*Article*

# Equity Performance of Zero-debt Firms vis-à-vis Their Leveraged Counterparts

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**Abstract**

The purpose of this article is to find out whether firms that operate with debt-free balance sheet are rewarded more by the investors at large. For this, we form portfolios of debt-free firms and compare their performance with performance of matching portfolios of leveraged firms from the same industry and of similar size. Both absolute and risk-adjusted return measures are used as performance proxies. Our results show that debt-free firms tend to outperform the leveraged counterparts in terms of both absolute and risk-adjusted performance measures.

**Keywords**

Zero-debt portfolio, leveraged portfolio, absolute performance measure, risk-adjusted performance measure

## Introduction

In the presence of agency problem and asymmetric information, the managerial financing decisions have been the subject of extensive theoretical and empirical research. External debt financing serves as a disciplining device because default in servicing debt may force the firms into liquidation. Therefore, questions, such as, 'how much debt financing is appropriate for firms?' puzzled the researchers since the legendary work of Modigliani and Miller (1958, 1963) (MM hereafter). Numerous studies in the past few decades have focused on the theories and determinants of capital structure and on whether there exists an optimal level of capital structure. The capital structure theories proposed by MM highlighted the tax benefit of debt and showed that value of the firm increases with debt in the presence of taxes. The 'trade off theory' of capital structure states that optimal capital structure is the one wherein the marginal benefit of interest tax shield equals the marginal cost of financial distress. Thus, we should expect moderate use of debt up to an optimal level by corporations. However, in reality a significant

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proportion of corporations choose to remain debt free and even more surprising is the fact the proportion of debt-free firms has steadily increased over time in recent years. About 20 per cent of US firms are debt free on an average as per recent records, more than 20 per cent of the US firms are debt free in some industries, and debt-free firms are not uncommon in most industries (Byoun & Xu 2013; Strebulaev & Yang 2006). Conservative use of debt has been noted in previous works. Graham (2000) observes that firms use too small amounts of debt to take advantage of tax benefits and reports that large, liquid firms with low expected distress costs use debt conservatively. He also reports that product market factors, growth options and low asset collateral lead to conservative debt usage. This debt conservatism puzzle referring to the notion that some firms use lower leverage than that which would maximize value from a static trade-off perspective has been explored in many studies (Graham, 2000; Frank & Goyal, 2005; Miller, 1977). Many empirical studies have been conducted to explore this apparent debt conservatism puzzle and examine the relationship between leverage and various firm characteristics (Bradley, Jarell & Kim, 1984; Graham, 2000; Rajan & Zingales, 1995).

The issue that this article focuses on is however slightly different. This study examines whether firms that choose to remain debt free are rewarded more by the investors at large compared to their leveraged counterparts. Companies with no debt are usually considered by investors to exhibit a conservative financial approach. There are both pros and cons to this approach. The lack of debt in the balance sheet means the company is expecting to generate a lot of surplus cash to grow. This also provides the company the flexibility to take on debt in future to finance an expansion or an acquisition. Although this is the strength of a debt-free company, debt per se is not detrimental for the company, if it remains within an optimal level. Debt is one of the cheapest sources of funds for a company. Moreover, the interest paid on debt is tax deductible and reduces the tax liability of the company. Apart from this, tax shield advantage debt can be used as an anti-takeover device (Harris & Raviv, 1990) and may also act to restrict managerial discretion (Jensen, 1986), adding to the benefits of debt financing. However, beyond a certain level, the fixed interest and principal commitments of debt can really hurt the ability of the company to operate freely and effectively. Debt beyond the optimal level can cause default on interest payments, leading to financial distress or even bankruptcy. It may also limit the ability to pay dividends as most of the surplus cash is utilized to service debt. Empirical research on the relation between leverage and stock returns suggests both positive and negative relation between the two. Bhandari (1988) finds that returns are positively related to leverage. On the other hand, Penman et al. (2007) find that there is a negative relation between returns and leverage. Fama and French (1992) find that when leverage is measured with book values of debt, there is a negative relation between returns and leverage, but when leverage is measured with market value of debt, there is a positive relation.

Although the heavy usage of debt has over time proved to be detrimental for the performance of many large firms in many countries, it is not clear that firms that operate with debt-free balance sheets were rewarded more by the investors. Very few studies have looked at the stock return performance of zero-debt firms exclusively. Zaher (2010) reports superior performance of a portfolio of debt-free firms compared to a portfolio of leverage counterparts. Lee and Moon (2011) also report that debt-free firms perform better over a long run based on Fama and French three-factor and Carhart four-factor models. However, these studies do not conduct further empirical analysis on why the zero-debt firms may be having superior return performance. In this study, we examine in the Indian context, whether the firms that choose to be debt free are rewarded. In particular, we form portfolios of firms that have zero debt and compare the return performance of the portfolio with a matched portfolio of firms that have debt. The results generally indicate that the portfolios of zero-debt firms exhibit superior performance than investments in leveraged peers in terms of both absolute and risk-adjusted performance measures. We also analyze if these zero-debt firms have better profitability than their leveraged counterparts and hence the superior performance, or if the superior performance can be attributed to their future growth

prospects along with their debt conservatism and excess cash that could be fruitfully utilized to fund these future growth prospects. This is in line with the findings of Denis and Sibilkov (2010), who find that higher cash holdings allow financially constrained firms to undertake value-increasing projects that might otherwise be bypassed. We find that the Indian debt-free firms may not necessarily be financially constrained or have better profitability than their leveraged counterparts, but nevertheless they have capital structure flexibility, higher cash reserves, more growth opportunities and are perceived by market participants positively and hence are rewarded with higher risk-adjusted stock returns.

Some works have been done in the Indian context about capital structure policy and leverage and some interesting issues were addressed. Mukherjee and Mahakud (2012) find that Indian manufacturing companies have a target capital structure and also estimate the speed of adjustment to the target capital structure. Ghosh (2009) finds that in India, on an average firms with low leverage have more productivity. However, to the best of our knowledge not much work has been done in the Indian context addressing the specific issue of this article, that is, performance of zero-debt firms vis-à-vis otherwise similar leveraged firms. As such, hopefully, the findings of this work would have some implications for investors at large, particularly in the Indian markets.

The remaining portion of the article is organized as follows: the next section deals with the data, the third section deals with methodology, the fourth section presents the results and interpretation, while the fifth section concludes the study.

## Data

Our study period is from the year 2000 to 2007. During this period, we collected samples of 'debt-free' firms and 'leveraged firms' each year from the Centre for Monitoring Indian Economy (CMIE) Prowess database.[1] We define 'debt' over here as long-term borrowings of the firms as indicated in their balance sheets obtained from the Prowess database. We define debt-free firms as those firms which have chosen to have no debt in their capital structure for at least 2 consecutive years: the current and the previous year. Every year, a sample of debt-free firms was collected from all firms listed in Bombay Stock Exchange (BSE).[2] We also created a sample of 'leveraged counterparts' from the firms which were also listed in BSE, which had debt to any extent in their capital structure for the current and the previous year and which were 'comparable' in nature. Comparable in nature here implies that each of these firms belonged to the same industry as its debt-free counterpart (we matched the Prowess NIC code/industry code to ensure that) and was of similar size (we ensured that by matching the market capitalization with the debt-free counterpart). We find that the policy of remaining debt free is persistent across industries and is rising continuously across time. As can be seen from Table 1, the number of zero-debt firms in the sample is 26 in 2000 and increased to 239 in 2007. We construct a hypothetical portfolio comprising all debt-free firms and call this portfolio the zero-debt portfolio (ZDP). A similar portfolio is constructed comprising the comparable leveraged firms and we call this the leveraged portfolio (LP).

**Table 1.** Year-wise Distribution of Firms

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|
| Number of debt-free firms (ZDP) | 26 | 46 | 78 | 117 | 159 | 205 | 214 | 239 |
| Number of control firms (LP) | 26 | 46 | 77 | 115 | 156 | 200 | 209 | 234 |

**Source:** Author's calculations.

**Note:** This table shows the year-wise breakup of the entire sample firms for which we have data to calculate the performance of debt-free firms and their control counterparts from 2000 to 2007.

For calculating performance based on risk-adjusted measures, such as, Sharpe's ratio, Treynor's ratio and Jensen's alpha, we also require data on the return of the market portfolio and the risk-free rate. For this, we have taken the S&P CNX Nifty total return index[3] as the proxy for the market portfolio and used the monthly closing figures of the same available in the CMIE Prowess database to calculate the market return. As a proxy for the risk-free rate, we have used the yields of 91-day T-bills during the said period available in the website of the Reserve Bank of India.

## Methodology

In this study, we examine in the Indian context, whether the debt-free firms (ZDP) are rewarded by investors, that is, the performance of the portfolio of zero-debt firms (ZDP) is superior compared to the performance of the portfolio of leveraged firms (LP) in terms of absolute and risk-adjusted performance measures. To test if the performance of zero-debt firms differs from the leveraged or 'control firms', every year from 2001 to 2007, we compute the average monthly portfolio returns (market capitalization weighted) of both the ZDP and the LP over the next 1, 2, 3, 4 and 5 years. We then apply the following measures to test for the difference in performance of the ZDP and the LP over the holding periods of next 1, 2, 3, 4 and 5 years, respectively.

(i) **Performance based on average monthly returns:** The average monthly returns of both the ZDP and the LP are found over various holding periods over the next 1, 2, 3, 4 and 5 years after the year of portfolio formation. The difference between the average monthly return of the ZDP over that of the LP is then calculated. A *t*-test is then applied to see if the differential average return is significantly different from zero.

(ii) **Performance based on holding period returns:** The average holding period return is calculated as the return obtained from a buy and hold strategy from the portfolios over various holding periods as follows:

$$R_{i,1\,to\,T} = \prod_{t=1}^{T}(1 + r_{i,t}) - 1$$

where $r_{i,t}$ is the return of the portfolio '$i$' for the month '$t$' and $\prod_{t=1}^{T}(1 + r_{i,t})$ is the product function from $t = 1$ to $T$. The difference between these holding period returns of the ZDP and the LP was then calculated and averaged across different years of portfolio formation to find the average premium of the ZDP vis-à-vis the LP across time. A *t*-test was applied to find the significance of this average premium.

(iii) **Performance based on Jensen's alpha:** Once the returns of the ZDP and the LP are found every month, the Jensen's alpha over various holding periods of 1, 2, 3, 4 and 5 years, respectively, after forming the portfolio is found by the estimate of the intercept from the following model of Jensen (1968).

$$R_p - R_f = \alpha_p + \beta_p (R_m - R_f)$$

where $R_p$ = the average portfolio return for the period concerned
$R_f$ = the risk-free rate for the same period
$R_m$ = the average market portfolio return for the same period
$\alpha_p$ = the Jensen's alpha

The difference in Jensen's alpha of the ZDP and the LP over a particular holding period averaged over various years of portfolio formations is taken as the required premium. The *t*-test is then applied to this premium to test if the difference is significantly different from zero.

(iv) **Performance based on Treynor's ratio:** Treynor's ratio or *reward-to-volatility* ratio introduced by Jack Treynor (1965) is measured for the ZDP and LP over various holding periods as per the following expression:

$$\text{Treynor's ratio (TR)} = \frac{(R_p - r_f)}{\beta_p}$$

where $R_p$ = the average return of the portfolio under consideration for the period concerned,
$r_f$ = the average risk-free rate for the same period and
$\beta_p$ = the beta of the portfolio concerned[4] and a measure of its systematic risk. Thus, the Treynor's ratio measures the risk premium[5] of the portfolio per unit of the volatility assumed. The difference in Treynor's ratio of the ZDP and the LP over a particular holding period averaged over various years of portfolio formations is taken as the required premium. The *t*-test is then applied to this premium to test if the difference is significantly different from zero.

(v) **Performance based on Sharpe's ratio:** William Sharpe (1966) introduced a similar risk-adjusted performance measure as Treynor but he used a different measure of risk in the denominator. Instead of beta coefficient of the portfolio, he used the total risk or the sigma of the portfolio in the denominator. He named his measure as the 'reward-to-variability' ratio which is given by

$$\text{Sharpe's ratio} = \frac{(R_p - r_f)}{\sigma_p}$$

where
$R_p$ = the equity portfolio return for the period concerned.
$r_f$ = the risk-free rate for the same period and
$\sigma_p$ = the total sigma or standard deviation of the portfolio or portfolio return during the period under consideration. Thus, the Sharpe's ratio measures the risk premium of the portfolio, per unit of the total risk assumed, and summarizes in a single measure the performance of a portfolio on a risk-adjusted basis. The premium based on the Sharpe's ratio is calculated as the difference in Sharpe's ratio of the ZDP over a particular holding period. A *t*-test is then applied to this premium to test if the difference is significantly different from zero.

Both Sharpe's ratio and Treynor's ratio measure risk-adjusted returns. The difference lies in how risk is defined in either case. In Sharpe's ratio, risk is determined as the degree of volatility in returns, that is, the variability in month-on-month or period-on-period returns, which is expressed through the standard deviation of the stream of return numbers being considered. In Treynor's ratio, one looks at the beta of the portfolio, the measure of systematic risk of the portfolio with the assumption that the portfolio is diversified. When one has to evaluate a portfolio which could have some unsystematic or diversifiable risk, Sharpe's ratio would be more meaningful because a truer measure of evaluation would be to judge the returns adjusted for the total risk of the portfolio. On the contrary, if we consider a fully diversified portfolio, the element of unsystematic risk would be very negligible and hence Treynor's ratio would be an adequate measure of risk-adjusted performance. In our case, we formed the portfolio of zero-debt

firms or the ZDP based on only one criteria as mentioned before, that there should be no long-term debt in the balance sheet of those firms for 2 consecutive years: the current year and the previous year. The portfolio of 'leveraged counterparts' or LP was formed based on two criteria: that these firms should belong to the same industry as their debt-free counterpart and that they were of similar size. It was thus not guaranteed that both kinds of portfolios would be well-diversified portfolios. Therefore, just to check if there were any significant differences in the risk-adjusted performance measures of these portfolios, we used two apparently similar measures: the Sharpe's ratio and the Treynor's ratio. Jensen's alpha is another measure of portfolio performance adjusted for the beta risk of the portfolio. Conceptually, it is similar to the Treynor's ratio, the only difference being that it is expressed as a differential return over the theoretically expected return (based on capital asset pricing model (CAPM)) which is sometimes easier to interpret than a ratio.

We also tested the difference in operating and financial characteristics of the zero-debt firms and the levered control firms (as constructed earlier) in order to explore any significant characteristic difference that would justify the difference in performance if any. To do the same, for 3 years before becoming debt free and the year in which the firm becomes debt free, we apply the *t*-test of equality of means (assuming both equal and non-equal variances) of the following variables over a combined total period from 1999 to 2006: profit before depreciation, interest and tax to total assets (PBDIT/TA), operating cash flow to TA (OCF/TA), market-to-book (M/B) ratio, cash and bank/TA, fixed assets/TA.

Firms with more profits relative to investment opportunities may address the agency problem of free cash flow with large dividends as a substitute for debt and become debt free (Fama & French, 2002). If firms simply become debt free by relying solely on internally generated funds, debt-free firms are likely to be more profitable than are leveraged firms and hence the cash flow from operations would be higher for debt-free firms than that of leveraged firms. We employ two ways to measure a firm's profitability—first PBDIT divided by TA and cash flow from operations divided by TA.

We measure expected future growth prospect using M/B ratio. Fama and French (2002) find that M/B value is negatively related to leverage, which is usually interpreted as reflecting a need to retain growth options under the trade-off theory. According to pecking order theory, more profitable firms use less debt but have higher market values. Therefore, firms with a high M/B value would have low leverage.

Graham (2000) shows that cash holdings are inversely related to leverage. Hence, firms with large cash holdings are more likely to become debt free than firms with small cash holdings. We have taken cash holding as the ratio of total cash and bank balance to TA.

Whited (1992) and Kiyotaki and Moor (1997) pointout that the size of collateral plays an important factor in the firm's borrowing decisions. The tangible assets, such as, land, plants and equipment serve as natural collaterals (Fama & French, 2002). Accordingly, we expect firms with lower tangible assets are more likely to become debt free than the firms having high tangible assets. Here, we define the tangible assets as net fixed assets to total assets.

## Results and Analysis

### *Return Performance of Zero Debt Firms*

Tables 2–6 look at the differences in returns between the ZDP and the LP. Table 2 represents the premium based on average monthly returns. As is evident from the table, the ZDPs have generated positive premiums on the average overall holding periods ranging from 1 to 5 years based on average monthly returns with the premiums over 3, 4 and 5 years being significant at 5, 10 and 10 per cent, respectively.

**Table 2.** Premium Based on Average Monthly Returns

| | Over | Year of Portfolio Formation | | | | | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Next | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Premium | *t*-statistic | Sig |
| ZDP | 1 yr | −0.017 | 0.005 | 0.038 | 0.029 | 0.039 | 0.032 | 0.037 | | | |
| | 2 yrs | −0.008 | 0.019 | 0.033 | 0.036 | 0.033 | 0.035 | −0.006 | | | |
| | 3 yrs | 0.006 | 0.022 | 0.036 | 0.035 | 0.033 | 0.008 | 0.023 | | | |
| | 4 yrs | 0.011 | 0.029 | 0.034 | 0.032 | 0.016 | 0.025 | 0.018 | | | |
| | 5 yrs | 0.019 | 0.028 | 0.029 | 0.019 | 0.029 | 0.021 | 0.012 | | | |
| LP | 1 yr | −0.003 | 0.004 | 0.037 | 0.026 | 0.034 | 0.032 | 0.020 | | | |
| | 2 yrs | 0.000 | 0.018 | 0.030 | 0.031 | 0.031 | 0.024 | −0.019 | | | |
| | 3 yrs | 0.009 | 0.020 | 0.034 | 0.030 | 0.026 | −0.003 | 0.021 | | | |
| | 4 yrs | 0.012 | 0.025 | 0.032 | 0.024 | 0.006 | 0.023 | 0.021 | | | |
| | 5 yrs | 0.016 | 0.026 | 0.028 | 0.009 | 0.025 | 0.023 | 0.015 | | | |
| **Premium** | 1 yr | −0.014 | 0.001 | 0.001 | 0.003 | 0.005 | −0.001 | 0.017 | 0.17% | 1.37 | |
| **(ZDP–LP)** | 2 yrs | −0.008 | 0.001 | 0.003 | 0.004 | 0.002 | 0.011 | 0.013 | 0.37% | 1.37 | |
| | 3 yrs | −0.003 | 0.002 | 0.002 | 0.004 | 0.008 | 0.011 | 0.002 | 0.36% | 2.11 | ** |
| | 4 yrs | −0.001 | 0.004 | 0.003 | 0.008 | 0.010 | 0.001 | –0.003 | 0.31% | 1.72 | * |
| | 5 yrs | 0.003 | 0.002 | 0.001 | 0.010 | 0.004 | −0.002 | –0.002 | 0.23% | 1.48 | * |

**Source:** Author's calculations.

**Notes:** The average monthly returns of both the ZDP and the LP are found over various holding periods over the next 1, 2, 3, 4 and 5 years after the year of portfolio formation. The difference between the average monthly return of the ZDP over that of the LP is then calculated. The *t*-test is then applied to this premium to test if the premium is significantly different from zero. *** indicates significant at 1 per cent, ** indicates significant at 5 per cent and * indicates significant at 10 per cent level of significance.

**Table 3.** Premium Based on Average Holding Period Returns

| | Over | Year of Portfolio Formation | | | | | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Next | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Premium | *t*-statistic | Sig |
| ZDP | 1 yr | −0.369 | 0.024 | 0.451 | 0.360 | 0.549 | 0.435 | 0.486 | | | |
| | 2 yrs | −0.392 | 0.406 | 0.948 | 1.190 | 1.130 | 1.172 | −0.263 | | | |
| | 3 yrs | −0.162 | 0.939 | 2.147 | 2.183 | 2.028 | 0.139 | 0.748 | | | |
| | 4 yrs | 0.133 | 2.320 | 3.396 | 3.144 | 0.820 | 1.523 | 0.824 | | | |
| | 5 yrs | 1.012 | 3.378 | 3.712 | 1.435 | 3.332 | 1.722 | 0.513 | | | |
| LP | 1 yr | −0.262 | −0.023 | 0.402 | 0.330 | 0.454 | 0.442 | 0.243 | | | |
| | 2 yrs | −0.274 | 0.235 | 0.771 | 1.013 | 1.019 | 0.706 | −0.443 | | | |
| | 3 yrs | −0.089 | 0.560 | 1.817 | 1.765 | 1.367 | −0.210 | 0.678 | | | |
| | 4 yrs | 0.111 | 1.413 | 2.744 | 1.949 | 0.136 | 1.391 | 1.196 | | | |
| | 5 yrs | 0.594 | 2.244 | 3.183 | 0.421 | 2.391 | 2.067 | 0.774 | | | |
| **Premium** | 1yr | −0.106 | 0.047 | 0.049 | 0.030 | 0.094 | −0.007 | 0.244 | 5.01% | 1.25 | |
| **(ZDP–LP)** | 2 yrs | −0.118 | 0.171 | 0.177 | 0.178 | 0.111 | 0.466 | 0.180 | 16.65% | 2.59 | ** |
| | 3 yrs | −0.073 | 0.379 | 0.330 | 0.418 | 0.661 | 0.348 | 0.070 | 30.47% | 3.36 | ** |
| | 4yrs | 0.022 | 0.907 | 0.652 | 1.195 | 0.685 | 0.132 | −0.372 | 46.00% | 2.21 | ** |
| | 5yrs | 0.418 | 1.134 | 0.529 | 1.014 | 0.941 | −0.345 | −0.261 | 48.99% | 2.16 | ** |

**Source:** Author's calculations.

**Notes:** The average holding period return is calculated as the return obtained from a buy and hold strategy from the portfolios over various holding periods. The difference between these holding period returns of the ZDP and the LP was then taken as the premium each year. This was then averaged across different years of portfolio formation to find the average premium and a *t*-test was applied to find the significance of this average premium.

**Table 4.** Premium Based on Jensen's Alpha

| | Over | Year of Portfolio Formation | | | | | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Next | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Premium | *t*-statistic | sig |
| ZDP | 1 yr | 0.020 | −0.001 | −0.018 | 0.018 | 0.015 | 0.007 | −0.004 | | | |
| | 2 yrs | 0.003 | −0.012 | 0.005 | 0.019 | 0.010 | 0.002 | 0.000 | | | |
| | 3 yrs | −0.016 | 0.001 | 0.010 | 0.015 | 0.004 | 0.002 | 0.008 | | | |
| | 4 yrs | −0.008 | 0.006 | 0.009 | 0.009 | 0.005 | 0.007 | 0.003 | | | |
| | 5 yrs | −0.003 | 0.005 | 0.003 | 0.007 | 0.010 | 0.004 | 0.003 | | | |
| LP | 1 yr | 0.033 | −0.002 | −0.031 | 0.017 | 0.007 | 0.005 | −0.006 | | | |
| | 2 yrs | 0.011 | −0.023 | −0.002 | 0.016 | 0.006 | −0.002 | −0.016 | | | |
| | 3 yrs | −0.013 | −0.008 | 0.005 | 0.012 | 0.000 | −0.009 | 0.007 | | | |
| | 4 yrs | −0.007 | −0.004 | 0.003 | 0.005 | −0.005 | 0.006 | 0.008 | | | |
| | 5 yrs | −0.006 | −0.005 | −0.001 | −0.001 | 0.007 | 0.007 | 0.006 | | | |
| **Premium** | 1 yr | −0.013 | 0.001 | 0.012 | 0.001 | 0.008 | 0.002 | 0.002 | 0.19% | 0.64 | |
| **(ZDP–LP)** | 2 yrs | −0.008 | 0.011 | 0.007 | 0.003 | 0.005 | 0.004 | 0.015 | 0.52% | 1.85 | * |
| | 3 yrs | −0.003 | 0.009 | 0.005 | 0.003 | 0.004 | 0.011 | 0.001 | 0.42% | 2.32 | ** |
| | 4 yrs | 0.000 | 0.010 | 0.006 | 0.005 | 0.010 | 0.000 | −0.004 | 0.37% | 1.79 | * |
| | 5 yrs | 0.003 | 0.009 | 0.005 | 0.009 | 0.003 | −0.003 | −0.003 | 0.34% | 1.85 | * |

**Source:** Author's calculations.

**Notes:** Once the returns of the ZDP and the LP are found every month, the Jensen's alpha over various holding periods of 1, 2, 3, 4 and 5 years after the portfolio formation is found. The difference in Jensen's alpha of the ZDP and the LP over a particular holding period averaged over various years of portfolio formations is taken as the required premium. The *t*-test is then applied to this premium to test if the difference is significantly different from zero.

**Table 5.** Premium Based on Treynor's Ratio

| | Over | Year of Portfolio Formation | | | | | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Next | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Premium | *t*-statistic | Sig |
| ZDP | 1 yr | −0.009 | 0.000 | 0.031 | 0.033 | 0.044 | 0.035 | 0.031 | | | |
| | 2 yrs | −0.006 | 0.013 | 0.034 | 0.042 | 0.040 | 0.033 | −0.012 | | | |
| | 3 yrs | 0.000 | 0.020 | 0.039 | 0.040 | 0.034 | 0.003 | 0.017 | | | |
| | 4 yrs | 0.005 | 0.027 | 0.038 | 0.036 | 0.013 | 0.020 | 0.013 | | | |
| | 5 yrs | 0.011 | 0.027 | 0.033 | 0.016 | 0.027 | 0.017 | 0.007 | | | |
| LP | 1 yr | −0.004 | 0.000 | 0.024 | 0.044 | 0.033 | 0.032 | 0.024 | | | |
| | 2 yrs | −0.003 | 0.009 | 0.026 | 0.042 | 0.032 | 0.027 | −0.031 | | | |
| | 3 yrs | 0.003 | 0.013 | 0.032 | 0.037 | 0.029 | −0.010 | 0.017 | | | |
| | 4 yrs | 0.005 | 0.017 | 0.030 | 0.031 | 0.001 | 0.020 | 0.018 | | | |
| | 5 yrs | 0.009 | 0.018 | 0.027 | 0.005 | 0.023 | 0.020 | 0.011 | | | |
| **Premium** | 1 yr | −0.005 | 0.000 | 0.006 | −0.011 | 0.011 | 0.003 | 0.007 | 0.16% | 0.57 | |
| **(ZDP–LP)** | 2 yrs | −0.004 | 0.004 | 0.008 | 0.000 | 0.007 | 0.005 | 0.019 | 0.57% | 2.14 | ** |
| | 3 yrs | −0.002 | 0.008 | 0.007 | 0.003 | 0.005 | 0.013 | 0.000 | 0.46% | 2.46 | ** |
| | 4 yrs | 0.000 | 0.010 | 0.008 | 0.005 | 0.012 | 0.000 | −0.005 | 0.41% | 1.72 | * |
| | 5 yrs | 0.002 | 0.010 | 0.006 | 0.011 | 0.004 | −0.003 | −0.003 | 0.37% | 1.70 | * |

**Source:** Author's calculations.

**Notes:** Once the returns of the ZDP and the LP are found every month, the Treynor's ratio over various holding periods of 1, 2, 3, 4 and 5 years after the portfolio formation is found. The difference in Treynor's ratio of the ZDP and the LP over a particular holding period averaged over various years of portfolio formations is taken as the required premium. The *t*-test is then applied to this premium to test if the difference is significantly different from zero.

**Table 6.** Premium Based on Sharpe's Ratio

| | Over | Year of Portfolio Formation | | | | | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Next | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Premium | *t*-statistic | Sig |
| ZDP | 1 yr | −0.11 | 0.00 | 0.29 | 0.30 | 0.57 | 0.51 | 0.37 | | | |
| | 2 yrs | −0.09 | 0.15 | 0.30 | 0.44 | 0.53 | 0.43 | −0.11 | | | |
| | 3 yrs | 0.00 | 0.20 | 0.37 | 0.45 | 0.42 | 0.03 | 0.15 | | | |
| | 4 yrs | 0.05 | 0.29 | 0.39 | 0.40 | 0.13 | 0.19 | 0.12 | | | |
| | 5 yrs | 0.12 | 0.30 | 0.32 | 0.16 | 0.26 | 0.17 | 0.07 | | | |
| LP | 1 yr | −0.04 | 0.00 | 0.25 | 0.36 | 0.43 | 0.48 | 0.26 | | | |
| | 2 yrs | −0.03 | 0.10 | 0.24 | 0.44 | 0.45 | 0.34 | −0.26 | | | |
| | 3 yrs | 0.03 | 0.13 | 0.31 | 0.43 | 0.35 | −0.10 | 0.14 | | | |
| | 4 yrs | 0.05 | 0.18 | 0.31 | 0.33 | 0.01 | 0.18 | 0.17 | | | |
| | 5 yrs | 0.09 | 0.20 | 0.27 | 0.05 | 0.21 | 0.20 | 0.10 | | | |
| **Premium** | 1 yr | −0.07 | 0.01 | 0.05 | −0.06 | 0.14 | 0.03 | 0.12 | 2.96% | 0.97 | |
| **(ZDP–LP)** | 2 yrs | −0.06 | 0.05 | 0.06 | 0.01 | 0.08 | 0.09 | 0.16 | 5.66% | 2.24 | ** |
| | 3 yrs | −0.02 | 0.08 | 0.06 | 0.02 | 0.07 | 0.12 | 0.01 | 4.72% | 2.57 | ** |
| | 4 yrs | 0.00 | 0.11 | 0.07 | 0.07 | 0.12 | 0.01 | −0.04 | 4.69% | 2.07 | ** |
| | 5 yrs | 0.03 | 0.10 | 0.05 | 0.11 | 0.05 | −0.03 | −0.03 | 4.04% | 1.96 | ** |

**Source:** Author's calculations.

**Notes:** Once the returns of the ZDP and the LP are found every month, the Sharpe's ratio over various holding periods of 1, 2, 3, 4 and 5 years after the portfolio formation is found. The difference in Sharpe's ratio of the ZDP and the LP over a particular holding period averaged over various years of portfolio formations is taken as the required premium. The *t*-test is then applied to this premium to test if the difference is significantly different from zero.

Table 3 presents the premium based on average holding period returns or buy and hold returns. Here, we find that the superior performance of the ZDP over that of the LP is even more apparent. The buy and hold return premium of the ZDP over LP ranges from 5 to 40 per cent approximately for 1–5 years holding period with almost all of them being significant at 5 per cent level of significance.

Tables 4, 5 and 6 present the premiums based on Jensen's alpha, Treynor's ratio and Sharpe's ratio which are our risk-adjusted performance measures estimated as detailed in the previous section. Here also we find that the superior performance of the ZDP with respect to the LP is pretty apparent for all these performance measures. The premium or difference of these measures over various holding periods of 1, 2, 3, 4 and 5 years are all positive and mostly significant particularly over 2 or more years of holding period. Our finding thus definitely points towards the fact that the zero-debt firms have been rewarded by the investors in the market and the stock performance of the zero-debt firms even on a risk-adjusted basis is superior compared to the performance of the leveraged firms.

## *Analysis of Drivers of Return Performance of Debt-free Firms*

Table 7 presents the *t*-test results of the difference in financial and operating characteristics of the zero-debt firms and the leveraged control firms for the year in which they became debt free and for 3 years before becoming debt free. We do not find any significant difference in profitability (as measured by PBDIT/TA and CFO/TA) between the debt-free and control firms for up to 3 years before becoming debt free. Hence, the difference in returns between the debt-free and leveraged firms does not arise due to differences in profitability, but may be more due to a 'positive investor perception'. As can be seen, the zero-debt firms have significantly higher cash balances than the leveraged (control) firms. This finding

**Table 7.** Drivers of Return Performance of Debt-free Firms

| Variable | Group | *t*-value | Sig. (2-tailed) | Mean |
|---|---|---|---|---|
| PBDITA/TA(−3) | Sample | 0.267 | 0.789 | 0.075 |
| | Control | | | 0.071 |
| PBDITA/TA(−2) | Sample | 0.174 | 0.862 | 0.079 |
| | Control | | | 0.078 |
| PBDITA/TA(−1) | Sample | 0.043 | 0.966 | 0.081 |
| | Control | | | 0.080 |
| PBDITA/TA(0) | Sample | 1.563 | 0.118 | 0.102 |
| | Control | | | 0.085 |
| CFO/TA(−3) | Sample | −0.817 | 0.414 | 0.039 |
| | Control | | | 0.047 |
| CFO/TA(−2) | Sample | −1.463 | 0.144 | 0.035 |
| | Control | | | 0.046 |
| CFO/TA(−1) | Sample | −1.597 | 0.110 | 0.031 |
| | Control | | | 0.046 |
| CFO/TA(0) | Sample | −1.140 | 0.254 | 0.021 |
| | Control | | | 0.033 |
| NFA/TA(−3) | Sample | −6.779 | 0.00*** | 0.183 |
| | Control | | | 0.242 |
| NFA/TA(−2) | Sample | −8.398 | 0.00*** | 0.170 |
| | Control | | | 0.240 |
| NFA/TA(−1) | Sample | −9.325 | 0.00*** | 0.158 |
| | Control | | | 0.233 |
| NFA/TA(0) | Sample | −9.311 | 0.00*** | 0.150 |
| | Control | | | 0.224 |
| cash/TA(−3) | Sample | 7.579 | 0.00*** | 0.088 |
| | Control | | | 0.051 |
| cash/TA(−2) | Sample | 9.164 | 0.00*** | 0.101 |
| | Control | | | 0.052 |
| cash/TA(−1) | Sample | 9.239 | 0.00*** | 0.111 |
| | Control | | | 0.058 |
| cash/TA(0) | Sample | 8.432 | 0.00*** | 0.115 |
| | Control | | | 0.065 |
| M/B(−3) | Sample | 2.090 | 0.037*** | 1.354 |
| | Control | | | 0.803 |
| M/B(−2) | Sample | 2.134 | 0.033*** | 1.560 |
| | Control | | | 0.860 |
| M/B(−1) | Sample | 1.058 | 0.291 | 1.527 |
| | Control | | | 1.209 |
| M/B(0) | Sample | 2.307 | 0.021*** | 1.525 |
| | Control | | | 0.880 |

**Source:** Author's calculations.

**Note:** The *t*-test for equality of means of financial and operating characteristics between the sample (debt free) and control (leveraged) firms for the year in which the firm became debt free and 3 years prior to that.

points to the conservative nature of these debt-free firms. Previous works (Bernanke & Gertler, 1989; Kiyotaki & Moore, 1997; Whited, 1992) also suggest that firms with lower debt proportion should have lower quantity of fixed assets to serve as collateral. We also find that the sample firms have significantly lower levels of fixed assets as a proportion of TA (or more proportion of intangible assets in TA) than the

control firms. The M/B ratios for the debt-free firms are significantly higher than the control firms before becoming debt free, which indicate that they have better growth opportunities. This is also consistent with their higher proportion of intangible assets.

In summary, the debt-free firms are found to be conservative with significantly higher levels of cash, higher proportion of intangible assets and more growth opportunities. Thus, the higher returns earned by debt-free firms could be because of the fact that the higher cash holdings would have allowed the zero-debt firms to undertake value-enhancing growth opportunities that otherwise might not have been undertaken (Denis & Sibilkov, 2010).

## Conclusion

This study tries to explore the possibility whether investors at large tend to reward firms that choose to remain debt free for at least 2 consecutive years. We look at the return performance of a portfolio of firms that have zero debt and compare it with the performance of a portfolio of firms matched by size and industry that have debt. Difference in return performance is examined based on both absolute and risk-adjusted performance measures over various holding periods ranging from 1 to 5 years after the portfolio formation year. The results clearly indicate that firms with no debt on their balance sheet exhibit superior performance both on absolute and risk-adjusted basis particularly over 2 or more years of holding period. The reason for difference in stock return performance is not due to profitability difference between the debt-free firms and the control firms, but more due to a positive investor perception that their debt-free balance sheet and large cash reserves may allow these firms to undertake those growth prospects in future that are currently reflected in their valuations.

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### Notes

1. CMIE stands for ‘Centre for Monitoring Indian Economy’ which maintains this database called ‘Prowess’ that has all relevant data pertaining to stock markets and firm-level data in India.
2. BSE stands for Bombay Stock Exchange that has more than 5,000 stocks listed in it divided into four principal groups, namely, A,B, T and Z, depending on some chosen parameters, such as, market capitalization, average transaction volume during the last 1 year and number of days traded during the last 1 year.
3. National Stock Exchange reports something called the S&P CNX Nifty total returns (TR) index. This shows the values of the Nifty index adjusted for dividends and hence returns calculated from changes returns on the index portfolio, inclusive of dividends.
4. The beta of a portfolio is obtained by regressing the excess returns of the portfolio over risk-free rate with the excess return of the market index over the risk-free rate over the time period concerned as per the following model:

$$R_p - R_f = \alpha_p + \beta_p (R_m - R_f)$$

   The slope of that equation will give the estimate of beta of the fund.
5. The risk premium of the fund or portfolio equals the difference of the return of the fund and the risk-free rate. It is an estimate of the premium available for bearing the risk by an investor in investing in the fund rather than a riskless asset.

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