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An Analysis of Joint Effects of Investment Opportunity Set, Free Cash Flows and Size on Corporate Debt Policy

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Abstract. This study, based on a sample of 1869 observations from 1989 to 1993 for non-regulated U.S. firms, examines the association between investment opportunity set (IOS), free cash flows (FCF) and debt, and also tests whether firm size acts as a moderating variable on this association. The results show that there is a significantly positive association between FCF and debt for low IOS firms, which provide support to Jensen's (1986) ''control hypothesis''. The results also show that the positive association between debt and high FCF for low IOS firms is more pronounced for large firms, suggesting that the firm size serves as a moderating variable on the association.

Key words: debt level, free cash flows, investment opportunity set, firm size, corporate debt policy

JEL Classification:

Jensen (1986) argues that managers of low growth-high FCF firms are likely to waste cash resources by investing them in uneconomic projects. He defines FCF as a ''cash flow in excess that required to fund all projects that have positive net present values when discounted at the relevant cost of capital (Jensen (1986) p. 323)''. He further argues that debt serves as a monitoring device for firms with high FCF because it discourages managers to engage in *non value maximizing* activities. The monitoring function of debt is described as the ''control hypothesis,'' which implies that firms with high FCF and low growth opportunities will have a higher debt level because debt would mitigate the agency problem associated with high FCF.

In a recent study, Agarwal and Jayaraman (1994), empirically tested the association between FCF and the debt level by using a proxy for FCF and found support for the validity of the ''control hypothesis.'' Their study, however, was based on a sample which did not consider the differences between high and low growth firms. A firm's growth opportunities are important for the ''control hypothesis'' because a firm with high growth opportunities is not likely to have a FCF problem. High IOS firms, by definition, would be able to utilize all available cash to finance projects with net positive present values (NPV). Thus, the results of their study may have been confounded by using both high and low growth firms. This study mitigates this problem by conducting separate analyzes on firms with low and high growth opportunities. Because the low growth firms are not expected to have projects with positive NPV in which investments could be made, the FCF proxy used by Agarwal and Jayaraman (1994) is considered more appropriate for this study. By focusing on the

low growth firms, this study is better able to evaluate the validity of the FCF/debt relationship, as suggested by the ''control hypothesis.''

Apart from IOS and FCF, firm size is also considered to be another important determinant of corporate debt level. Findings of several studies provide evidence supporting the positive association between debt and firm size (e.g. Ang and McConnell (1982), Titman and Wessels (1988)). The empirical evidence on the positive association between debt and firm size suggests that the association between debt and FCF will be moderated by the firm size.[1] We, therefore, expect that the association between debt and FCF would be more valid for larger firms with low growth opportunities.

We conducted analyzes on five-year data from 1989 to 1993 relating to non-regulated industrial firms. In order to identify firms with low growth opportunities, a composite IOS measure is developed by conducting a common factor analysis on six growth variables. A composite IOS measure is used because individual growth variables will not be able to capture the growth opportunities of a firm in entirety. The low growth firms are identified in terms of the bottom quartile of IOS scores.

The results of this study indicate that the association between debt and FCF is positive for low growth firms measured in terms of the bottom quartile of IOS, and the association is statistically significant. This finding thus provides support for Jensen's ''control hypothesis,'' that the positive association between FCF and debt level is especially significant for firms with low IOS. The results on the firm size support the second expectation that the positive association between debt and FCF is more pronounced for larger firms with low growth opportunities. This finding suggests that the firm size serves as a moderating variable on the association between the debt level and FCF.

The remainder of the paper is organized as follows: In part two, we develop hypotheses for the study. Part three discusses research methodology, including sample selection procedures. Results are presented in part four. Summary and conclusions are presented in part five.

1. Hypotheses for the study

Two hypotheses are tested in this study. The first hypothesis examines the relationship between debt and FCF for low growth firms, and the second hypothesis tests whether firm size would act as a moderating variable on the debt/FCF relationship.

Association between IOS, FCF and debt

In support of his ''control hypothesis,'' Jensen (1986) persuasively argues that debt reduces the agency costs of FCF by reducing the discretionary resources, particularly cash flows, under the control of management. By issuing debt, managers are bonding their promises to pay out future cash flows to debt holders and also give these debt holders an opportunity to commence bankruptcy proceedings if managers fail to meet the interest and principal payments. Thus, other things being equal, firms with large FCF are likely to have higher levels of debt which will reduce the agency costs of FCF. On the other hand, firms

with low FCF will have low levels of debt because they do not have to rely on debt as a control mechanism to reduce the agency costs of FCF. The equity market will provide control for these firms. The association between debt and FCF has been empirically supported by the findings of recent study (Jayaraman and Agarwal (1994)).

The ''control hypothesis,'' however, further suggests that firms with large FCF will have higher levels of debt especially when they have low growth opportunities (low IOS), which means that the relationship between debt and FCF will depend upon the availability of growth opportunities for the firm (Jensen, 1986). The ''control hypothesis'' thus suggests that firms with high FCF are expected to have a higher level of debt especially when they have low growth opportunities. This expectation is examined upon the following hypothesis:

H1: There will be a positive association between FCF and debt level for firms with low IOS.

Impact of firm size on the association between IOS and debt

It has been well documented in the literature that a firm's debt level is influenced by its size (e.g. Warner (1977), Ferri and Jones (1979), Ang et al. (1982), Titman and Wessels (1988)). Large firms are generally more diversified and are less prone to bankruptcy and financial distress, which enable them to have an easier access to capital markets, especially bond market (this has been referred to as ''size effect''). Moreover, a significant portion of large firms' value consists of assets-in-place[2] (e.g. Kole (1991), Kester (1986), Mason and Merton (1985)) which will allow them to issue a higher level of debt. On the other hand, smaller firms are generally not in a strong position to issue debt, because their borrowing capability is limited. In addition, the smaller firms with high FCF are not likely to have a severe agency problem because their span of control would be relatively narrower which would make it easier to control the managements' actions and thus mitigate the ''control problem''.

In view of the strong empirical evidence which documents a higher debt level for large firms, it can be argued that the positive association between debt and FCF will be moderated by the firm size. Thus, the debt level serves as a control mechanism for management's actions in large firms, but it does not mitigate the control problem in small firms. In a recent study, Vogt (1994) found that the relationship between cash flows and investment spending differ between small and large firms. Smaller growth firms conform more to the pecking order behavior (e.g. Myers and Majluf (1984)), while larger non-growth firms conform more to the free cash flow behavior, as explained by the ''control hypothesis.'' This argument suggests that the control problem will be more severe for larger firms, which would require a control mechanism to discourage managers from making decisions that are not in the best interests of shareholders. Thus, the positive association between high FCF and debt is expected to be more pronounced for larger firms than smaller firms. The following hypothesis tests this expectation:

H2: The positive association between FCF and debt will be pronounced for larger firms.

2. Research methodology

A. Sample selection

The study is based on pooled cross-section time series data of firms selected from PC Plus version of Compustat from 1989 to 1993. As a first step, firms with the following four digit SIC are excluded from the study so that it can primarily be focused on non-regulated industrial firms: (1) 100–1400 (mining firms), (2) 2911 (petroleum firms), (3) 4011 (railroads), (4) 4911–4991 (utilities), (5) 6021–8744 (financial, medical and other service firms). By excluding these firms, we eliminated the confounding effect of regulations on the financing choice decisions. Second, only publicly traded firms, which are incorporated in the United States and are not subsidiaries of another firm, are retained in the sample. Third, firms are examined to determine whether information on all variables required for analyzes is available. Firms with missing information on IOS variables are excluded from further analyzes. Table 1 lists the number of firms in the Compustat and in the final sample for each industry group. The final sample consists of 1869 observations.

Investment opportunity set (IOS)

The Investment Opportunity Set (IOS) is an unobserveable variable, and requires an appropriate proxy for empirical analyzes. There is, however, no consensus on a reliable proxy for growth. Smith and Watts (1992) suggest that IOS be measured in terms of book value of assets to total firm value (A/V). A higher A/V ratio is considered to represent a lower IOS. The ratio of market value of equity to book value of equity (MVE/BE) has been used in some research studies (e.g. Chung Chaeoenwong (1991), Collins and Kothari (1989), Lewellen et al. (1987)). Another important measure used by researchers is the earnings/price ratio (EP) (e.g. Chung Chaeoenwong (1991), Kester (1984), Smith and Watts (1992)). In addition, several other measures have been used as proxies for IOS[3], which include the sale growth (Lehn and Poulsen (1989)) and the research intensity measure represented by a ratio of R&D expenditures divided by Sales (Kole (1991)). Skinner developed an IOS index by conducting a factor analysis on the following four variables: PPE/ Market Value, R&D/Sales, Tobin's q, and Asset Beta (riskiness of firms' assets) Gaver and Gaver (1993) also used the factor analysis techniques on six variables.[4]

In this study, we also use a composite measure of IOS by conducting a common factor analysis on the following six growth measures: (1) Market-to-book value of assets (MKTBKASS), (2) Market-to-book value of equity (MKTBKEQ), (3) R&D/book value of assets (R&D), (4) Earnings/price ratio (EP), (5) advertisement expenditures (ADV), and (6) operating performance (OPE). The first four variables have been extensively used as proxies for IOS by prior studies (e.g. Chung Chaeoenwong (1991), Collins and Kothari (1989), Lewellen et al. (1987)), and have lately been used by Gaver and Gaver (1993) in factor analysis to develop an IOS index. The first two variables are supported on the ground that the ratio between market and book values for assets and equities are closely related to the firm's growth opportunities (also see Gul and Tsui (1998)). The variable of R&D expenditures and EP are considered to play an important role in the firm's future

Table 1. Summary of SIC-defined industry representation of 1869 sample firms with available data from 1989 to 1993

Industry Description	SIC Codes	Number of Sample Firms	Populations of Firms
Heavy construction	1600–1799	8	150
Food products	2000–2070	86	402
Textile mills	2200–2221	9	110
Finished apparel	2300–2330	9	202
Millwork, etc.	2421–2451	5	84
Furniture	2510–2522	28	114
Paper products	2600–2631	15	147
Newspaper publishing	2711	0	101
Periodicals, books	2721–2731	5	84
Chemicals	2800–2829	37	176
Drugs, pharmaceuticals	2834	153	451
Plastics	3080–3089	58	225
Footwear	3140	5	74
Cement	3241–3270	2	61
Blast furnaces (steel)	3312	0	130
Nonferrous metals	3330–3334	0	53
Metal tools, parts, etc.	3411–3460	49	303
Machinery	3510–3537	69	222
Computing equipment	3570–3571	91	179
Electrical machinery	3600–3621	48	138
Semiconductors	3674	115	235
Motor vehicles	3711	19	57
Aircraft/aerospace	3721–3760	27	202
Instruments and controls	3812–3861	616	1518
Air transport	4512	0	83
Radio & TV broadcasting	4833	3	85
Retail-dept. stores	5311–5331	148	216
Retail-grocery	5411	24	153
Retail-apparel	5651	49	70
Retail-fast food	5812	191	317
Total firms		1869	6396

growth (e.g. Kole (1991), Gaver and Gaver (1993)). Advertisement expenditures, similar to R&D expenditures contribute to the firm's future growth (e.g. Mason and Merton (1985)). The variable of OPE provides information on the earnings generated by the assets-in-place similar to the variable of EP, and this variable is also negatively related to growth opportunities.

2. *Descriptive statistics and correlations of IOS factor*

Descriptive statistics and correlations among individual variables of IOS are presented in Table 2.

The EP ratio is negatively correlated only with advertisement (ADV), but not with other

Table 2. Descriptive statistics and correlation of six measures of IOS[1]

	MKTBKEQ[2]	MKTBKASS[3]	EP[4]	R & D[5]	ADV[6]	OPE[7]
Panel A: Descriptive statistics						
Maximum	288	29.919	2.846	1.365	32.75	0.5
Third Quartile	3.784	2.444	0.066	0.097	0.036	0.190
Median	2.014	1.488	0.039	0.041	0.020	0.133
First Quartile	1.124	1.083	− 0.032	0.006	0.012	0.062
Maximum	− 193.517	0.401	− 34.118	0	0	− 2.225
Mean	3.058	2.168	− 0.135	0.064	0.050	0.089
Panel B: Correlation						
MKTBKEQ	1.00	0.164***	0.025	− 0.045	0.005	0.051*
MKTBKASS		1.00	0.029	0.3***	0.03	− 0.284***
EP			1.00	0.002	− 0.003	0.093***
R & D				1.00	0.076**	− 0.498***
ADV					1.00	− 0.102***
OPE						1.00

***p-value < 0.001, **p-value < 0.01, *p-value < 0.05.

[1] The six IOS measures are calculated on the basis of total sample of 404 firms. Firms with missing values for any measure have been excluded from the sample.

[2] The ratio of the market value of common stocks to the book value of common shares [Compustat items (24 × 25)/60].

[3] The ratio of the market value of the firm to the book value of assets. The market value is defined as the book value of total liabilities plus the market value of common shares [Compustat items [(6 + 60 + (24 × 26))/6]].

[4] The ratio of primary earnings per share before extraordinary items to closing price per share [Compustat items 58/24].

[5] The ratio of research and development expenditure to total assets [Compustat items (46/6)].

[6] The ratio of advertising expenditure to sales [Compustat items (45/12)].

[7] The ratio of operating income before depreciation adjusted for LIFO reserve to assets [Compustat items ((13 − 240)/6)].

variables. The OPE variable is negatively correlated with MKTBKASS, R&D and ADV. Most correlations are statistically significant.

The common factor analysis results are presented in Table 3.[5]

In Panel A of Table 3, the starting communalities of individual IOS variables are given. The eigenvalues of the reduced correlation matrix of six individual IOS variables are given in Panel B. The sum of squares of factor loadings reflects the proportion of variance explained by the factor, and this amount of variance is the characteristic root or eigen value (Kline (1994) p. 29). The larger the eigenvalue the more variance is explained by the factor. The eigenvalue of factor 1 is 1.0028, which suggests that one common factor adequately explains the interrelations among individual proxy variables. The eigenvalue of other factors is much below 1, suggesting that their capability to explain the interrelationship among individual proxy variables is limited. We thus decided to use factor 1 for further analyzes.

The correlations between the common factor and six individual variables of IOS are presented in Panel C. As expected, the common factor is positively associated with four

Table 3. Selected statistics related to a common factor analysis of six measures of IOS

Panel A: Estimated commonalities of six IOS measures					
MKTBKEQ	MKTBKASS	EP	R & D	ADV	OPE
0.040940	0.149283	0.014292	0.280043	0.011393	0.284528
Panel B: Eigenvalues of the reduced correlation matrix of six IOS measures					
1	2	3	4	5	6
1.0028	0.1954	0.0162	− 0.0012	− 0.1967	− 0.2359
Panel C: Correlation between the common factor and the six IOS measures					
MKTBKEQ	MKTBKASS	EP	R & D	ADV	OPE
0.01108	0.43637	− 0.04585	0.62864	0.12638	− 0.63164
Panel D: Descriptive Statistics of the common factor					
	Maximum			12.45996	
	Third Quartile			0.115601	
	Median			− 0.18423	
	First Quartile			− 0.40833	
	Minimum			− 0.77079	
	Mean			0	

variables and negatively associated with EP and OPE. All correlations are statistically significant. The significant correlations suggest that the common factor fully reflects the growth opportunities represented by individual variables. Descriptive statistics of the common factor are provided in Panel D.

Free cash flow (FCF)

The variable of FCF is not readily identifiable. We have, therefore, calculated FCF on the basis of the most commonly technique suggested in the literature (e.g. Lehn and Poulsen (1989), Lang et al. (1991), Agarwal and Jayaraman (1994), Gul and Tsui (1998)). FCF is obtained by deducting the following variables from operating income before depreciation (INC): incomes taxes less change in deferred taxes from the previous year to the current year (TAX), gross interest expense on short and long term debt (INTEXP), total amount of preferred dividend requirement on cumulative preferred stock (PFDIV), and total dollar amount of dividends declared on common stock COMDIV).

$$\text{FCF} = \text{INC} - \text{TAX} - \text{INTEXP} - \text{PFDIV} - \text{COMDIV}. \quad (1)$$

The FCF measure is scaled by the market value of common equity at the end of the preceding fiscal year (FCF/EQ)[6], and this variable hereafter is referred to as FCF in the text of this paper, and will be identified as FCF/EQ in the tables. Descriptive statistics of FCF are given in Table 4.

The variable debt-equity is used as a dependent variable, and is calculated as Book-debt/market-equity. The variable of Dividend Yield (*DY*) is used as a control variable, because

Table 4. Coefficients of leverage regressed on FCF/EQ, size and dividend yield for high[1] and low[2] IOS sample

Model	N^3	Intercept	FCF/EQ	Size	*DY*	*F* value	R^2	Adjusted R^2
Panel A: High IOS								
1	394	0.441***	0.089	—	—	0.423	0.11%	− 0.15%
2	465	− 0.031	—	0.119**	—	8.650**	1.83%	1.62%
3	394	0.010	0.081	0.125**	—	3.787*	1.89%	1.39%
4	394	− 0.046	0.082	0.146**	− 0.122	3.220*	2.40%	1.66%
Panel B: Low IOS								
5	429	0.368***	2.240***	—	—	76.351***	15.11%	14.91%
6	466	0.552*	—	0.042	—	0.931	0.20%	− 0.01%
7	429	0.094	2.254***	0.049	—	38.892***	15.38%	14.98%
8	429	− 0.074	2.219***	0.089	− 0.040	26.803***	15.85%	15.26%

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.
[1] High IOS represents the top quartile of the sample ranked on the basis of IOS variable.
[2] Low IOS represents the bottom quartile of the sample ranked on the basis of IOS variable.
[3] *N* changes with each equation because of missing values for independent variables.

dividend payment may also be associated with IOS and FCF (Gaver and Gaver (1993)): Dividend Payment/Market Price Per Share.

3. Results

We conducted OLS regression tests to examine the association between *DE* as a dependent variable, and FCF and size as independent variables, and *DY* as a control variable.

Results on association between debt and FCF for low IOS firms

The sample was divided into high and low IOS groups on the basis of top and bottom quartile of IOS scores and tests were conducted separately on the two groups. The results are contained in Table 4.

Models 1, 2, 5, and 6 examine the association of debt with FCF and firm size separately for high as well as low IOS groups. In models 3 and 7, both FCF and firm size are included as independent variables, and in models 4 and 8, *DY* is included as the control variable.

The results show that the coefficients of FCF in the regression models for the low IOS group are positive for all three models and are statistically significant. Though the FCF coefficients for the high IOS group are also positive, they are statistically insignificant. The significant positive coefficients indicate that the debt level of low growth firms is high when their FCF is high. The *R*-square values for all three models in the low IOS group are much higher compared to those of the high IOS group models, which suggests that the explanatory power in the low IOS group models is much stronger. Similarly, *F*-values of all three low IOS group models are much higher than those for the high IOS group models suggesting that the low IOS group models are more robust.

The above results support Hypothesis 1 that there is a positive association between FCF and *DE* for firms with low IOS. These results thus support Jensen's ''control hypothesis.''

Impact of firm size on the association between debt and FCF for low growth firms

The positive coefficients in models 2, 3, 4, 6, 7, and 8 in Table 4 for the firm size variable suggest that larger firms are associated with higher debt levels. Though the coefficients for firm size in the high IOS group are statistically significant, but their *R*-square values are very low, suggesting very low explanatory power.

In order to have a better understanding of the impact of size on the association between *DE* and IOS, the sample was divided into large and small firms and separate regression tests were conducted on the two groups. The classification of sample into large and small firms was based on the log of total assets (TA). The top quartile of the sample was classified as large and the bottom quartile as small. The results on both groups are contained in Table 5.

The test results for both subgroups indicate that there is a positive association between DE and FCF, which suggests that the low growth firms with high FCF have a higher debt level. But the *R*-square values and F-values of the regression tests for the two groups differ significantly. The *R*-square value for large firms (model 4) is 17.40% compared to only 5.36% for small firms (model 2). The higher *R*-square value for large firms suggests that the model for larger firms has a better explanatory power. The higher F-value for large firms suggests that the model for these firms is more robust compared to the model for small firms. These results thus provide support for Hypothesis 2 that the positive association between debt and FCF is comparatively stronger for larger firms than smaller firms with low growth opportunities.

4. Conclusion

The results of this study support the ''control hypothesis'' that the firm's debt level will be higher when it has high FCF and low IOS. These results are consistent with Jensen's

Table 5. Coefficients of leverage regressed on FCF/EQ for large and small[1] companies on low[2] IOS sample

Model	Intercept	FCF/EQ	*DY*	*F* value	R^2	Adjusted R^2
Panel A: Small companies (N = 209)						
1	0.343***	1.261**	—	10.203**	4.65%	4.20%
2	0.293**	1.440***	0.203	5.888**	5.36%	4.45%
Panel B: Large companies (N = 218)						
3	0.538**	2.349***	—	44.375***	16.91%	16.53%
4	0.627***	2.304***	−0.034	22.861***	17.4%	16.64%

***$p < 0.001$, **$p < 0.01$.

[1] Based on median split of size variable.

[2] Low IOS represents bottom quartile of the sample ranked on the basis of IOS variable.

argument that there is a positive association between FCF and debt level, especially when the growth opportunities are low. The results also show that there is a positive association between debt and FCF for low growth firms, especially when they are large. The higher debt levels for larger firms may be explained by the fact that larger firms requiring funds for growth opportunities are likely to go to the debt market rather than the equity market since debt financing would be relatively cheaper for them. Moreover, it would be easier for them to arrange debt because of relatively low bankruptcy risk.

The evidence provided by earlier studies (Agarwal and Jayaraan (1994), Vogt (1994), Lehn and Poulsen (1989)) did not fully explain the role of FCF in corporate debt policy decisions. Our findings document a robust relationship between debt and FCF for low growth firms, thus providing support for Jensen's ''control hypothesis.'' The weaker association between debt and FCF for small firms suggests that they are likely to use FCF for self-financing and will resort less to debt. This is understandable since debt financing will, in any case, be more expensive for smaller firms than larger firms.

A limitation of this study is that the ownership structure could not be included in the analyzes. Inclusion of this variable could provide more insights into the debt/FCF relationship because of agency costs associated with the ownership structure (Agarwal and Jayaraman (1994)). Future studies should consider this important variable.

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Notes

1. This reasoning is consistent with the pecking order hypothesis for small firms. Vogt (1994) argues that small firms will be constrained from obtaining external finance because of ''asymmetric information-induced liquidity constraints''.
2. Gaver and Gaver (1993) have discussed the definition of assets-in-place. Also see Kole (1991), Kester (1986) and Mason and Merton (1985).
3. A number of other variables have also been used by different authors. For example, see Mackie-Mason (1990); Kole (1991).
4. Gaver and Gaver (1993) used the following six variables: (1) Market-to-Book Value of assets, (2) Market-to-Book Value of Equity, (3) R&D/Book value of assets, (4) Earnings/Price Ratio, (5) the variance of the rate of return on the firm, and (6) the consensus choices of growth-oriented mutual funds.
5. We also used components analysis, and since the results of both analyzes are similar. We report the results of the common factor analysis.
6. We decided to scale the variable as suggested by Lehn and Poulson (1989) because the scaled variable will be more comparable across firms.

References

Agrawal, A. and N. Jayaraman, ''The dividend policies of all-equity firms: a direct test of the free cash flow theory.'' *Managerial and Decision Economics* 15, 139–148, (1994).

Ang, J.C. and J. McConnell, ''The administrative costs of corporate bankruptcy: A note.'' *Journal of Finance* 37, 219–216, (March 1982).

Chung, K. and C. Charoenwong, ''Investment options, assets in place, and the risk of stocks.'' *Financial Management* 20, 21–33, (1991).

Collins, D.W. and S.P. Kothari, ''An analysis of intertemporal and cross-sectional determinants of earnings responsive coefficients.'' *Journal of Accounting & Economics* 11, 143–181, (1989).

Ferri, M.G. and W.H. Jones, ''Determinants of financial structure: A new methodological approach.'' *Journal of Finance* 34, 631–644, (1979).

Gaver, J.J. and Kenneth M. Gaver, ''Additional evidence on the association between the investment opportunity set and corporate financing, dividend, and compensation policies.'' *Journal of Accounting & Economics* 1, 233–265, (1993).

Gul, F.A. and Judy S.L. Tsui, ''A test of the free cash flow and debt monitoring hypotheses: Evidence from audit pricing.'' *Journal of Accounting and Economics* 24(2), 219–237, (1998).

Jensen, M., ''Agency costs of free cash flow, corporate finance and takeovers.'' *American Economic Review* 76, 323–339, (1986).

Kester, K.W., ''Capital and ownership structure: A comparison of United States and Japanese manufacturing corporations.'' *Financial Management* 15(1), 5–16, (1986).

Klein, *An easy guide to factor Analysis*, Routledge, 1994.

Kole, S.R., ''A cross-sectional investigation of managerial compensation from an ex ante perspective.'' (Simon Graduate School of Business Administration, University of Rochester, Rochester, NY, 1991).

Lehn, K. and A. Poulsen, ''Free cash flow and stockhholder gains in going private transactions.'' *The Journal of Finance* XLIV(3), 771–787, (1989).

Lewellen, W., C. Loderer, and K. Martin, ''Executive compensation contracts and executive incentive problems: An empirical analysis.'' *Journal of Accounting & Economics* 9, 287–310, (1987).

Mason, S.P. and R.C. Merton, ''The role of contingent claims analysis in corporate finance.'' in E. I. Altman, ed. *Recent Advances in Corporate Finance*, (Irwin, Homewood, IL), 7–54, (1985).

Myers, S.C. and N.J. Majluf, ''Corporate financing and investment decisions when firms have information that investors do not have.'' *Journal of Financial Economics* 187–221, (June 1984).

Smith, C.W. Jr., and R.L. Watts, ''The investment opportunity set and corporate financing dividend, and compensation policies.'' *Journal of Accounting & Economics* 32, 263–292, (1992).

Titman, S. and R. Wessels, ''The determinants of capital structure choice.'' *The Journal of Finance* 1–19, (March 1988).

Vogt, S.C., ''The cash flow/investment relationship: Evidence from U.S. manufacturing firms.'' *Financial management* (Summer) 23(2), 3–20, (1994).

Warner, J., ''Bankruptcy costs: Some evidence.'' *Journal of Finance* 32, 237–347, (1977).