and large firms. Small (large) firms are defined as firms below (above) the median of total assets. The coefficient for the bankruptcy probability PB_t is positive and significant. The coefficient of about 1.1 means that an increase in the bankruptcy probability by one percentage point (e.g. from 0.01 to 0.02) coincides with an increase in expected one-year growth of 1.1 percentage points. The coefficient for small firms is higher at about 1.3 and lower for larger firms, about 1.0. The coefficient for current asset growth is positive at about 0.07 for all firms. The coefficient for change in asset turnover ΔAT_t is negative, but close to zero. Also the coefficient for current sales growth $GSALES_t$ is negative, but close to zero. There is therefore little persistence in yearly growth rates. When we use separate variables for negative and positive current sales growth, see Model III, we find that the coefficient for $GSALES_t^-$ is negative at about -0.2 and the coefficient for positive current positive sales growth $GSALES_t^+$ is positive, but close to zero. Negative current sales growth is therefore related to increased sales growth next year, while positive current sales growth to a lesser degree is related to positive sales growth next year. The coefficient for bankruptcy risk PB_t remains at approximately 1.1 when separate variables are used for negative and positive current sales growth. The coefficient for bankruptcy risk also remains approximately unchanged for small and large firms. The predictability of growth as measured by the average R^2 is low, about 3 percent, irrespective of whether one uses the whole sample or the samples consisting of

only small or large firms. This is lower than the R^2 of about 7 percent reported by Chan et al. (2003) for listed firms in the US. They did, however, have access to variables from the securities markets when making the predictions.

When estimating the coefficients of equation (2) for all firms , see Model IV in Panel A in Table 7, we find that the coefficients for asset turnover AT_t, retained earnings RE_t, profitability ROA_t, the equity ratio EQ_t, and the size variable $SIZE_t$ are all negative and significant. The coefficient for working capital $WCAP_t$ is positive, but not significant. Due to the positive correlation between the equity ratio and, respectively retained earnings and working, capital we exclude working capital and retained earnings, see Model V. The coefficient estimates for the equity ratio EQ_t decreases slightly to about -0.02. The predictability increases slightly to about 4 percent when the financial ratios are used instead of the bankruptcy probability. We also find that all the financial ratios, with the exception of working capital, are negatively related to future growth when we split the sample into small and large firms.

Since a possible tradeoff between bankruptcy risk and growth is most relevant for firms with high bankruptcy risk, we make separate estimations for these firms. Firms with high bankruptcy risk are defined as firms with estimated bankruptcy probability higher than the median bankruptcy probability. The results are reported in Table 8. The results confirm that there is a positive and significant relationship between the bankruptcy probability PB_t and future sales growth for firms with high bankruptcy risk and that most of the financial ratios are negatively related to future growth. Exceptions are a positive sign of the coefficient for working capital $WCAP_t$ for the sample containing all firms and positive signs of the coefficients for working capital and retained earnings RE_t for the sample containing large firms only. The predictability is highest for large firms with an R^2 of about 5 percent.

To control for the importance of industry sector for future growth rates we include indicator variables for the four largest sectors in the sample. These are Real estate and business activities (I_{10}), Domestic trade, repair of goods (I_7), Construction (I_6), and Manufacturing (I_4) see Table 1. The two largest sectors, I_{10} and I_7, have a significant negative coefficient, signalling lower growth. When we restrict the sample to small firms only, the Construction sector comes in with a significant positive coefficient. This pattern remains when we restrict the sample to high bankruptcy firms.

4 Discussion

The previous section shows that there is a negative relationship between the explanatory variables in the bankruptcy prediction model and future growth. In this section we provide a discussion of possible explanations for this relationship.

Equity ratio Almost all discussions of optimal leverage take as a starting point the article of Modigliani and Miller (1958). According to Modigliani and Miller (MM) the value of firms' assets do not depend on the leverage ratio. There is therefore no value created for the owners by engaging in refinancing or changing the leverage. If the total value of firms' assets include the value of future investment opportunities and growth, the MM-argument implies that there should be no relationship between leverage and future growth. The MM-argument is, however, based on an arbitrage argument that relies on perfect information and frictionless markets. By introducing more realistic assumptions, in the form of different market imperfections, there may be an optimal leverage ratio and our finding of a negative relationship between equity ratio and future growth rates can be explained.

In the presence of *transaction costs*, the arbitrage argument causing the MM-result to hold may no longer be valid. Transaction costs may cause equity ratios to be adjusted only when they move too far away from optimal level, see, e.g., Fischer et al. (1989). Transaction costs are also the basis for the pecking-order model of debt, see Myers (1984). According to this model, retained earnings are the "cheapest" form of capital followed by new debt and new equity. According to this model the equity ratio will vary over time depending on the available investment opportunities and the cost of capital, which depends on the stock of internally generated funds. If firms spend a long time accumulating internal funds, this may help explain a negative relationship for most of the time between the equity ratio and future growth. Another explanation for optimal leverage that can explain our finding is based on the argument of *asymmetric information*. According to Jensen (1986) a high level of debt will discipline managers and lead to more efficient operations. More efficient firms will have higher profitability from their investments. This may lead to a negative relationship between the equity ratio and growth, as our analysis show.

Retained earnings Retained earnings are closely linked to the equity ratio. Retained earnings measure the degree to which funds are kept in the firm and not paid out as dividends. A high level of internal funding may indicate that the firm is constrained from external funding

(debt or equity), as in the pecking-order model of debt, see Myers (1984). If all firms were funding-constrained, we would expect to see a positive relationship between retained earnings and growth because firms with higher retained earnings would have a higher investment capacity. However, when comparing funding-constrained firms (high level of retained earnings) with unconstrained firms, we would expect the latter to have higher expected growth rates. This implies a negative relationship between retained earnings and future growth.[14]

Working capital Working capital is the only financial ratio that in most of our regressions is not negatively related to future growth. The data does, however, show that for most of the models the relationship between working capital and growth is close to zero and is not significant. This finding may be due to different relationships between liquidity and growth in different firms. We see two explanations for a positive relationship between liquidity and growth. Working capital measures firm liquidity, i.e., the ability to pay short term debt with liquid assets. First, good liquidity means that the firm is not hindered by short term debt problems and is therefore in a position to grow. Second, sales-lead expansions also increases firms' short term assets (increased cash holdings, bank deposits, or funds receivable). On the other hand, for some firms there may be a negative relationship between liquidity and growth. If firms are trying to achieve sales growth by first building capacity and inventory, the liquidity may become strained. Inventory building may reduce liquidity through increased short term debt, debt to suppliers, or a reduction in cash reserves or deposits. High levels of inventory do, however, facilitate fast future sales growth. This would imply a negative relationship between liquidity as measured by working capital and future sales.

Return on assets The negative relationship between profitability and growth seems at first puzzling. One would expect that a high asset return implies profitable investment opportunities and that future investments and growth will follow. This argument assumes, however, that future profitability remains equal to current profitability. Different studies show the presence of mean reversion in profitability over time.[15] Fama and French (2000) document the presence

[14] A large body of literature, see, e.g., Fazzari et al. (1988), find a positive relationship between cash flow and investments. One of the explanations for this is that firms may be constrained by the availability of external financing. Firms therefore have to use internal funds to finance investment.On the other hand, Kaplan and Zingales (1997) show some results where firms that appear less financially constrained exhibit greater investment-cash flow sensitivities than firms that appear more financially constrained.

[15] Mean reversion in profitability implies a negative relatiohsip between current profitability ROA_t and future changes in profitability. To see this, consider as an example an AR(1) model represented by the regression equation

$$\Delta ROA_{t+1} = (\alpha - ROA_t)\kappa + \epsilon_{t+1},$$

of mean reversion in profitability for listed US firms and Allen and Salim (2005) also document mean reversion for listed UK firms. Nordal and Næs (2010) provide evidence of mean reversion in asset return for Norwegian non-listed firms. The intuition behind mean reversion in profitability is that competition will force profitability to a long run mean. If changes in asset return is influenced by changes in sales, we would therefore expect to see a negative relationship between current profitability and future growth. Firms with below-mean growth today is expected to improve their profitability. The improvement in profitability will partly be caused by increased growth in sales. On the other hand, a high profitability may also indicate that the firm has market power. The firm may be optimizing its profitability by keeping prices high and sales volume low. Firms with market power have usually low growth potential, indicating a negative relationship between profitability and growth.

Asset turnover Firms with high earnings capacity of assets, as measured by asset turnover (sales/total assets) should be able to increase sales by investing in new capacity. This would imply a positive relationship between asset turnover and growth. In the cross section of firms from different industries, however, a high asset turnover may indicate that the firm's production technology is labor intensive. Increasing sales by hiring new workers may be more time consuming and costly than adding new capital, e.g., because of coordination costs and negative economies of scale. Based on this line of reasoning, there should be a negative relationship between asset turnover and expected sales growth.

Firm size There is a large literature within the field of industrial organization on the implications of firm growth on the firm size distribution, see for example Mansfield (1962). A negative relationship between size and future sales growth contradicts the classical proportional growth law of Gibrat, which stipulates that expected firm growth is independent of size. Our finding that the expected growth rate is decreasing with size is, however, in line with more recent empirical evidence in this field, see for example Cabral and Mata (2003). Jovanovic (1982) argue that a decreasing relationship between firm growth and size can be explained by selection. If most small firms are young and if many young firms go bankrupt, the remaining small firms naturally have a higher growth rate than larger firms.

where high (low) levels of profitability implies a negative (positive) change in profitability at the rate κ towards the long-run average α.

5 Concluding remarks

In this paper we use a large sample of financial reports for Norwegian non-listed firms to study the relationship between bankruptcy risk and sales growth. There is currently very little empirical evidence on the non-listed sector of the economy. Considering that this sector is more important than the listed equity market in most countries, both with respect to value added and employment, more knowledge about non-listed firms is warranted.

The characteristics of firms with high bankruptcy risk are similar to the characteristics of firms with expected high future growth in sales. Examples are low equity ratio, low current profitability, and current low levels of earnings capacity of capital. This relationship indicates a tradeoff between the upside potential of high future growth and the downside risk of bankruptcy. A tradeoff between risk and return is well documented in capital markets where securities are traded based on expectations about the future. Interestingly, as our results suggest, such a tradeoff also seems to be present at the firm level. At the firm level this tradeoff follows from the competition between firms and the actions made by firms' owners and management. Our analysis also indicate low predictability of sales growth. This result is relevant for the task of valuing non-listed firms.

A Specific data issues

A.1 Consolidated versus unconsolidated statements

Consolidated statements are available for the years 1992-2007. The number of group accounts grew each year from 1992 to 1998. From 1999 and onwards, it was not mandatory to submit consolidated accounts for sub-groups.[16] In addition, it was no longer mandatory for companies defined as "small" to submit consolidated statements. The new rules made the number of group accounts drop from about 10200 in 1998 to 3200 in 1999. Since we don't have information about ownership or cross-ownership, we cannot select sub-samples based on this variable. In order to secure comparability over time we therefore focus on only unconsolidated accounts in our analysis.

A.2 Changes in legislation and accounting rules

Several events were important for financial reporting in Norway during the sample period:

The *1992 tax reform* The tax reform introduced a new method for reporting taxes. Before 1992, only taxes payable the following year were included in the profit- and loss statements. From 1992 and later the statement also included taxes payable beyond the following year ("deferred taxes"). Before 1992 the liability side of the balance sheet included untaxed reserves. When performing analysis on accounting data before the tax reform in 1992, it was customary to split these reserves between equity and debt according to the effective tax rate. This method is shown on, e.g., page 96 in Kinserdal (1983). With an effective tax rate s, a fraction s of the reserves was added to the company's debt and a fraction $1-s$ was added to equity. We use this approach (with s equal to 0.4) to amend equity and debt in the reports for the years 1988-1991.

The *1999 accounting reform* The accounting reform changed the specification requirements for the profit- and loss statement and the balance sheet. An important change was the reclassification of write-downs of fixed assets and intangible assets from being extraordinary costs to being operating costs. The reclassification makes it difficult to compare operating profit and profit before extraordinary items before and after 1999. We therefore amended the profit- and loss statements before 1999 by reclassifying write-downs as an operating cost and

[16] Consider the case where company A owns company B which owns company C. B and C are considered to be a sub-group, and B may make consolidated accounts for the group $(B+C)$. A will submit consolidated accounts for the group $A+B+C$.

by recomputing operating profit and profit before extraordinary items.[17]

The *2006 tax reform* The tax code was changed making dividends paid in 2006 or later taxable for non-corporate shareholders. This caused high payments of dividends before 2006 and very low payment of dividends in 2006. For a description of this reform, see Allstadsæter and Fjærli (2009).

[17]For a recent description of the Norwegian account law in English, we refer readers to Revisorforeningen (2007). An English translation of the law may also be found, e.g., on pages 315-351 in Kinserdal (2001).

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Figure 1: Main indicators for the Norwegian economy 1988-2007

The figure shows some main indicators for the Norwegian economy over the 1988-2007 period. The indicators are (1) GDP growth (left axis), (2) inflation (left axis) and (3) oil prices in USD (right axis). GDP growth is calculated based on fixed 2000 prices. Oil prices are in fixed 2007 USD.

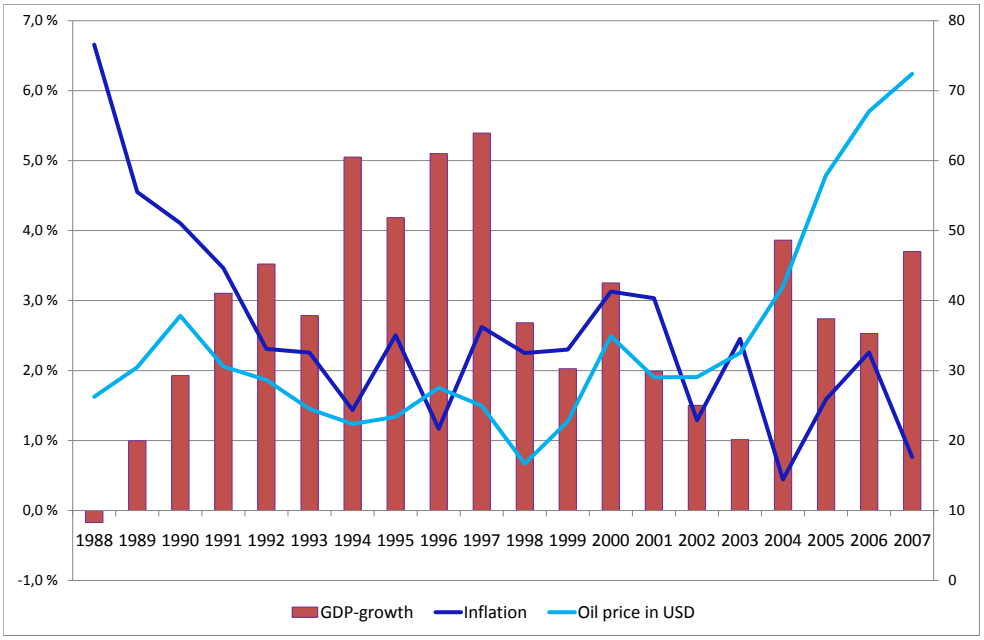

Table 1: Industrial structure in Norway 1988-2007

The table reports the number of companies within each industry group each year during the period 1988-2007. The last two rows shows respectively the average number of companies each year for each industry group over the period, and each industry group's percentage of the average number of all comapnies each year over the period. The industry codes are:

1	Agriculture, hunting, and forestry	6	Construction
2	Fishing	7	Domestic trade, repair of goods
3	Oil and gas extraction, mining	8	Hotels and restaurants
4	Manufacturing	9	Transport and communication
5	Electricity, gas, and water supply	10	Real estate, business activities

Year	1	2	3	4	5	6	7	8	9	10	Sum
1988	62	292	183	2 791	43	1 369	5 035	281	841	4 603	15 500
1989	72	289	213	2 939	54	1 487	5 529	316	1 002	5 285	17 186
1990	98	318	246	3 348	70	1 644	6 785	418	1 279	6 067	20 273
1991	106	308	256	3 513	80	1 662	7 724	451	1 356	6 400	21 856
1992	114	388	235	3 688	81	1 820	8 454	517	1 486	6 887	23 670
1993	129	463	273	3 852	124	1 948	9 163	607	1 629	7 278	25 466
1994	147	559	275	4 035	124	2 264	9 842	679	1 754	7 753	27 432
1995	191	642	276	4 238	166	2 727	10 673	719	2 065	8 533	30 230
1996	204	672	274	4 533	178	3 228	11 883	819	2 267	9 697	33 755
1997	218	704	302	4 836	204	3 805	12 936	945	2 629	11 071	37 650
1998	251	755	319	5 037	240	4 155	13 514	1 062	2 734	12 063	40 130
1999	263	784	320	5 069	288	4 403	13 984	1 170	2 715	12 900	41 896
2000	295	759	315	5 249	288	4 719	14 505	1 283	2 877	13 907	44 197
2001	322	757	331	5 237	294	4 867	14 518	1 260	2 939	14 333	44 858
2002	313	726	330	5 127	298	4 828	14 518	1 307	2 974	14 264	44 685
2003	359	631	351	5 142	329	4 967	14 798	1 343	3 004	14 817	45 741
2004	368	697	370	5 233	364	5 240	14 949	1 367	3 097	15 920	47 605
2005	507	733	385	5 587	387	6 383	16 634	1 583	3 445	18 479	54 123
2006	579	769	415	5 701	429	7 287	17 264	1 721	3 677	20 846	58 688
2007	522	798	441	5 759	434	8 213	17 712	1 906	3 957	22 911	62 653
Average	256	602	306	4 546	224	3 851	12 021	988	2 386	11 701	36 880
Percent	0.7	1.6	0.8	12.3	0.6	10.4	32.6	2.7	6.5	31.7	100.0

Table 2: Descriptive statistics on one year sales growth 1989-2007

The table reports descriptive statistics (minimum, median, mean, standard deviation) for the one year growth rate in sales for non-listed Norwegian firms over the years 1989-2007. The number of companies (N) each year are also reported.

Year	N	Mean	Median	Max	Min	Std
1989	13557	0.0235	0.0049	1.1645	-0.5484	0.2362
1990	14784	0.0650	0.0406	1.2284	-0.5530	0.2464
1991	18177	0.0801	0.0379	1.5649	-0.5151	0.2711
1992	20070	0.0753	0.0346	1.5965	-0.5218	0.2650
1993	21658	0.0711	0.0287	1.4324	-0.4777	0.2477
1994	23900	0.1281	0.0780	1.3019	-0.4374	0.2520
1995	24395	0.0897	0.0529	1.0354	-0.4575	0.2213
1996	27533	0.1078	0.0572	1.4331	-0.4525	0.2590
1997	30835	0.1352	0.0770	1.6359	-0.4612	0.2829
1998	33339	0.1212	0.0669	1.6539	-0.5043	0.2854
1999	35014	0.0794	0.0391	1.5349	-0.5157	0.2706
2000	36563	0.1063	0.0531	1.6503	-0.5274	0.2935
2001	37446	0.0959	0.0451	1.6884	-0.5351	0.2909
2002	37831	0.0762	0.0328	1.5526	-0.5381	0.2744
2003	38394	0.0611	0.0236	1.4864	-0.5365	0.2625
2004	39707	0.1265	0.0619	1.7128	-0.4817	0.2930
2005	44091	0.1193	0.0551	1.7841	-0.4938	0.2970
2006	47095	0.1495	0.0780	1.8431	-0.4764	0.3086
2007	50570	0.1631	0.0974	1.8076	-0.4916	0.3098
Mean	31 314	0.0987	0.0508	1.5320	-0.5013	0.2720
Median	33 339	0.0959	0.0529	1.5649	-0.5043	0.2711
Max	50 570	0.1631	0.0974	1.8431	-0.4374	0.3098
Min	13 557	0.0235	0.0049	1.0354	-0.5530	0.2213

Table 3: Descriptive statistics on selected financial items and ratios 1988-2007

The table reports descriptive statistics on selected financial items and ratios over the period 1988-2007. The variables are Total assets, Sales/Total assets, Working capital/Total assets, Retained earnings/Total assets, Equity ratio, and Return on assets. [1)] Measured in Million NOK.

	Mean	Median	Max	Min	Std
Assets[1)]	46.6	5.4	402 800.0	1.0	784.0
Sales/assets	2.0105	1.7825	8.7798	0.0623	1.4316
Working capital	0.1592	0.1523	0.7560	-0.6397	0.2135
Retained earnings	0.1877	0.1729	0.6990	-0.8947	0.1726
Equity ratio	0.5304	0.3424	4.5118	0.0002	0.5529
Return on assets	0.1021	0.0935	0.5219	-0.3589	0.0997

Table 4: Definitions of financial items

Working capital	Short term assets - Short term debt
Retained earnings	Book equity - Paid in equity
Return on assets	Earnings before extraordinary items and interests after taxes / Total assets
Equity ratio	Book equity / Debt

Table 5: Correlation between explanatory variables

The table shows the average of the yearly correlation coefficients between the explanatory variable for the period 1989-2007.

	$GSALES_t$	AT_t	$WCAP_t$	RE_t	ROA_t	EQ_t	$SIZE_t$	$GASSETS_t$	ΔAT_t
$GSALES_t$	1								
AT_t	0,06	1							
$WCAP_t$	-0,04	0,10	1						
RE_t	-0,08	-0,03	0,35	1					
ROA_t	0,18	0,08	0,05	0,21	1				
EQ_t	-0,10	-0,14	0,39	0,65	0,04	1			
$SIZE_t$	0,05	-0,28	-0,12	-0,06	-0,13	0,00	1		
$GASSETS_t$	0,23	-0,04	-0,03	-0,05	0,03	-0,05	0,08	1	
ΔAT_t	0,21	0,11	0,01	-0,01	0,02	0,01	-0,03	-0,14	1

Table 6: Estimated parameters for prediction of bankruptcy within 3 years

The table reports the results from an estimated logit model of the probability that a given firm goes bankrupt within 3 years. The probability of observing bankruptcy is assumed to be given by the model,

$$Prob(Y = Bankrupt) = F(\beta'\mathbf{x})$$

where $\mathbf{x}$ is the vector of explanatory variables, β is the vector of coefficients, and $F(.)$ is a cumulative distribution function. Explanatory variables are asset turnover (AT), working capital ($WCAP$), retained earnings (RE), profitability (ROA), equity ratio (EQ), the log of total assets ($SIZE$), and four indicator variables for industry groups (I_i). The industry groups are: Manufacturing (4), Construction (6), Domestic trade, repair of goods (7), and Real estate, business activities (10). All models are estimated over the period 1989-2002. We exclude firms with values below the 2.5 percentile value or above the 97.5 percentile value for the variables AT, $WCAP$, RE, ROA, and EQ. The t-values are given in parenthesis. Significance at the 1 and 5 percent level are marked by $**$ and $*$, respectively. The six last rows show various standard statistical test results from the estimation. AUROC is the area under the receiver operating characteristic curve.

CONST	-2.833^{**}	-1.326^{**}	-1.399^{**}
	(-167.94)	(-18.02)	(-18.31)
AT	0.010	-0.029^{**}	-0.073^{**}
	(1.77)	(-5.06)	(-11.40)
$WCAP$	-0.552^{**}	-0.554^{**}	-0.662^{**}
	(-12.85)	(-12.98)	(-15.00)
RE	-2.345^{**}	-2.245^{**}	-2.256^{**}
	(-36.18)	(-34.26)	(-33.70)
ROA	-3.374^{**}	-3.368^{**}	-3.133^{**}
	(-44.39)	(-44.61)	(-40.92)
EQ	-1.541^{**}	-1.510^{**}	-1.483^{**}
	(-27.32)	(-26.64)	(-25.53)
$SIZE$		-0.170^{**}	-0.150^{**}
		(-20.81)	(-18.44)
I_4			0.377^{**}
			(12.95)
I_6			0.306^{**}
			(9.73)
I_7			0.073^{**}
			(2.77)
I_{10}			-0.679^{**}
			(-21.66)
N	496 735	496 735	496 735
Log likelihood	-59 459	-59 226	-58 490
LR	19 380	19 845	21 317
Prob	0.0000	0.0000	0.0000
Pseudo R2	0.1401	0.1435	0.1541
AUROC	0.8071	0.8096	0.8177

Table 7: Estimated sales growth

The table reports the results from estimating yearly growth rates in sales using six different versions of the regression equation,

$$y_{t+1} = a + b_1 x_{1,t} + b_2 x_{2,t} ... + \epsilon_{t+1}.$$

Panel A shows the results of the estimations when the sample includes all firms for the sample period 1989-2006, whereas panels B and C show similar results when the sample includes small or large firms only. Small (large) firms are firms with asset size below (above) the median level of asset size. The explanatory variables (x) are the time t estimated bankruptcy probability (PB_t), the yearly growth rate in total assets ($GASSETS_t$), the yearly growth rate in sales ($GSALES_t$) as well as the growth rate conditioned on being negative ($GSALES_t^-$) and the growth rate conditioned on being positive ($GSALES_t^+$). The financial ratios included are asset turnover (AT_t), working capital ($WCAP_t$), retained earnings (RE_t), profitability (ROA_t), equity ratio (EQ_t), and a size variable ($SIZE_t$) (log of total assets). The indicator variables for industry i is I_i. The industries are: Manufacturing (4), Construction (6), Domestic trade, repair of goods (7), and Real estate, business activities (10). For every year an OLS regression is made. The reported coefficients are the mean of the coefficients for the year-by-year regressions. The t-values are given in parentheses. The last column show the average number of companies in a year over the estimation period ($\overline{N}$).

Panel A: All firms

	I	II	III	IV	V	VI
CONST	0.054	0.060	0.041	0.129	0.127	0.154
	(9.0)	(9.2)	(7.9)	(16.7)	(16.3)	(21.3)
PB_t	1.144	1.262	1.054			
	(20.8)	(20.3)	(19.2)			
$GSALES_t$	-0.011					
	(-2.2)					
$GSALES_t^-$			-0.232	-0.210	-0.211	
			(-9.9)	(-9.8)	(-9.8)	
$GSALES_t^+$			0.032	0.033	0.035	
			(7.3)	(7.4)	(7.6)	
$GASSETS_t$	0.065		0.068	0.067	0.067	
	(10.3)		(10.5)	(10.2)	(10.2)	
ΔAT_t	-0.012		-0.009	-0.010	-0.010	
	(-5.4)		(-3.9)	(-4.2)	(-4.2)	
AT_t				-0.004	-0.004	-0.007
				(-4.7)	(-4.6)	(-7.9)
$WCAP_t$				0.006		0.009
				(1.8)		(2.1)
RE_t				-0.038		-0.045
				(-7.5)		(-9.8)
ROA_t				-0.128	-0.137	-0.114
				(-11.6)	(-12.3)	(-9.9)
EQ_t				-0.012	-0.020	-0.017
				(-7.2)	(-11.9)	(-12.6)
$SIZE_t$				-0.003	-0.003	-0.003
				(-4.2)	(-4.3)	(-3.6)
I_4				-0.002	-0.002	-0.003
				(-0.6)	(-0.5)	(-0.9)
I_6				0.017	0.017	0.023
				(1.7)	(1.6)	(2.2)
I_7				-0.010	-0.010	-0.011
				(-2.6)	(-2.6)	(-2.6)
I_{10}				-0.008	-0.008	-0.011
				(-2.1)	(-2.0)	(-2.7)
$\overline{R^2}$	0.022	0.007	0.028	0.035	0.034	0.014
$\overline{N}$	23418	23418	23418	23418	23418	23418

Table 7: continued

Panel B: Small firms

	I	II	III	IV	V	VI
CONST	0.051	0.057	0.036	0.251	0.247	0.215
	(8.5)	(8.8)	(6.9)	(20.1)	(19.0)	(16.5)
PB_t	1.267	1.317	1.176			
	(18.2)	(17.7)	(17.0)			
$GSALES_t$	-0.011					
	(-2.2)					
$GSALES_t^-$			-0.259	-0.220	-0.221	
			(-11.0)	(-11.1)	(-11.3)	
$GSALES_t^+$			0.033	0.031	0.035	
			(6.6)	(6.3)	(7.4)	
$GASSETS_t$	0.074		0.088	0.089	0.088	
	(16.0)		(19.3)	(19.5)	(20.0)	
ΔAT_t	-0.009		-0.002	-0.004	-0.004	
	(-3.7)		(-0.9)	(-1.8)	(-1.8)	
AT_t				-0.005	-0.005	-0.008
				(-9.2)	(-9.1)	(-12.4)
$WCAP_t$				0.001		0.003
				(0.4)		(0.8)
RE_t				-0.081		-0.088
				(-8.3)		(-9.4)
ROA_t				-0.136	-0.153	-0.106
				(-11.5)	(-12.9)	(-8.0)
EQ_t				-0.006	-0.028	-0.011
				(-2.8)	(-18.6)	(-4.8)
$SIZE_t$				-0.018	-0.018	-0.010
				(-9.9)	(-9.8)	(-5.2)
I_4				-0.002	-0.003	-0.001
				(-0.6)	(-0.7)	(-0.3)
I_6				0.025	0.022	0.032
				(2.4)	(2.2)	(3.0)
I_7				-0.010	-0.011	-0.010
				(-3.5)	(-4.2)	(-3.0)
I_{10}				0.009	0.009	0.010
				(1.6)	(1.6)	(1.9)
$\overline{R^2}$	0.020	0.008	0.028	0.039	0.037	0.021
$\overline{N}$	11051	11051	11051	11051	11051	11051

Table 7: continued

Panel C: Large firms

	I	II	III	IV	V	VI
CONST	0.056	0.062	0.045	0.109	0.110	0.148
	(9.2)	(9.4)	(8.3)	(13.2)	(13.1)	(18.7)
PB_t	1.022	1.226	0.932			
	(15.3)	(16.1)	(14.1)			
$GSALES_t$	-0.015					
	(-3.4)					
$GSALES_t^-$			-0.222	-0.208	-0.208	
			(-9.6)	(-9.1)	(-9.0)	
$GSALES_t^+$			0.025	0.026	0.027	
			(4.8)	(5.2)	(5.3)	
$GASSETS_t$	0.063		0.064	0.063	0.063	
	(9.2)		(9.3)	(9.0)	(8.9)	
ΔAT_t	-0.015		-0.013	-0.014	-0.014	
	(-5.2)		(-4.4)	(-4.4)	(-4.4)	
AT_t				-0.005	-0.005	-0.007
				(-3.6)	(-3.4)	(-5.7)
$WCAP_t$				0.007		0.009
				(1.1)		(1.4)
RE_t				-0.007		-0.014
				(-1.3)		(-2.7)
ROA_t				-0.133	-0.135	-0.134
				(-10.5)	(-10.2)	(-10.4)
EQ_t				-0.017	-0.017	-0.022
				(-6.8)	(-9.3)	(-10.5)
$SIZE_t$				-0.001	-0.001	-0.002
				(-1.6)	(-1.7)	(-2.5)
I_4				-0.002	-0.002	-0.004
				(-0.5)	(-0.4)	(-0.9)
I_6				0.012	0.012	0.017
				(1.1)	(1.1)	(1.6)
I_7				-0.005	-0.005	-0.006
				(-1.0)	(-1.0)	(-1.1)
I_{10}				-0.019	-0.019	-0.024
				(-4.0)	(-3.9)	(-5.1)
$\overline{R^2}$	0.025	0.006	0.030	0.038	0.038	0.014
$\overline{N}$	12367	12367	12367	12367	12367	12367

Table 8: Estimated sales growth for firms with high bankruptcy risk

The table reports the results from estimating yearly growth rates in sales for firms with high bankruptcy risk using six different versions of the regression equation,

$$y_{t+1} = a + b_1 x_{1,t} + b_2 x_{2,t} ... + \epsilon_{t+1}.$$

Firms with high bankruptcy risk are defined as firms with estimated bankruptcy probability higher than the median bankruptcy probability. Panel A shows the results of the estimations when the sample includes all firms for the sample period 1989-2006, whereas panels B and C show similar results when the sample includes small or large firms only. Small (large) firms are firms with asset size below (above) the median level of asset size. The explanatory variables (x) are the time t estimated bankruptcy probability (PB_t), the yearly growth rate in total assets ($GASSETS_t$), the yearly growth rate in sales ($GSALES_t$) as well as the growth rate conditioned on being negative ($GSALES_t^-$) and the growth rate conditioned on being positive ($GSALES_t^+$). The financial ratios included are asset turnover (AT_t), working capital ($WCAP_t$), retained earnings (RE_t), profitability (ROA_t), equity ratio (EQ_t), and a size variable ($SIZE_t$) (log of total assets). The indicator variables for industry i is I_i. The industries are: Manufacturing (4), Construction (6), Domestic trade, repair of goods (7), and Real estate, business activities (10). For every year an OLS regression is made. The reported coefficients are the mean of the coefficients for the year-by-year regressions. The t-values are given in parentheses. The last column show the average number of companies in a year over the estimation period ($\overline{N}$).

Panel A: All firms

	I	II	III	IV	V	VI
CONST	0.056	0.066	0.041	0.167	0.163	0.199
	(9.6)	(10.4)	(7.8)	(17.7)	(17.3)	(21.5)
PB_t	1.029	1.084	0.855			
	(12.6)	(13.2)	(10.7)			
$GSALES_t$	0.007					
	(1.3)					
$GSALES_t^-$			-0.285	-0.254	-0.254	
			(-12.0)	(-12.1)	(-12.2)	
$GSALES_t^+$			0.064	0.063	0.064	
			(13.5)	(12.8)	(12.7)	
$GASSETS_t$	0.059		0.061	0.059	0.059	
	(9.1)		(9.4)	(9.0)	(9.0)	
ΔAT_t	-0.017		-0.013	-0.014	-0.014	
	(-7.3)		(-5.6)	(-5.7)	(-5.7)	
AT_t				-0.008	-0.008	-0.011
				(-9.2)	(-9.1)	(-14.0)
$WCAP_t$				0.002		-0.003
				(0.6)		(-0.9)
RE_t				-0.037		-0.038
				(-4.8)		(-4.6)
ROA_t				-0.149	-0.154	-0.168
				(-9.2)	(-9.4)	(-10.6)
EQ_t				-0.041	-0.049	-0.068
				(-6.6)	(-7.4)	(-12.0)
$SIZE_t$				-0.007	-0.006	-0.005
				(-6.4)	(-6.2)	(-4.9)
I_4				0.002	0.002	0.005
				(0.6)	(0.6)	(1.3)
I_6				0.027	0.026	0.038
				(2.6)	(2.5)	(3.6)
I_7				-0.008	-0.008	-0.005
				(-1.9)	(-1.8)	(-1.2)
I_{10}				-0.016	-0.014	-0.021
				(-3.3)	(-3.1)	(-4.6)
$\overline{R^2}$	0.025	0.005	0.034	0.043	0.043	0.017
$\overline{N}$	11259	11259	11259	11259	11259	11259

Table 8: continued

Panel B: Small firms

	I	II	III	IV	V	VI
CONST	0.050	0.059	0.034	0.325	0.320	0.284
	(8.1)	(9.0)	(6.1)	(14.3)	(13.9)	(11.6)
PB_t	1.230	1.240	1.059			
	(13.7)	(14.1)	(12.2)			
$GSALES_t$	-0.003					
	(-0.5)					
$GSALES_t^-$			-0.305	-0.261	-0.262	
			(-11.9)	(-12.0)	(-12.1)	
$GSALES_t^+$			0.047	0.045	0.049	
			(6.4)	(6.0)	(6.5)	
$GASSETS_t$	0.078		0.095	0.091	0.090	
	(15.4)		(17.8)	(16.0)	(16.0)	
ΔAT_t	-0.013		-0.005	-0.007	-0.007	
	(-5.9)		(-2.0)	(-3.0)	(-2.9)	
AT_t				-0.007	-0.007	-0.011
				(-9.8)	(-9.5)	(-13.0)
$WCAP_t$				-0.001		-0.006
				(-0.1)		(-1.2)
RE_t				-0.085		-0.088
				(-6.3)		(-6.6)
ROA_t				-0.158	-0.166	-0.149
				(-10.0)	(-10.7)	(-9.6)
EQ_t				-0.049	-0.072	-0.066
				(-6.7)	(-11.2)	(-9.1)
$SIZE_t$				-0.026	-0.026	-0.016
				(-8.5)	(-8.4)	(-4.9)
I_4				0.002	0.001	0.006
				(0.5)	(0.4)	(1.5)
I_6				0.032	0.029	0.042
				(3.3)	(3.0)	(4.2)
I_7				-0.012	-0.013	-0.009
				(-3.4)	(-3.4)	(-2.3)
I_{10}				0.005	0.008	0.008
				(1.2)	(1.9)	(1.7)
$\overline{R^2}$	0.024	0.006	0.034	0.047	0.046	0.023
$\overline{N}$	5678	5678	5678	5678	5678	5678

Table 8: continued

Panel C: Large firms

	I	II	III	IV	V	VI
CONST	0.061	0.072	0.047	0.136	0.138	0.186
	(10.6)	(11.3)	(8.7)	(10.2)	(10.3)	(13.9)
PB_t	0.826	0.947	0.645			
	(7.8)	(8.3)	(6.1)			
$GSALES_t$	0.007					
	(1.4)					
$GSALES_t^-$			-0.292	-0.268	-0.267	
			(-11.7)	(-10.8)	(-10.8)	
$GSALES_t^+$			0.064	0.063	0.063	
			(11.2)	(10.5)	(10.4)	
$GASSETS_t$	0.056		0.056	0.053	0.053	
	(8.1)		(8.3)	(7.8)	(7.8)	
ΔAT_t	-0.019		-0.015	-0.016	-0.016	
	(-6.1)		(-5.1)	(-5.3)	(-5.2)	
AT_t				-0.010	-0.010	-0.014
				(-8.0)	(-7.9)	(-11.9)
$WCAP_t$				0.005		-0.001
				(0.7)		(-0.1)
RE_t				0.010		0.013
				(0.9)		(1.1)
ROA_t				-0.139	-0.138	-0.186
				(-6.9)	(-6.8)	(-9.4)
EQ_t				-0.043	-0.039	-0.075
				(-3.9)	(-3.6)	(-7.2)
$SIZE_t$				-0.003	-0.004	-0.004
				(-2.5)	(-2.6)	(-2.6)
I_4				0.003	0.004	0.005
				(0.5)	(0.6)	(0.9)
I_6				0.021	0.022	0.034
				(1.8)	(1.9)	(2.9)
I_7				0.000	0.001	0.004
				(0.0)	(0.1)	(0.7)
I_{10}				-0.027	-0.027	-0.035
				(-4.1)	(-4.1)	(-5.4)
$\overline{R^2}$	0.029	0.004	0.038	0.049	0.048	0.018
$\overline{N}$	5580	5580	5580	5580	5580	5580