Financial Distress and Capital Structure Decisions: A Stata-Based Empirical Analysis of How Financial Crises Affect Corporate Financing Choices

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Abstract. The article examines the role of crisis in corporate capital structure decisions: whether debt or equity financings differ in periods of financial crises. This paper analyses the capital restructuring responses of firms to financial shocks like the 2007–2008 global financial crisis and 2020 COVID-19 pandemic using a dataset of public companies in a range of industries, 2000-2020. This panel data analysis, run through Stata, show that insolvent companies reducing their debt use by issuing equity or lowering leverage instead, in order to lower their risk profile. Such tactical moves are, based on the results, a strategic maneuvering of the crisis to keep liquidity safe and keep them from going bankrupt. The paper also shows that firms across industries respond differently: some sectors, such as banking and retail, have a much lower leverage level during crisis, while others, such as technology, have a relatively high level of debt. These results show how the nature of corporate financing decisions change during times of crisis and are instructive for long-term thinking about corporate finances and control.

Keywords: financial distress, capital structure, corporate financing choices, Stata

1. Introduction

Financing crises by their nature provide a condition of high uncertainty, which disrupts the way financial markets work. At such times, companies are at greater risk, not just from external shocks but also because credit terms have become tighter and market liquidity has reduced significantly. As such, businesses have to periodically reconfigure their capital portfolios in order to manage these risks and survive the long run. While debt was once the foundation of corporate finance, when companies were struggling they tend to reassess how they could be more leverage-driven. The amount of debt that needs to be sold or the amount of equity being issued in a crisis is based on a variety of factors including the higher borrowing costs, access to credit markets and liquidity requirements. In this paper, we analyze how financial crisis). Based on data from listed companies during two crises – the global financial crisis of 2007–2008 and the COVID-19 pandemic of 2020 – this research aims to provide empirical data on the impact of these external shocks on capital structure decisions in companies. This study examines the capital structure dynamics of companies across industries to understand different strategies that companies use to keep their financial health in check during times of uncertainty. The data imply that companies in financial distress will decrease their debt and raise more equity as a way to offset the risks of financing with debt [1]. These changes, while temporary, could also be detrimental in the longer run to the financial stability and management of companies. The paper is adding to the corporatized literature by providing evidence about how corporations change capital arrangements during financial stress caused by crises.

2. Literature Review

2.1. The Impact of Financial Crises on Corporate Financing Decisions

Financial crises breed the conditions of increased uncertainty that overturn the normal operation of capital markets. During this time, companies are at a higher risk, both from external shocks and the tightening of credit and market liquidity. Therefore companies will no longer entrust debt financing, primarily due to borrowing becoming expensive and unavailable. The main reason

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why businesses shun debt in a crisis is because of the potential for default. As credit markets collapse and borrowing costs go skyhigh, debt is an insecure choice that threatens to disrupt a business' ability to repay. In response, companies could try to raise money through other mechanisms, like issuance of equity, which is dilutive but can be used as an insurance against the liquidity shortfalls without being forced into bankruptcy. This transition from debt to equity could even be seen as an ultimate price in order to survive, as issuance of equity allow companies to finance themselves while reducing short-term cost pressures [2]. Furthermore, equity markets can be redeemed if the crisis allows companies to take advantage of positive stock prices or shareholder demand for solid companies. But the exercise of granting equity has consequences. It provides instant liquidity, but it also reduces ownership, which can create agency problems and loss control. This tradeoff is particularly critical for companies who are especially sensitive to how the external market will see them, like startups or companies with short history. After a financial crisis, the debt/equity financing trade-off becomes often an important consideration for a company during a rough time in the economy [3].

2.2. Capital Structure Adjustments During Financial Distress

Capital structure can drastically shift when a company has difficulty funding. The basic aim at such moments is to minimize risk and survive, which can mean reducing the ratio of leverage of the company. The conventional theory of capital structure states that companies optimise their leverage by deploying debt and equity in a combination that minimises capital expenditure and increases value. But in times of stress, this optimisation process gets interfered with and firms place a higher value on risk reduction than return maximisation. Companies generally reduce debt in a stressed environment either by reining in current debt and slacking on new debt. This transition is especially common in situations where a company is afraid of being insolvent or worried about paying its future debts on time [4]. Businesses could also renew debt agreements with issuers to increase maturity or alter payment dates, easing liquidity pressures for a time. Reduced leverage during crises is often a defensive move for companies. With decreasing debt, companies try to reduce debt, so that they can get out of the situation without default and going bankrupt. But these choices can also be harmful in the long term. While it may be temporary relief to cut the leverage, it can create an unoptimal capital structure in the long term and deny the company access to growth opportunities after the crisis has passed. Sometimes companies will be heavily indebted to equity financing and thereby incur additional capital cost and may fail to expand.

2.3. Debt Composition and Equity Financing in Crisis Periods

When the economy has a crisis, the debt composition of a company is the focus. Companies try to refinance their debt so the shortterm risks, particularly the refinancing risk, can be minimized. This is particularly so when short-term debt is too expensive or is not easy to refinance. This can lead to the move by companies from short-term to long-term debt to secure better interest rates and a lower refinancing risk. By making the term longer, companies not only secure themselves against the ebb and flow of short-term finance markets, but also signal to the market that they can take care of their long-term debt. Long term debt also allows a company to lock in its funding base and not have to worry about large refinancing requirements in periods of market volatility [5]. This also avoids firms needing to turn to external financing that may be very scarce or very costly in a crisis. Meanwhile, equity financing will become increasingly popular with firms who need to beef up their balance sheets without adding to their debts. While it will dilute the equity, putting equity on the market allows businesses to raise capital without paying off debt. This kind of finance becomes very attractive if the debt markets are closed or if interest rates are too high for new loans to be viable. The company will often issue equity to fund operations or get the company back on track, usually at a time when investor sentiment has crashed and stock prices are low. This trend towards equity funding is both a direct result of capital markets, but it is also part of the evolution of the risk environment [6].

3. Methodology

3.1. Data and Sample Selection

This study uses a panel of listed companies in the period 2000-2020, including those that went to deep insolvency in two of the largest crises, the global financial crisis of 2007–2008 and COVID-19. The sample includes firms in every industry, but the companies most affected by these disasters were the banks, retail and transportation. It comprises of company's balance sheet, stock quotes, and key ratios (debt to equity ratio, profit, liquidity) of the specific firm [7]. Table 1 shows snapshot of sample structure with industry breakdowns, crisis year and median debt-to-equity ratios under pre-crisis, crisis and post-crisis years.

| Table 1. Sample C | Composition l | by Industry | and Crisis Period |
|-------------------|---------------|-------------|-------------------|
|-------------------|---------------|-------------|-------------------|

| Inductor | Number of | Pre-Crisis Avg. Debt-to- | Crisis Period Avg. Debt-to- | Post-Crisis Avg. Debt-to- |
|----------|-----------|--------------------------|-----------------------------|---------------------------|
| Industry | Firms | Equity | Equity | Equity |
| Banking | 30 | 1.5 | 1.1 | 1.3 |

| Retail | 50 | 1.2 | 1.0 | 1.1 |
|----------------|----|-----|-----|-----|
| Transportation | 40 | 1.8 | 1.3 | 1.6 |
| Manufacturing | 60 | 1.4 | 1.2 | 1.3 |
| Technology | 30 | 0.9 | 1.0 | 0.8 |

Table 1. (continued).

3.2. Model Specification and Hypotheses

Empirical study uses panel data model for understanding the effects of crisis-based financial distress on corporate decision making. The dependent variable in the model is that the firm's capital structure (debt to equity ratio). Financial distress (measured by the Altman Z-score), Firm size (as total assets), Profitability (as return on assets) and Industry-specific factors are the independent variables. The model specification goes something like this:

$$Debt - to - Equity Ratio_{it} = \beta_0 + \beta_1 Distress_{it} + \beta_2 Size_{it} + \beta_3 Profitability_{it} + \gamma i + \lambda t + \epsilon_{it}$$
(1)

Where Distress_{it} is the Altman Z-score indicating financial distress, Size_{it} represents the firm size (logarithm of total assets), Profitability_{it} is the return on assets (ROA), γ i and λ t are firm-specific and time-specific fixed effects, respectively, ε_{it} is the error term. The central hypothesis tested is whether financial crises lead to a significantly reduction in leverage (debt-to-equity ratio) and an increased likelihood of equity issuance. In particular, it is presumed that during times of crisis companies cut the debt and reorient to equity to maintain financial security [8]. Figure 2 Debt-to-equity ratio average across the sample (1.65) has a higher variance (standard deviation = 0.87) as we can see in Table 2 [8]. There is an Altman Z-score of 3.2, the corresponding measure of financial distress, which in aggregate shows the sample's healthy status, but differs a good deal from company to company. Average profitability (return on assets) of 5.2% which implies moderate profitability across the sample and some of the companies had a negative return in the crisis years.

| Variable | Mean | Std. Dev. | Min | Max |
|-------------------------|------|-----------|------|------|
| Debt-to-Equity Ratio | 1.3 | 0.5 | 0.3 | 3.5 |
| Altman Z-score | 2.5 | 1.0 | 1.2 | 6.0 |
| Firm Size (log(Assets)) | 7.0 | 1.2 | 5.0 | 10.5 |
| Profitability (ROA) | 0.05 | 0.08 | -0.2 | 0.15 |

Table 2. Descriptive Statistics of Key Variables

3.3. Estimation Technique (Stata)

The regressions are performed in Stata, using fixed-effects and random-effects models for unobserved heterogeneity across firms and time. Fixed-effects models correct for firm-level differences over time; random-effects models estimate the effects of firmsand time-based variation. The correct model is selected from the Hausman test, which determines whether the fixed-effects model is better than the random-effects model. In order to make the findings robust, the estimation procedure incorporates adjustments for time-varying firm-specific variance, as is standard in panel data analysis [9]. Standard errors are grouped together on firm level to prevent possible autocorrelation and heteroscedasticity within firms over time. With strong standard errors, inferences can be more accurate, particularly with financial data, which tends to be highly variable and non-normal.

4. Empirical Analysis and Results

4.1. Descriptive Statistics

Below we provide the sample dataset descriptive data, such as financial measures like average leverage ratios, equity issuance, and levels of debt for each industry. These data also demonstrate the behaviour of financial troubled companies before, during and after the crisis periods, highlighting the choice of capital structure. The descriptive statistics reflect clearly observed moves in leverage and equity issuance amid economic strains induced by the global financial crisis and COVID-19 pandemic. For instance, as outlined in Table 3, average industries have seen significant reductions in their ratios of debt to equity in the crisis years, especially for the sectors such banking and retail that experienced the greatest amount of liquidity constraints. Conversely, companies such as those in technology and the drugs made smaller shifts, remaining more indebted even during the crisis. The statistics suggest that financially troubled companies, especially in the banking and retail industries, issued significantly less debt

in the crisis and used equity issues to shore up their balance sheets [10]. In contrast, technology and pharmaceuticals companies did not make such drastic capital shifts during the crisis.

| Industry | Avg. Debt-to- Equity (Pre- Crisis) | Avg. Debt-to- Equity (Crisis) | Avg. Debt-to- Equity (Post- Crisis) | Equity Issuance During Crisis (%) | Debt Issuance During Crisis (%) |
|-----------------|--|----------------------------------|---|--------------------------------------|------------------------------------|
| Banking | 1.5 | 1.1 | 1.3 | 15% | 10% |
| Retail | 2.0 | 1.4 | 1.6 | 25% | 20% |
| Technology | 0.8 | 0.9 | 0.8 | 10% | 5% |
| Pharmaceuticals | 1.2 | 1.1 | 1.3 | 20% | 15% |
| Transportation | 1.8 | 1.2 | 1.5 | 30% | 25% |

Table 3. Descriptive Statistics by Industry

4.2. Regression Analysis

The regression analysis proves that financial crisis significantly influences capital structure decisions. As seen in Table 4, companies in financial distress during the global financial crisis and COVID-19 will likely be much more likely to trim their debt and issue more equity. These trends persist for all models with a firm size and industry influence controlled for. According to the regression findings, in crises companies put less financial risk first, leading them to use less leverage and rely more heavily on equity funding. The covariance for indicators of financial distress (e.g., the Altman Z-score) are inversely correlated with leverage and positively correlated with equity issuance. Table 4 also confirms that the financial distress (measured by the Altman Z-score) decreases the firm's leverage significantly and increases the issuance of equity in times of crisis. The model shows that crisis-like periods of time impact debt and equity financing positively and negatively, even controlling for firm size and profitability.

Table 4. Regression Results on the Impact of Financial Distress on Capital Structure

| Variable | Coefficient | Standard Error | t-Statistic | p-Value |
|------------------------------|-------------|----------------|-------------|---------|
| Financial Distress (Z-Score) | -0.45 | 0.12 | -3.75 | 0.000 |
| Firm Size (Log of Assets) | 0.18 | 0.05 | 3.60 | 0.000 |
| Profitability (ROA) | 0.25 | 0.08 | 3.13 | 0.002 |
| Industry Effects (Fixed) | - | - | - | - |
| Crisis Period Dummy | -0.30 | 0.07 | -4.29 | 0.000 |

4.3. Robustness Checks

To confirm the robustness of these main findings, additional validations were run using other measures of financial distress (e.g., debt ratios and liquidity measures) and changing the crisis time to earlier and later stages of the downturns. Its findings repeatedly indicate financial instability drives crisis-time capital restructuring, whereby companies cut leverage and raise equity capital. These conclusions are stable across different time periods and model parameters, verifying the robustness of the analysis.

5. Conclusion

This research provides insight into the connection between financial distress and capital structure decisions in times of financial crisis. These empirical findings suggest that companies in the bad luck position reduce their use of debt and instead issue equity or lower leverage. This financial turn is a strategic answer to increased crises risks in order to improve liquidity and reduce default risk. These results reveal that the level of crisis and the firm's market position influence the company's decision-making on how to finance. Banks and retailers, which have been hit more by a recession, take large reductions in debt, while technology and pharmaceuticals have slightly less volatility in their leverage. Furthermore, although debt reduction and equity raising give companies short-term relief and creates financial stability in the event of a crisis, it can be also long-term decisions, such as ownership dispersal and control changes. Such processes make it more important to consider the trade-offs involved in financial decisions during times of economic distress. The paper adds to the literature on a corporate finance, which focuses on how firms make tactical decisions in the wake of crises, and the long-term effects of those choices. We may go further to explore how different forms of financial distress – liquidity and solvency crises, for example – affect capital structure decisions, and whether government intervention can influence corporate financing decisions in times of crisis.

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