Capital Structure and the 2001 Recession

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Abstract

The recession of 2001was somewhat different from the recession of the late 2000s in that it was not associated with a financial crisis. As might be expected, the effects of those two recessions on firm capital structure were significantly different. Fosberg (2012b) showed that the recession of the late 2000s caused firms, on average, to increase their MDRs (market debt ratio) by about 5.5%. It is shown here that the 2001 recession caused firms, on average, to decrease their MDRs by approximately .5% to 1%. The effect is even stronger in 2001 when capital structure is measured by BDR (book debt ratio). Using that measure, debt financing decreased, on average, by about 1.5% to 2%. Interestingly, the MDR change in 2001 was completely reversed by the end of 2002 but the BDR change was not.

Keywords: Capital Structure, Debt Financing, Equity Issuance

1. Introduction

In the late 2000s, a financial crisis began in the United States and quickly spread to Europe and other parts of the world. The net effect of the financial crisis was to greatly disrupt the financial markets, reduce the amount of debt and equity capital financing available to businesses and to create a severe recession in the U. S. and other countries. The result of this was to increase the amount in the amount of debt in firms' capital structures (MDRs) by, on average, 5.5% between 2006 and 2008 (see Fosberg (2012b)). The recession of the late 2000s was different from most other recessions because it was caused by a financial crisis, whereas, most other post WWII recessions were not. This suggests that the capital structure response to other recessions may have been different from the response to the late 2000s recession. In this study, this possibility is tested by investigating what happened to the capital structures of sample firms before, during and after the 2001 recession. The NBER calculates this recession lasted from March 2001 to November 2001.

2. Sample Selection

For each year from 1998 through 2004 an initial sample of firms was taken from all firms listed on the current and research files of the COMPUSTAT data base. Firms in the financial services or utilities industries were excluded from all annual samples. To be included in the initial sample for a year a firm must have had sufficient data available to calculate the firm's market and book debt ratios. A firm's market debt ratio (MDR) is defined to be book long-term debt divided by the market value of the firm. Firm market value is calculated as total assets less book common equity plus market common equity (common shares outstanding times share price). A firm's book debt ratio (BDR) is defined to be book long-term debt divided by total assets. This procedure yielded initial annual sample sizes ranging of from 4,890 to 5,996 firms.

3. Empirical Analysis

Table 1 contains the mean values of the sample firms MDRs and BDRs from 1998 through 2004. Looking first at the MDR, the data indicates that the 2001 recession caused MDRs to drop from an average of .146 in 1999 to .142 in 2001. An MDR of .0150 indicates that the sample firm has a capital structure that is 15% debt. Additionally, beginning in 2003 there was a marked decline in mean MDR to .119 in 2003 and .102 in 2004.

Fosberg (2012a) has shown that this likely was caused by the cuts in personal income tax rates that occurred in 2003. A similar, but even stronger, capital structure impact is evident when looking at BDRs. Specifically, mean BDR decreased from .186 in 1999 to .172 on 2001. In sum, the data indicates that the 2001 recession caused mean MDR to decline by .4% and mean BDR to decline by 1.4%. This decrease in mean debt ratios is the opposite of what occurred during the recession of the late 2000s when mean MDRs increased by, on average, 5.5%. Further, the reduction in mean MDR had been completely reversed by the end of 2002 but the reduction in mean BDR had not.

In table 2 the effect of the 2001 recession on the issuance of debt and equity by the sample firms is investigated. Column one of table 2 shows the mean values of the sample firms' net equity issuance divided by total assets ratio. Net equity issuance is the total value of all preferred and common equity issued during the year less the total value of all preferred and common equity repurchases. The data indicates there was a marked decrease in equity issuance during the 2001 recession. Specifically, net equity issuance decreased from 9.1% (.091) of total assets in 1999 to 4.9% in 2001. By 2004 net equity issuance had increased to 8.9% of total assets. Thus, even though the 2001 recession caused a marked decrease in equity issuance this was almost completed reversed three years after the recession ended. Column two of table 2 shows the mean values of the sample firms' net debt issuance divided by total assets ratio. Net debt issuance is the total value of all new debt financing obtained during the year less the total value of all debt repayments. The most obvious implication of the data in column two is that debt financing has been a much less significant source of capital for the sample firms than equity financing during the sample period. The maximum amount of net debt financing in any year was 2.7% of total assets (1998) versus a maximum of 12.3% of total assets for equity financing (2000). Additionally, the 2001 recession caused a significant reduction in the amount of debt financing companies raised as net debt financing dropped from 1.5% of total assets in 1999 to 0.0% in 2001. Unlike net equity financing, net debt financing had not returned to prerecession levels by 2005. The third column of table 2 shows the difference between the amount of equity financing and debt financing raised in each year. During the sample period, the excess of equity financing over debt financing varied from a low of 2.7% of total assets in 1998 to a high of 11.7% of total assets in 2000. From 1999 to 2001 the excess of equity financing decreased from 7.6% to 4.9%. Thus, although the 2001 recession caused a reduction in both equity and debt financing by the sample firms the reduction in equity financing was much greater. Nevertheless, equity financing still exceeded debt financing in the recessionary period. The excess of equity over debt financing had returned to prerecession levels by 2004 (8.4%).

Next, a regression analysis is employed to further investigate the effect of the 2001 recession on the sample firms' capital structures. Numerous studies have shown that certain variables, like firm profitability and growth prospects, affect the amount of debt a firm employs in its capital structure. In the regression analysis which follows these variables will be used as control variables to indicate what the MDRs and BDRs of the sample firms would have been in nonrecessionary time periods. Annual dummy variables will be added to the regressions to capture the effects of unusual economic events, like the 2001 recession, on firm capital structure. The set of control variables used in this analysis is similar to that used by Fama and French (2002) and Flannery and Rangan (2006). A brief discussion of these variables follows. For a more detailed discussion of these variables and their effect on firm capital structure see the above cited papers. As larger firms have been found to employ more debt in their capital structures, the natural log of total assets (Assets) is used as a size proxy. It is believed that this occurs because larger firms have better access to the credit markets. Firm profits have been shown to be inversely related to the amount of debt financing a firm employs. It is thought that more profitable firms get more of their capital from internally generated funds and, therefore, need to borrow less. The profitability measure used is earnings before interest and taxes divided by total assets (EBIT). Previous studies have found that the quantity of tangible assets that a firm has is directly related to their use of debt financing. Tangible assets are thought to be viewed as better collateral by lenders and consequently the more tangible assets a firm has the more they can borrow. Property, plant and equipment divided by total assets (PPE) is used to proxy for the amount of tangible assets that a firm owns. Depreciation and amortization expense divided by total assets (Depr) is used to measure the quantity of non-debt tax shields a firm has available. Non-debt tax shields have been shown to be inversely correlated with the amount of debt in a firm's capital structure. Non-debt tax shields may reduce the value of the tax shields generated by debt and therefore tend to reduce the amount of debt financing that a firm employs. The market to book ratio (M/B) is used to capture company investment opportunities. The market to book ratio is calculated as total assets less book value of common equity plus market value of common equity divided by total assets. Firms with more investment opportunities generally employ less debt in their capital structures.

It is believed that growth opportunities are not viewed as good collateral by lenders and therefore reduce the amount of debt financing a firm can obtain. It has also been shown that the more unique a firm's assets the less debt they usually have in their capital structure. Unique assets are thought to be harder to sell and are consequently less valuable as collateral for lenders. Assets uniqueness is measured by research and development expense divided by total assets (R&D). Annual dummy variables for each year from 1999 through 2004 (D99 through D04) are used to capture the effects of unusual economic events, like the recession of 2001, on firm capital structure. For example, D99 takes on a value of 1 if the capital structure data is from 1999 and zero, otherwise.

The dependent variable in the regressions is either MDR or BDR. $MDR_{i,t}$ represents the market debt ratio of firm i in year t. Lagged values of the control variables are used to mitigate any endogeneity problems associated with the regressions. The data from each year is combined and a single regression of the form

$$MDR_{i,t} = a_1 + a_2 Assets_{i,t-1} + a_3 EBIT_{i,t-1} + a_4 PPE_{i,t-1} + a_5 Depr_{i,t-1} + a_6 M/B_{i,t-1} + a_7 R\&D_{i,t-1} + Dummies + \varepsilon_{i,t}$$

is used to analyze the sample data. The results of this regression analysis, using MDRs as the dependent variable, are contained in the first two columns of table 3. The t values of the regression coefficients in all regressions are calculated using White (1980) heteroscedasticity adjusted standard errors. Since the coefficients of the control variables are not of primary interest, to conserve space the coefficients of the control variables are not reported in table 3. Most of those coefficients have the expected sign and are statistically significant. In the first column of table 3 are the results of a regression using all the sample firms. The coefficients of the annual dummies for 1999 and 2000 (D99 and D00) are small and statistically insignificant. This suggests that no significant economic events that affected firm capital structure occurred in those years. The coefficient of D01 is negative and significant at the 1% level. The coefficient's value of -.011 implies that the recession of 2001 caused , on average, a 1.1% reduction of the amount of debt the sample firms used in their capital structures. This is consistent with the data presented in table 1. The coefficient of D02 is negative but statistically insignificant. This suggests that the effects of the recession on firm capital structure were almost completely reversed by the end of 2002. The coefficients of D03 and D04 are negative and significant at the 1% level. This likely is the result of the 2003 cuts in personal income tax rates that was previously reported in Fosberg (2012a). The effects of the 2003 tax cuts are evident in all the regressions reported in table 3, however, since they are not of interest here they will not be discussed further.

Next, the regression analysis is repeated after trimming the sample to exclude firms with large operating losses and those with little or no debt in their capital structures. Firms with large operating losses may be in such poor financial condition that they are largely excluded from the capital markets and, therefore, could not fully adjust their capital structures to the desired level during the 2001 recession. Including these firms in the analysis would tend to result in an under estimation of the capital structure adjustment firms made during the financial crisis. A firm is defined to have a large operating loss if EBIT $\leq$ -.5. Firms with little or no debt in their capital structures could not significantly reduce the debt in their capital structures during the recession even if they wished. Including these firms in the analysis might result in an underestimate of the debt reduction made by the sample firms. Low debt firms are defined to be firms with a MDR $\leq$ .03. Excluding these two groups of firms from the sample removes two possible sources of bias from the analysis. The results of the regression using the trimmed sample of firms is contained in column two of table 3 (Trim) and are similar to those from the full sample regression. The coefficient of the annual dummy variable for 2001 (D01) has a negative sign (-.005) but is not statistically significant while the coefficient for D02 is very small and statistically insignificant. These results tend to support the previous findings that the recession caused firms to reduce the amount of debt in their capital structures in 2001 and reverse those changes by the end of 2002.

The last two columns of table 3 contain the results of a similar regression analysis conducted using BDR as the dependent variable. The regression reported in the third column used the full the full sample of firms while the regression reported in the fourth column used the trimmed sample. The coefficient of D01 is negative and statistically significant in both regressions. The coefficient value of -.020 in the full sample regression suggests that the regression caused firms, on average, to reduce the amount of debt in their capital structures by 2%. The coefficient of D02 is negative (-.024) and statistically significant in both regressions. This confirms that when capital structure is measured by BDR there was no reversal in the capital structure effects of the 2001 recession.

4. Conclusion

The recession of 2001was somewhat different from the recession of the late 2000s in that it was not associated with a financial crisis. As might be expected, the effects of those two recessions on firm capital structure were significantly different. Fosberg (2012b) showed that the recession of the late 2000s caused firms, on average, to increase their MDRs by about 5.5%. It is shown here that the 2001 recession caused firms, on average, to decrease their MDRs by approximately .5% to 1%. The effect is even stronger in 2001 when capital structure is measured by BDR. Using that measure, debt financing decreased, on average, by about 1.5% to 2%. Interestingly, the MDR change in 2001 was completely reversed by the end of 2002 but the BDR change was not.

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Table 1: Firm Debt Ratios

	MDR	BDR
1998	.150	.190
1999	.146	.186
2000	.148	.173
2001	.142	.172
2002	.147	.168
2003	.119	.164
2004	.102	.151

Table 2: Security Issuance

	Eq. Iss. / T. Assets	Debt Iss. / T. Assets	Diff.
1998	.054	.027	.027
1999	.091	.015	.076
2000	.123	.006	.117
2001	.049	-.000	.049
2002	.044	.002	.042
2003	.061	.000	.061
2004	.089	.005	.084

Table 3: Regression Analysis of Market and Book Debt Ratio Changes

	MDR		**BDR**	
	Full	Trim	Full	Trim
Control Var.	Yes	Yes	Yes	Yes
D99	-.000 (0.09)	.002 (0.36)	.001 (0.24)	.002 (0.37)
D00	.003 (0.83)	.022** (4.04)	-.009* (3.72)	.003 (0.57)
D01	-.011** (3.05)	-.005 (0.88)	-.020** (4.84)	-.011** (1.99)
D02	-.005 (1.35)	.001 (0.12)	-.024** (5.82)	-.024** (4.26)
D03	-.031** (9.27)	-.038** (7.46)	-.028** (6.88)	-.017** (2.95)
D04	-.044** (13.9)	-.051** (10.7)	-.040** (9.92)	-.028** (4.99)
N Adj. R^2	21,926 .13	10,893 .11	21,926 .13	10,893 .02

* and ** represent significance at the 5% and 1% levels, respectively.