



The Impact of Leverage on Firm's Investment

Jahanzeb Khan and Naeemullah

Foundation University Institute of Engineering and Management Sciences, New Lalazar, Rawalpindi Cantt. PAKISTAN

Available online at: www.isca.in, www.isca.me

Received 21st January 2014, revised 5th March 2014, accepted 30th May 2014

Abstract

This paper examines the impact of financial leverage on the firm's investment decision by using information on Pakistani publicly traded companies. In this paper, researcher has find out the negative relationship between leverage and investment, but the negative relationship between leverage and investment is significantly stronger for those firms which have low growth opportunities as compared to high growth opportunities. Growth opportunities play a vital role in investment decision of firm with leverage to avoid under or over investment. This research analyzes the results by using empirical model and measures the significance of endogeneity problem in implication of model. The paper supports to agency theory of corporate leverage and it shows the major impact of leverage especially when growth opportunities are low for firm.

Keywords: Impact, leverage, firm's, investment.

Introduction

In corporate finance, the central issue of investment decision of a firm is the impact of financial leverage of that firm. Investment policy of a firm should depend on factors like future demand, production technology of a firm, market interest rate, a specified time as this was also discussed and explained by Modigliani and Miller in 1958.

A large number of researchers has changed this position and made the argument that financing consideration significantly complicates the investment relationship by introducing important determinants beyond neoclassical fundamentals. Theory says that finance tends to affect real investment decisions, when markets are missing or incomplete, due to transactions cost and asymmetric information. Agency problems arise from attractions between shareholders, debt holders, management and effect the investment¹⁻⁶. Sometime under investment or over investment leads to a range of situations in which investment may not be fully responsive or may be over responsive with the changes in economic fundamentals.

This paper not only provides the new evidence of relationship between financial leverage and investment but also extends the previous research and literature in several main dimensions pertaining to empirical methodology (which includes the treatment of problem of endogeneity) in relationship between investment and leverage⁷⁻¹⁷. This paper is developed to examine the relationship for publically traded companies of Pakistan.

This paper allow for the Comparison of results of two similar but quiet independent samples. McConnell and Servaes also discuss the pooling regression as in previous researches most of the authors use pooling regression which resulted in ignoring individual firms effect due to such approach, researchers could

not manage to fully identify the impact of leverage on growth when relationship was also governed by individual characteristics of a firm which was unobservable. In this paper authors tried to extent earlier analysis by using panel data methodology for controlling heterogeneity among individual firms and tested results using alternative empirical methods.

In 1977, Paper return by Myers analyzes the possible externalities generated by debt on optimal investment strategy of shareholders and management. It introduces the idea that overhang reduces the incentives of shareholders and management coalition in control of the firm to the investment opportunities where net present value is positive if not fully then at least partially. As compared to firms with low level of leverage, highly levered firms exploit valuable opportunities less likely. An under investment theory developed in 1996 explains the firm with large debt commitment invest less irrespective of the nature of their growth opportunities. If future growth opportunities organized reasonably earlier the effect could be attenuated by firm taking corrective action and lowering its leverage, even if debt creates potential under investment incentives.

As managers reduce leverage by anticipating of futures investment opportunities so a negative empirical relation between leverage and growth may arise even during regression that control for growth opportunities leverage explain the information of management behavior investment opportunities. There is a possibility of leverage might proxy for growth opportunities and as the endogeneity problem; literature also discusses another agency problem of over investment. The problem is the manager's mentality to expend the firm's scale even some time considering the poor project which results in reduction of shareholders wealth. In case of debt financing management's ability to carry out some projects is highly

depended on the availability of cash flow.

According to Lang et al (1996) in US, there is a negative relation between financial leverage and future growth at the firm level and for diversified firms, at the wider scope. Those firms which have good investment opportunities doesn't reduces the growth but firms which have low investment opportunities could be effected.

Methodology

The data for variable study was obtained from 2006 to 2010 for analysis of financial statements of non-financial firms published by state bank of Pakistan. Only those non-financial firms was selected whose data for variable was available throughout the sample period. Initially we select 200 firms for this paper but after the winsorizing of data (a technique to remove outliers) we are left with 108 firms.

The sample of 2006 to 2010 is ideal because during this period Pakistani economy went under lots of economic problems and also is on path of recovery since 2009. Thus our sample period had a latent ability to control for different economic conditions that may impact the leverage behavior of firms.

Regression Equation: The following panel data regression will be used to estimate the impact of leverage on investment of the firm.

$$I_{i,t}/K_{i,t-1} = \alpha + \lambda_t + \beta(CF_{i,t}/K_{i,t-1}) + \delta Q_{i,t-1} + \eta LEVERAGE_{i,t-1} + \varphi(SALE_{i,t-1}/K_{i,t-1}) + \mu_i + \varepsilon_{i,t} \quad (1)$$

Investment: Where investment is calculating by following formula: (Current Year Operating fixed assets at cost - Last Year operating fixed assets at cost), Operating fixed assets of the previous year after deducting accumulated depreciation

Cash flow: Cash flow represents operational cash flow of the firm and is calculated as follows; (Gross Profit - General, administrative and other expenses) + Depreciation for the year, Previous year's operating fixed assets of the previous year after deducting accumulated depreciation

Tobin's Q: Tobin's Q is used as the proxy for growth opportunities of any firm and it is calculated by dividing the market value of total assets of a firm by its assets book value.

Sales: In sales we considered the sales of selected firms for the selected years and sales of every year are divided by the Operating fixed assets after deducting accumulated depreciation of the same year.

Sales of previous year: Operating fixed assets of the previous year after deducting accumulated depreciation

Leverage: Leverage is calculated by the following formula; Total liabilities of previous year, Operating fixed assets of the previous year after deducting accumulated depreciation

Panel Data Estimation Techniques: We will estimate a panel data regression model of common effect and random effect model. In this research paper we used two models Common Effect Model and Random Effect Model as these are supportive and were used in previous researches while researcher did not used the Fixed Effect Model the reason was the less number of firms. Some previous researches included the Fixed effect Model as they used large number of firms and the data used for the purpose was reasonably acceptable but in this paper after winsorizing due to the filtering process outliers were excluded so the remaining data do not allowed the researcher to use the Fixed Effect Model so that the results could show the true position.

Common Effect model: The common effect model is as follows:

$$I_{i,t}/K_{i,t-1} = \alpha + \lambda_t + \beta(CF_{i,t}/K_{i,t-1}) + \delta Q_{i,t-1} + \eta LEVERAGE_{i,t-1} + \varphi(SALE_{i,t-1}/K_{i,t-1}) + \mu_i + \varepsilon_{i,t} \quad (2)$$

The common effect model is estimated under the assumption of homogeneity of cross sectional units. Our firms are manufacturing concerns but they are different from each other as they operate in different industries. Thus they may have industrial and seasonal patterns. Thus common effect model may not be in the position to give us generalizable and robust results.

Random effect model: We will estimate the following random effect model;

$$I_{i,t}/K_{i,t-1} = \alpha + \lambda_t + \beta(CF_{i,t}/K_{i,t-1}) + \delta Q_{i,t-1} + \eta LEVERAGE_{i,t-1} + \varphi(SALE_{i,t-1}/K_{i,t-1}) + \mu_i + \varepsilon_{i,t} \quad (3)$$

Random effect model is a powerful estimation technique and it controls for the errors caused by the error term. The coefficients obtained by this model are more generalizable and robust.

Results and Discussion

Descriptive statistics: It is evidence from the statistics that we have 557 firms-observations; the mean of investment is 22 percent while the leverage is 62 percent. It can be seen that investment is less as compared to leverage. One can infer that the percentage of investment is less the percentage of leverage. Thus it appears that leverage have negative association with investment.

The above mentioned table1 explains the relationship between investment, cash flows, sales, Tobin's Q and leverage.

Correlation: Table-2 represents correlation matrix. It indicates that there is no significant correlation among our independent variables. Thus one can safely say that there is no problem of multi collinearity among over independent variable.

Regression Results: Table-3 represents the results of common effect model;

The common effect model indicates that all of over independent variables has positive significant coefficient except leverage. However this test is conduct under the assumptions of homogeneity of firms. This over simplistic assumption prevents us to make generalizable and robust results. Thus we resort random effect model which is more powerful technique than common effect model.

Table 4 represents the results of random effect model:

This is a power full technique of panel data analysis, it control

for the basis discussed by the error term and random effect model assigns positive significant coefficient to cash flow previous sale and Tobin's q, while leverage have negative and significant coefficient.

The cash flow has effect on investment (PV =.05). This result is according with the findings of Fazzari et al 1988. This clearly indicates that Pakistan firms finance their investment from internal funds. This is due to fact that Pakistani firms do not have access to cheap credit, further some industries such as textile tend to investment in positive and PV project from internal resources. Only thus there is also an industrial pattern on their behavior.

Tobin's Q represents the growth opportunities to firm. As there are more growth opportunities to firm, the more they will invest. This result is also according to the findings of Fazzari et al 1988. Thus it clearly indicates that the firm's growth opportunities induce their investment.

Table 1
The relationship between investment, cash flows, sales, Tobin's Q and leverage.

Variable	Observations	Mean	Standard deviation
Investment	557	0.225686	0.631508
Cash flow	557	0.402783	0.505786
Sales	557	3.256476	3.606205
Tobin's Q	557	0.622156	0.186105
Leverage	557	0.620378	0.177795

Table 2
Correlation Matrix

	investment	Cash flows	Sales	Tobin's Q	Leverage
investment	1				
Cash flows	0.2127	1			
Sales	0.1674	0.4021	1		
Tobin's Q	-0.0954	-0.244	-0.1544	1	
Leverage	-0.1257	-0.248	-0.1565	0.4829	1

Table 3
Common Effect Model

Investment	Coefficient	Standard. Error	T	P> t	[95% Conf. Interval]	
Cash flow	0.19887	0.05726	3.47	0.001	0.0863993	0.31133
Sales	0.01637	0.00788	2.08	0.038	0.0008995	0.03184
Tobin's Q	1.24571	0.51671	2.41	0.016	0.2307487	2.26066
Leverage	-1.5096	0.54146	-2.79	0.005	-2.573215	-0.4461
_cons	0.25381	0.10666	2.38	0.018	0.0442962	0.46332

Table-4
Random Effect Model

Investment	Coefficient	Standard error	Z	P> z	[95% Conf. Interval]	
Cash flow	0.19512	0.05694	3.43	0.001	0.0835317	0.30671
Sales	0.01775	0.00784	2.26	0.024	0.0023798	0.03312
Tobin's q	1.05249	0.51663	2.04	0.042	0.0399208	2.06506
Leverage	-1.3479	0.54086	-2.49	0.013	-2.408	-0.2879
_cons	0.14755	0.11449	1.29	0.197	-0.0768434	0.37195

The sales have positive significant coefficient that indicates previous year's sales have positive impact on investments of today. Increases the sales of past period will increase the investment of firm. Thus when economy is experiencing growth and sales that will generally lead to increase in output of the firm and consequently in order to meet demand for their product, the firms will increase their investment by expanding their production base thus causing increase in investment by firm.

The leverage is having negative significant impact on investment. As the firms are getting more and more levered their investment tends to decrease. This is due to the fact that highly levered firms face the risk of bankruptcy cost. This also raises their probability of default that prevents them from making new investment. Thus highly levered firms tend to make less investment in Pakistan.

Conclusion

This paper covers the major aspects with link to the empirical relationship of leverage and investment of Pakistani firms. In this paper we tried to extend the knowledge about the investment policy of firms in different sectors of market. Using a panel of Pakistani publicly traded firm's between (2006 to 2010), we concluded that when the firms have lower growth opportunities than there will be less investment by firms. The relationship of leverage and investment is negative that indicates highly levered firms make less investment in Pakistan. The positive significant coefficient of cash flow indicates that Pakistani firms use their internal funds to invest in positive NPV projects. Finally the previous year sales have positive significant impact on the investment behavior of the firms in the current year.

In nutshell it can be safely said that Pakistani firms by nature are Fazzari firms. The high cost of leverage, information asymmetries and behavioral patterns make leverage not a good choice to finance investment in Pakistan.

References

1. Albuquerque R, A. Agency Conflicts, Investment, and Asset Pricing, *The Journal of Finance*, **63** (1), 1-38 (2008)
2. Ali Ahmed H, Managerial Ownership Concentration and Agency Conflict using Logistic Regression Approach, Evidence from Bursa Malaysia, *Journal of Management Research*, **1**(1), 1-38 (2009)
3. Ferreira M.A, Why Do Firms Hold Cash?, Evidence From EMU Countries, *European Financial Management*, **10**(2), 295-315 (2004)
4. Jensen M., Agency cost of free cash flow, corporate finance, and take overs, *American Economic Review*, **76**, 323-329 (1986)
5. Ozkan A.O.N., Corporate cash holdings: An Empirical Investigation of UK Companies, *Journal of Banking and Finance*, 2103-2134 (2004)
6. Tirman O.T., Financial Distress and Corporate Performance. *Journal of Finance*, **49**, 1015-1040 (1994)
7. Bill Francis et al., Leverage and Growth: Effect of Stock Options, *Journal of Economics and Business*, (63), 569-573 (2011)
8. Coricelli F. et al., When Does Leverage Hurt Productivity Growth?, A firm level analysis, *Journal of International Money and Finance*, (31), 1674-1694 (2012)
9. Iang L. et al., Leverage, Investment and Firms Growth, *Journal of Financial Economics*, **40**, 3-18 (1996)
10. Faulkender M. et al., Cash Flows and Leverage Adjustments, *Journal of Financial Economics*, **103**, 632-639 (2012)
11. Manos R. et al., Leverage and Business Group. *Journal of Economics and Business*, **59**, 448-455 (2007)
12. Seoungpil Ahnet et al., Leverage and Investment in Diversified Firms, *Journal of Financial Economics*, **79**, 318-329 (2006)
13. S. Kalemli-Ozcan et al., Leverage Across Firms, Banks, and countries, *Journal of International Economics*, (88), 284-288 (2012)
14. Johnson S.A., Debt Maturity and the Effects of Growth Opportunities and Liquidity Risk on Leverage, *Review of Financial Studies*, (16), 209-236 (2003)
15. Huynh K.P. R., Age Effects, Leverage and Firm Growth, *Journal of Economic Dynamics and control*, 1004-1011 (2010)
16. Leary M., Bank loan supply, Lender choice and corporate capital structure, *Journal of finance*, **64**(3), 1143-1185 (2009)
17. McConnell J.S., Equity Ownership and the two Faces of Debt, *Journal of Financial Economics*, **39**, 131-157 (1995)
18. Modigliani M., Cost of capital, Corporation Finance, and Theory of Investment, *American Economic Review*, **53**, 433-443 (1958)
19. Myers, Determinants of corporate borrowing, *Journal of Financial Economics*, **5**, 147-175 (1977)
20. Fazzari Steven M., Hubbard G. and Petersen Bruce C, *Financing constraints and corporate finance.*, *Brookings Pap. Econ Act*, **1**, 141-195 (1988)