

Assessing indirect bankruptcy costs on New Zealand listed firms

Abstract:

This study investigates indirect bankruptcy costs for a recent sample of listed firms' bankruptcies in the New Zealand over the period of 8 years. Research indicates that indirect bankruptcy cost is approximately 4.39%, 7.67% and 11.57% of firm value in year -3, -2 and -1 relative to the year bankruptcy announcement. Together with that direct costs reported by Bradbury and Lioyd (1994) in New Zealand study suggest total bankruptcy related cost is around 12.39%, 15.67% and 19.57% of firm value over the corresponding three years prior to the bankruptcy filed. After control potential endogeneity, between firm capital structure variables and financial distress costs this study finds leverage, profitability and firm size has significant influence of determine the magnitude of indirect bankruptcy costs. Finding indicates that the development of insolvency law is especially important, because keeping viable business is operating is one of the important goals of bankruptcy systems.

Keywords: Bankruptcy costs; indirect costs; capital structure; New Zealand

Introduction

This study investigates indirect bankruptcy costs for a recent sample of listed firms' bankruptcies in the New Zealand over the period of 2005 February to 2012 February. Moreover, study identified leverage, profitability, firm size as which are determined indirect bankruptcy costs. A firm optimal capital structure is often determined by the trade-off between the costs and benefits of debt. The primary benefit of debt financing is the tax - shield which is indicates as the tax deductibility of the debt interest expenses. On the other hand, most significant cost is associated with debt is the bankruptcy costs when the debt is default. In perfect capital markets, the risk of bankruptcy is not disadvantage of debt, rather bankruptcy simply reallocate resources and transfer ownership of the firm from equity-holders to debt-holders. However, in reality, bankruptcy is disruptive and very costly to

shareholders and firm owners. In conceptually, when bankruptcy occurs the market value of the equity becomes zero and the market value of the firm is less than or equal to the face value of debt. Alongside direct bankruptcy costs (i.e. lawyer fees, administrative fees, auditor fees, legal fees, management fees) bankruptcy generates huge indirect costs for business; including lose market share (Opler and Titman 1994), inefficient assets sales (Shleifer and Vishny 1992), and loss of customers, suppliers and employees. Magnitude and behaviour of bankruptcy cost is difficult to generalise due to different institutional structure, especially such indirect costs. This paper provides evidence of bankruptcy costs in New Zealand which has creditors oriented insolvency laws. In countries such as USA , where the insolvency law is debtors oriented, choose to file bankruptcy either financial distress or strategic decisions (Chatterjee, Dhillon, and Ramirez 1996; Franks, Nyborg, and Torous 1996). However, countries where the insolvency law is creditors' oriented bankruptcies are filed only due to financial distress, otherwise firms can end up in liquidations. Hence, the US based studies magnitude of bankruptcy costs cannot accurately predict firms' bankruptcy costs.

Around the globe companies facing increasing pressure to maintain balance capital structure, because over-leveraged leads to high probability of financial distress. The increasing financial distress consequently raises firm's costs of capital and decrease firm value. The Business Finance in New Zealand (2004) indicates that New Zealand firms finance their assets more by debt than equity. Further it shows mean ratio of New Zealand firms debt-to-assets ratio is 0.60. Though firms enjoy high debt levels, the determine of indirect bankruptcy costs and the factors impact on it is important in New Zealand firms because the country's bankruptcy laws do not protect business owners as much as US laws do. As an example, New Zealand does not provide homestead exemption or future earnings exemptions in their bankruptcy. Due to global financial crisis the firms filing bankruptcy is increase in recent years. As an example 106 large US firms filed for Chapter 11 or Chapter 7 bankruptcy in

2011 (Hamilton 2012). According to the New Zealand statistics forced insolvencies of firms are dramatically increased compared to 1988 (Fabling and Grimes 2004) and liquidation and bankruptcies tend to rise during difficult economic times (background note 2001).

Using New Zealand bankrupt companies, this study finds indirect bankruptcy costs of approximately 4.39%, 7.67% and 11.57% of firm value in year -3, -2 and -1 relative to the year bankruptcy announcement. Together with that direct costs reported by Bradbury and Lioyd (1994), study suggest total bankruptcy related costs around 12.39%, 15.67% and 19.57% of firm value over the corresponding three years prior to the bankruptcy filed. Results confirm endogeneity of financial distress and loss in sales. Moreover this study indicates that firm size, leverage level and profitability of firms have significant impact on indirect bankruptcy. This paper makes a number of contributions to the literature because most existing studies use data from US or European countries, where insolvency laws are debtors oriented, and it is interesting to find out magnitude and behaviour of bankruptcy costs on creditors oriented country like New Zealand. This study employs most recent bankruptcy firm data from 2005 February to 2012 February, which provides more accurate picture of the bankruptcy costs in recent years. In additionally, this study adds to the empirical evidence on the relationship of bankruptcy costs and firm capital structure variables. Finally, the econometric analysis is more robust than prior research due to use of the dynamic panel generalised method of moment technique to control the endogeneity effect of bankruptcy costs and loss of profit/sales.

The next section reviews prior research, develops the hypotheses and is followed by discussion of data, variables, methods and procedures used for this empirical study. The results and conclusion then follow.

Literature Review

The costs of bankruptcy is significant because they have an influence on determine firms optimal capital structure. If expected bankruptcy costs is high, then lower level of debt can be anticipated (Vos and Webber 2000). In earlier research by Baxter (1967) and Warner (1977) developed optimal capital structure incorporate with bankruptcy costs. These models shows the firm can maximize their value through level of debt up to certain point, where the marginal present value benefit of tax shield equals to marginal present value of costs of debt. The knowledge of the magnitude of bankruptcy costs has important influence of particular firm's capital structure and indebtedness. The basis for empirical capital structure research is the seminal study by Modigliani and Miller (1958) who showed that in the case of perfect capital markets, capital structure is irrelevant. However, in practice, different levels of market imperfections prevail through the inclusion of corporate taxes, interest rates and information asymmetry.

The costs of bankruptcy are compromised by two types of distinguish costs. First type is direct bankruptcy costs which is include lawyer fees and other administrative fees related to bankruptcy filed. Prior to 1980's bankruptcy literature extensively examine and report this direct cost. This may be because of only the direct costs are important when determine the capital structure of firms (Haugen and Senbet 1978) and the relatively ease in calculation. According to the US findings this direct costs is varies between 1% to 10% in US companies (Ang, Chua, and McConnell 1982; Warner 1977). However, firm size has significant influence of this direct bankruptcy costs. Using US small firms Baxter (1967) reports that small firm direct bankruptcy costs was 19.9% of assets value, which is considerably higher than large firms. In New Zealand context, Bradbury and Lioyd (1994) estimates the median value of direct bankruptcy costs of New Zealand large firms are 8% of firm value and bankruptcy costs is 14.3% for the New Zealand small businesses.

Indirect bankruptcy costs include lawyer fees, administrative fees, sales decline etc. However, indirect bankruptcy costs literature is relatively thin. Indirect bankruptcy costs which are not limited only actual bankruptcy firms. Firms which have high probability to bankruptcy also can have indirect bankruptcy costs, because publicity of financial distress leads to loss market value of firm. In his widely cited paper Altman (1984) defined indirect bankruptcy cost is equal to lost sales and profits resulting when potential buyers of a product or service perceive that default is likely. Using US firms, Altman (1984) reported indirect bankruptcy costs can be varies between 8.1% to 10.5% of firm value. In Australasian evidence, Chow and Pham (1978) found this indirect costs is approximately 20% in Australian firms. However, Wruck (1990) noted, Altman's results suffer by reverse causality problem. Hence, rather than sales loss can cause by the financial distress, financial distress can caused by the loss of sales. Opler and Titman (1994) address this causality problem by selecting firms in industries that experience economic distress.

The magnitude of indirect bankruptcy costs and its behavior is highly influenced by bankruptcy law (Vladimirov 2011). As an example creditors friendly Germany firms bankruptcy filing is three times smaller than debtors friendly US (Claessens and Klapper 2005). Further, using US (debtors oriented bankruptcy law country) and Germany (creditors oriented bankruptcy law country) firms, Vladimirov (2011) finds that indirect bankruptcy costs are lower when creditors' rights in bankruptcy are higher. Further, they claim that indirect bankruptcy costs increase more slowly when the creditors' rights in bankruptcy are high. This may be due to fact that when creditors' friendly bankruptcy code allows for a better coordination with banks, which ease out-of-court workouts prior to bankruptcy (Brunner and Krahen 2008).

Apart from country bankruptcy code, the firm characteristics have significant influence of indirect bankruptcy costs (Bhabra and Yao 2011). Firm profitability is a critical element,

since prior studies have shown that capital markets are concerned about the ability for debt repayment of firms and profitability is a key sign of debt repayment ability. Muller and Baker III (1997) used US data to explain that the pattern of the Altman's Z score mirrors the firm ROA pattern. Braver et al. (2005), using NYSE data found mean ROA of non-bankruptcy firms has relatively higher than the bankruptcy firms' and the bankrupt firms' ROA decreased over the four years prior to bankruptcy. Consistent with above findings Millar and Chen (2004) found a negative relationship between firm ROA and bankruptcy risk. Taehun et al (2010) also find significant negative relationship between ROA and Korean firm bankruptcy risk. Further, they find a one unit increase in the logarithm of ROA leads to 94.5% decrease of bankruptcy risk in Korean firms. Although debt provides tax-shield advantages for corporations, simultaneously the level of debt increases firm financial distress. For low leveraged firms the risk of default remains low and along with a debt level the probability of default is increased. This is echoed by Opler and Titman (1994), who suggest that firm leverage level play an significant role in determining the financial distress. Further, they explain in economic downturn, top leveraged firms decline 26% more sales than those who were in bottom level.

Prior research has found that the size of firm is a significant factor determining of firm bankruptcy. Early studies by McConell and Pettit (1984) and Pettit and Singer (1985) found a negative relationship between firm size and bankruptcy risks. Gill et al (2009) explain that due to larger firms being more diversified and having more stable cash flows, the probability of bankruptcy is less than small firms. As an example, for New Zealand SMEs born in 2001 with more than 500 employees, the survival rate is 47% higher than firms born in the same year in 1-5 employees (SMEs in New Zealand: New Zealand structure and dynamics, 2010). Larger firms are usually more stable with greater credibility and assets. They do not easily get into bankruptcy as small ones. This may be the information gap, lack of knowledge,

inaccessibility to debt and other factors effect in business failures are decrease along with firm size.

Prior studies indicate industry effect is an important component in determining bankruptcy. Chava and Jarrow (2004) give two reasons for bankruptcy risk varying among industries. The first reason is the level of competition; it varies from industry to industry. The second reason is accounting conventions; different industries may have different accounting conventions. Therefore, the likelihood of bankruptcy can differ from industry to industry. Recently, Carter and Aukeen (2006), using 57 bankrupt small businesses found significant industry effect in small firm's bankruptcy. Further, they found bankrupt firms are more likely to be in the retail industry. Nordal and Naes (2010) used Norwegian non listed firms for the period of 1988- 2007 and found the construction industry positively and significantly affects bankruptcy in non-listed firms. SMEs in New Zealand: Structure and Dynamics (2010) reports that SMEs, in the mining, education, training, healthcare and social assistance industries are less likely to last for six years or more.

Methodology

Data and sample selection

This study includes all 16 companies in New Zealand Stock Exchange which filled receivership in the period between 2005 February – 2012 February. From delisted companies in NZX Deep Archive database, this study carefully selected firms in receivership/bankruptcy. Selected firms details further cross checked with New Zealand Ministry of Economic Development insolvency directory. After selected the bankrupt names using DataStream database this study gather data for required variables.

Method

The actual cost of bankruptcy is difficult to determine. However, measurement of bankruptcy costs includes both direct costs and indirect costs. Following Altman (1984) and Bhabra and Yao (2011) this study measure indirect bankruptcy costs based on foregone sales and profit concepts. Giroux and Wiggins (1984) and Kwansa and Parsa (1990) explained that decline in net sales was a main indication of corporate bankruptcies. Altman (1984) further suggested strong correlation between corporate bankruptcies and sales decline. Hence, following Altman (1984) indirect bankruptcy costs this study estimate indirect bankruptcy costs as the difference between expected profits for the period up to selected years before bankruptcy announcement (under financial healthy condition) and actual profit (under financial distress condition). The event period for each firm is designed as t-3, t-2, t-1 and t0, where to the year firm files the bankruptcy.

Step 1: Regress bankruptcy firm's sales on aggregate industry sales for each year in the estimation period.

$$S_{it} = a + bS_{It}$$

Where S_{it} = Sales of firm I in period t, S_{It} =Aggregate sales of industry I in period t and t= 5 years

Second, using coefficient, b from equation (1) estimate firms sales in particular year.

$$\hat{S}_{it} = a + bS_{It}$$

$$\hat{P}_{it} = \hat{S}_{it} * \bar{M}$$

\hat{S}_{it} = Estimated sales; t=-2,-1, 0; \hat{P}_{it} = Estimated profits

\bar{M} = Average profit margin over 5years for the firm

$$\delta P_{it} = P_{it} - P_{it}^e \quad t=12,-1,0$$

Finally expected profit is compared with actual profit, which determines the indirect bankruptcy costs for each year.

Where δP_{it} = Unexpected profit (losses), P_{it} = *Actual profit*

Then this indirect cost is compared with the total value of the firm for up to three years prior to bankruptcy.

Determine the factors effect in indirect bankruptcy costs

Using panel data analysis of bankrupt firms in New Zealand between 2012 February- 2005 February, this section analysed the factors determinants of indirect bankruptcy costs. Prior studies have used ordinary least square (OLS) regression to determine the factors effect in bankruptcy (Bhabra and Yao 2011). However, OLS requires that the independent variables are strictly orthogonal to the error term, and that these errors are independently and identically normally distributed with a mean of zero and variance equal to σ^2 . Opler and Titman (1994) explain endogeneity between sales drops and financial distress, because it is hard to determine whether the loss in profits is due to financial distress or whether financial distress is caused by the loss in profits. If the strict exogeneity condition fails, then panel OLS will be inconsistent. The Durbin-Wu-Hausman (DWH) test can be used as diagnostic test for endogeneity of indirect bankruptcy costs and independent variables. In the presence of endogeneity to obtain consistent and unbiased estimates this study used a dynamic panel generalised method of moment estimator. The analysis includes a Hansan/Sargan overidentification test for serial correlation to ensure this model specification validity.

Results

Considering corporate bankruptcies from 2005 to 2011, it shows only 18 companies filed bankruptcy. This is significantly small compared to US. Similar to UK and Australia, New Zealand follows creditors' friendly bankruptcy code. This creditors friendly bankruptcy code promotes in inefficient liquidations than a bankruptcy (Acharya et al. 2011). Hence, bankruptcies are not commonly exists in New Zealand market.

Table 1: Descriptive statistics

| Variable | Mean | Std.dev | Min | Max |
|--------------------------|---------|-----------|---------|----------|
| Debt to Assets (totdebt) | 45.3557 | .615104 | 9.9 | 212.8968 |
| EBIT (ebit) | 2.7858 | .74188 | -12.533 | 21.7921 |
| Sales (Insales) | 4.8874 | 7.2232.68 | -1.3050 | 22.0202 |

Descript statistics indicates bankruptcy firms have 45.35% total debt in their capital structure. Usually New Zealand firms enjoy high debt level in their capital structure, because high investor protection of New Zealand companies and high financial instrument availability leads them to increase their leverage levels. This finding is consistent with Hewa Wellalage and Locke (2012) who indicates New Zealand large listed firms mean leverage ratio is 44%. Hence, high leverage is not a distinguish characteristics of bankruptcy firms in New Zealand. However, Grahm et al.(2012) find that US bankruptcy firms have high leverage of 60%. Nevertheless, bankruptcy firms mean value of EBIT is significantly low and it indicates as 2.79. This indicates prior to the bankruptcy New Zealand firms lose their earnings. This finding is consistent with Bhabra and Yao (2011) who explain that more economically sound firms have high EBIT and decline EBIT indicates the possibility of firm bankruptcy. Furthermore, this study indicates mean value of sales is 4.89 and this finding is consistent with Altman (1984) who describes there is strong correlation between corporate bankruptcies and sales decline.

The results for the indirect bankruptcy costs as a percentage of firm value are shown in Table 2. It reports six industrial sectors and bankruptcy costs in t-3, t-2 and t-1 prior to the bankruptcy announcement. Considering total sample of bankruptcy firms, Table 2 suggests that bankruptcy costs are 4.39%, 7.67% and 11.57% over the last three years (t-3, t-2 and t-1) before actual bankruptcy respectively. Further, Table 2 clearly shows bankruptcy costs in the year before the bankruptcy announcement (t-1) is approximately 3 times higher than three years before the bankruptcy announcement (t-3).

A result in Table 2 indicates that clear variance in bankruptcy costs among the industries. The lowest bankruptcy costs for one year before the actual bankruptcy (t-1) is shown by intermediate and durables industry and it is indicated as 4.62%. The highest bankruptcy costs for one year before actual bankruptcy (t-1) is shown by textile and apparels industry and it indicated as 17.2%. Further, pharmaceutical, financial and energy industries also show high bankruptcy costs one year before actual bankruptcy. The textile and apparels industry shows the highest indirect bankruptcy costs in all three years and it represent as 8.3%, 14.4% and 17.2% in t-3, t-2 and t-1 respectively. Overall the result indicates bankruptcy costs are depending on industry and it varies between 4.62% to 17.2% form firm value. This indicates heterogeneity of bankruptcy costs in different industries.

Table 2: Indirect bankruptcy costs in the three years preceding bankruptcy

| Industry | t-3 | t-2 | t-1 |
|-------------------------|------------|------------|------------|
| Financial | 4.7% | 9.3% | 13.2% |
| Media & technology | 6.9% | 8.2% | 9.2% |
| Mining | 1.6% | 3.3% | 7.7% |
| Pharmaceutical | 1.7% | 6.9% | 16.6% |
| Textile & apparels | 8.3% | 14.4% | 17.2% |
| Energy | 4.54% | 8.52% | 12.45% |
| Intermediate & Durables | 3.01% | 4.35% | 4.62% |
| Overall | 4.39% | 7.67% | 11.57% |

The DWH result revealed that sales and indirect bankruptcy costs has a significant endogeneity problem, suggesting a need to address the issue of potential endogeneity. Table 3 address the issue of potential endogeneity by means of lag instrumental variables. The coefficient of debt to assets ratio is positively and statistically significant at 10% level for indirect bankruptcy costs (bcost), indicating high leveraged level firms experience greater possibility to increase indirect bankruptcy costs. This finding is consistent with Bhabra and Yao (2011), who find significant positive relationship between indirect bankruptcy costs and firm leveraged level in US bankruptcy firms. As expected this study indicates the coefficient of EBIT variable is negatively and statistically significant at 10% level for bankruptcy variable, indicating high profitable firms withstanding distress condition. Next, results indicate that firm size (lnsales) variable is positively and statistically significant 1% level for bankruptcy variables. This indicates that the firm size is important to the costs of bankruptcy determinant process (Brealey and Meyers 2000). This may be the process of large firm bankruptcy is lengthy and complex.

Table 2: Factors determine the indirect bankruptcy costs

| Variable | Coef. | Std. Err. |
|-----------------------------------|--------------|------------------|
| Indirect bankruptcy costs (bcost) | | |
| L1 | .79040** | .30950 |
| Debt to Assets (totdebt) | .344788** | 0.3086 |
| EBIT (ebit) | -4.1854* | 3.0717 |
| Sales (lnsales) | 2.7215*** | .59100 |
| Finance industry (Finance) | -.40569** | 0.19813 |
| Regression summary | | |
| No'of obs | 15 | |
| No'of groups | 5 | |

Conclusion and implications

This study examines the magnitude of indirect bankruptcy costs for New Zealand large companies over the eight year period, 2005 February -2012 February. Approximately indirect bankruptcy costs amount to 4.39%, 7.67% and 11.57% of firm value in year -3, -2 and -1 relative to the year bankruptcy announcement. Together with that direct costs reported by Bradbury and Lioyd (1994), this study suggest total bankruptcy related costs around 12.39%, 15.67% and 19.57% of firm value over the corresponding three years prior to the bankruptcy filed. Furthermore, this study indicates firm size, leverage level and profitability of firms have significant impact on indirect bankruptcy.

This study indicates the importance of studies on bankruptcy costs in New Zealand is apparent due to high bankruptcy costs (approximately 20% of firm value). Therefore, polices regulations and new company strategies need to be developed to reduce firm bankruptcy costs. Moreover, this study raises the potential for regulatory and policy reforms that may enhance survival in the industry sectors. The development of insolvency law is especially important in times of recession because keeping viable business is operating is one of the important goals of bankruptcy systems.

Yet, the current New Zealand bankruptcy law need to provide consent to be in business, or in control of a business immediately after bankruptcy. Owners' future earnings are exempt from the obligation to repay debt and have a homestead exemption also need to implement. Furthermore, external financing providing by banks or other lending institutes needs to be flexible enough to take account of the different types of firms at different in capital structure, profitability, size and nature of the business. This can leads to avoid firm bankruptcy probability.

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