An Empirical Study of Industry Concentration and Cyclicality of Cash Flows with Regard to Leveraged Buyouts

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A review of the significance of leveraged buyout activity during the 1980's and early 1990's is given. Industry concentration and the cyclicality of cash flows are examined in relation to premiums paid and stock price reactions during buyouts. The results indicate that industry concentration is significant in relation to buyout premiums, but not to stock price reactions. Cash flow cyclicality is related to abnormal stock returns during the full study period, and to premiums paid for buyouts announced after the 1986 Tax Reform Act was passed.

I. Introduction and Objectives of the Study

Leveraged buyouts (IBOs) become increasingly popular during

the 1980's, as investment banking firms grew adept at arranging them and investors channeled their money into junk bond funds. The level of corporate debt rose from $ 965 billion in 1982 to $ 1.8 trillion in 1988, representing an increase from 32 percent to 37 percent of the U.S gross national product in those six years (Greenwald, 1988). The number of LBOs increased steadily from 1983 through 1989, then took a downturn during 1990 and 1991, as economic recession occurred. There was a slight rebound during 1992, When economic indicators started to rebound.

LBOs have produced fundamental changes in the financial structure of the nation's corporations. Between the years 1984 and 1988, nonfinancial corporations retired a net $ 313 billion of equity and borrowed a net $ 613 billion of debt (brady, Congressional hearings, 1989). Not all of the debt was LBO-related, but the size of the debt issued in the course of LBO transactions drew attention. Nicholas brady, secretary of the department of the treasury, contends that the economic future of the U.S. and its ability to remain competitive in a global economy are jeopardized because of the growing use of corporate leverage and fundamental changes in the financial structure of the nation,s corporations. This view is supported by research which indicates that the initial debt ratings of the acquiring firms in LBOs are often downgraded (Amihud, 1989; Marais et al., 1987) and they often experience negative abnormal stock returns (lehn and poulsen, 1989; marais et al., 1987; Travlos and cornett, 1993).

The nature of buyouts has changed during the past decade. During the early 1980's, 10-to-1 debt-to-equity ratios were common during corporate acquisitions. Now it is difficult to find such high debt-to-equity ratios, and 2-to-1 ratios are considered leveraged (Rock, 1993). Much of the current activity involves refinancings encouraged by favorable interest rates (grad, 1993). Rizzi (1993) notes that over $ 100 billion in high-yield bonds and bank debt will mature and need to be refinanced in the next few years.

An LBO affects not only the parties who are directly involved, but also others who are influenced by the impact on the economy as a whole. Areas of concern for the economy in general include lost jobs resulting from LBOs and the holding of junk bonds by financial institutions. In 1989 the federal reserve estimated that LBO loans comprised 9.9 percent of all commercial loan activity in large banks[1]. Secretary Brady points out that banks have not fared well in the LBOs that have gone sour. Also, firms facing cash flow difficulties tend to compensate by curtailing investment. Firm investment decreases by an estimated $. 20 to $. 40 for each

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1- Many institutions have limits on the amount of equity they can have in their portfolios. Life insurance companies limit equity to a certain percent of the portfolio, and banks are not generally allowed to hold securities. But the characteristics of junk bonds are in many ways more like equity than like debt. Thus the regulatory limitations are circumvented when these institutions hold junk bonds.

$ 1.00 decrease in cash flow (fazzari, hubbard, and petersen, 1988). This could have an unfavorable "ripple effect" throughout the economy.

Consequently, opinions about LBOs are varied. One view is that they are valid investment opportunities, providing a proper return for the level of risk involved, while dramatically increasing the efficiency of the firm. An opposing belief is that LBOs result in excessive prices being paid for acquired firms at the expense of the losing parties, including the firms' bondholders. There are also fears that the increase in corporate debt will increase the firms' risk of bankruptcy. Faust (1990), for example, found that bankruptcy risk did increase during the 1980s, and that the number of business failures rose dramatically from 1979 through 1986. This finding supports the reported downgrading of bonds by rating services, reflecting the increase in bond riskiness.

A particular concern is whether the purchasers of bought out firms properly assess the firms' values. The middle and late 1980's provided an extended time of economic expansion. Acquirers with myopic viewpoints based on short-run conditions may have discounted the possibility of an economic recession during this time. The impact of an economic downturn on an acquirer's ability to meet debt obligations may not have been properly considered during the "Decade of Greed".

Although several witnesses before a senate committee[1]
indicated that they were cautious in their LBO dealings and
considered such factors as debt payments, others indicated
otherwise. For example, Dr. Lawrence H. Summers of Harvard
university, testified that there would probably be some
bankruptcies due to excessive LBO debt during the next
recession. To the extent that the consequences of wide-scale
default could be devastating to the U.S. economy, the federal
government could justify intervening in LBO transactions. The
cost of intervention would presumably be a reduction in economic
efficiency, specifically a less efficient allocation of capital.

Given the complexity of evaluating the impact of changes in
regulation and the differences of opinion about the desirability of
LBOs, it is of interest to focus on a few of the perceived issues.
Two factors that are likely to determine how well a firm will be
able to perform after a buyout are the cyclicality of its cash flows
and the level of competition within the firm's industry. These have
not been considered in previous studies.

Several researchers have examined other variables with respect
to LBO premiums and stock price reactions at the announcement
of a buyout. Tables 1 and 2 summarize those variables found to
be significant.

1- All appeared before the senate committee as public witnesses on finance hearings on
leveraged buyouts and corporate debt in january 1987.

Independent Variable	Study
undistributed free cash flows	Lehn and Poulsen (1989)
effective tax liability	Lehn and Poulsen (1989)
presence of competing offers	Easterwood, Hseih, and Singer (1988)
presence of competing offers	Lowenstein (1990)
% management ownership	Easterwood, Hseih, and Singer (1988)

Table 1. Variables That have been Significant in Relation to
Premiums Offered in Leveraged Buyouts

Independent Variable	Study
relative P/E ratio	Travlos and Cornett (1993)
managerial disputes	Travlos and Cornett (1993)
firm risk (std. deviation)	Grammatikos and Swary (1986)
% management ownership	Grammatikos and Swary (1986) DeAngelo, DeAngelo, and Rice (1984)
buyout leadership	Grammatikos and Swary (1986) DeAngelo, DeAngelo, and Rice (1984) Travlos and Cornett (1993)

Table 2. Variables that have been Significant in Relation to Stock Prices
at the Announcement of a Proposed Leveraged

The first objective of this study is to determine whether the premiums paid in LBOs reflect the cyclicality of cash flows and the concentration within the firms' industries. The second is to assess whether the stock price reactions at the announcement of a buyout proposal reflect cyclicality and concentration. A third objective is to evaluate the impact of the 1986 tax reform act on

the LBO process with regard to premiums paid and stock price reactions.

The paper is organized as follows. Section II provides a description of explanatory variables and an explanation of the hypotheses. Section III presents the model specification. Section IV provides details for sample selection and data sources. Empirical results are presented in section V. Section VI offers concluding remarks.

II. Explanatory Variables

Cyclicality

The use of high-risk debt instruments such as junk bonds has been at the center of the debate over the desirability of leveraged buyouts. The main concern is the ability of bought-out firms to service the debt in a recessionary economy. Therefore, the ability of bought-out firms to operate successfully throughout various economic cycles needs to be considered. Some studies have addressed the potential economic stability of bought-out firms by looking at the debt ratios, such as the debt-equity ratio and the interest coverage ratio (faust, 1990; Travlos and cornett, 1993). Debt ratios which measure equity based on book values measure only a firm's past capacity. Those ratios which are based on expectations (e.g., based on market values) may also not be the most fitting ones. If expectations are not met, a firm with heavy debt may find itself insolvent. Simulation studies show that a

significant percentage of LBO -firms would be distressed during a recession (e.g.. Bernanke and campbell, 1988, and Warshawsky, 1990). However, the results of these studies are questionable since the simulations do not allow for firms' reactions to the dilemma and do not reflect possible future changes in the financial environment that may be relevant (faust, 1990).

Empirical studies show a relationship between stock prices and the business cycle (e.g.. moore, 1983, and zarnowitz, 1990). Seth (1990) developed a "coefficient of cyclicality" by using the coefficient resulting when the ratio of firm earnings to firm assets is regressed on the percentage change in gross national product (GNP). The purpose of seth's research was to assess the impact of increased leverage on firms' interest burdens in alternative economic states. A similar measure will be used in this study to determine whether cyclicality is an important factor with regard to buyout premiums and stock price reactions. This measure (CORR) is constructed by calculating the correlation coefficient between the firm's cash flows and the level of nominal GNP.

Nominal GNP is used because cash flow data are also in nominal terms. Cash flows and GNP are measured on an annual basis for a period of ten years before the announcement of the buyout bid. This correlation implicitly considers the cash flows of the industry (ies) in which a firm is operating and the proportion of resources devoted to each industry, since the firm's cash flows will be affected by these factors. A high correlation between a

firm's cash flows and nominal GNP suggests that an increase (decrease) in the firm's cash flows is highly correlated to upswings (downswings) of the market. This high correlation suggests a higher degree of risk for the LBO firm. As a result, a negative relationship between this factor and each of the dependent variables is expected.

Industry Concentration

Another factor that is relevant in determining a firm's capacity to operate under varying economic conditions is the degree of concentration within the firm's industry. Bain (1951) provided the basis for using concentration ratios to measure market power. If a firm operates in a relatively concentrated environment, there are few competitors. This type of firm is likely to earn higher economic rents than a firm in a less concentrated (more competitive) environment. The extreme example is a monopoly. Firms in this situation are usually subject to more government regulation and intervention than firms in more competitive environments. Their values should be easier to assess because their positions within the market are better defined than firms subject to greater degrees of competition. Thus it is more likely that firms in higher-concentration industries would be correctly priced before a buyout. Therefore, lower premiums and less pronounced stock price reactions would be expected for these firms. That is, a negative relationship is expected between the

measure of concentration and each of the dependent variables.

The best-known concentration ratio is the herfindahl index, calculated by adding the squared market share percentages for all firms in an industry (copeland and weston, 1988). A lower herfindahl Index indicates less market concentration and a higher herfindahl Index indicates more market concentration. The index is sensitive to both market shares of the firms within an industry and to inequality in the distribution of the market shares[1]. The higher a target firm's herfindahl index, the less competitive the industry, and the lower the expected premium and the smaller the expected stock price reaction for the buyout.

The 1986 Tax Reform Act

The tax advantages of LBOs have been a controversial issue. U.S. tax code has favored corporate debt financing by allowing the deductibility of interest payments. The profits arising from LBO's are "gifts from the IRS" because of the accompanying interest and depreciation deductions (lowenstein, 1985, and Grundfest, 1989). These deductions, which reduce corporate tax liability, have caused some concern regarding the level of tax collection from the corporate sector of the economy. However, the original stockholders of a bought-out firm are likely to

1- This Measure is Frequently Used as a Guide in Administering U.S. Department of Justice Anti-Trust guidelines in merger cases.

experience a premium (recognized as a gain) which is taxable. Some LBOs result in the sale of some of the firm's assets. Any sales gain is also taxable. In cases where the company is resold after a period of time, a taxable gain can result. Finally, the interest paid to bondholders by the bought-out corporation is taxable for the recipients.

Therfore the total effect of buyouts on tax collections is not clear. However, it is clear that the corporate tax benefits from LBO's are positively correlated with the size of the premium paid to stockholders (kaplan, 1989, lehn and poulsen, 1987). Most of the benefit is passed on to the original stockholders and is not retained by the new owners of the firm. Although tax considerations are seen not as a driving force in LBO activity, the tax savings are important (kaplan, 1989; lehn and poulsen, 1987).

Given the significance of the role of taxes in LBO's it is important to examine the impact of major changes in the U.S. tax code. The tax reform act of 1986 involved several of these. The implementation of this act in 1987 affected both personal and corporate taxes (martin, 1991, Gordon and mackie-mason, 1990, and warren, Gorham, and lamont, 1986). For example, while eleven different marginal tax brackets for individuals, ranging from 11% to 50% existed before the act, just two marginal brackets, with a matimum rate of 28%, remained in the years immediately following the act. Since the premiums paid to individuals in LBO's are taxed as personal income to the extent

that they represent gains to the stockholders, this change affected individuals. It seems likely that shareholders would be more receptive to LBO's after the tax reform act than before. This effect could emerge in the form of lower required premiums.

Other changes in the act affected corporate taxation. For example, prior to the tax reform act the maximum marginal corporate tax bracket was 46%. After the tax reform act it was 39%, with a maximum average rate of 34%. The impact of this change was a reduction in the income tax shelter from interest expense and other LBO expenses such as the use of loss carryforwards from the acquired firm. This change may make LBO firms less attractive to acquire. Also, since the act, the tax basis of the assets acquired in an LBO can no longer be increased. This change removed one of the potential income shelters for the acquirers[1] . Buyouts became less attractive following the enactment of the 1986 tax reform act (gordon and mackie-Mason, 1990).

1- Other Changes Include a Decrease in the Amount of Tax Liability in Excess of $ 25, 000 that Could be Reduced by Business Tax Credits; the Elimination of Lower Rates for Capital Gains Income; a Reduction in the Deduction Allowance for Dividend Income; and New Restrictions on the Handling of net Operating Losses when there is More than a 50% Change in the Ownership of a Loss Corporation Over a Three Year Period (for Further Explanation See: Martin, 1991, Gordon and Mackie-Mason, 1990, and Warren,Gorham, and Lamont, 1986).

The total impact of the tax reform act changes on the appeal of target firms is difficult to assess accurately. Due to the potential influence of the act on premiums paid and stock price reactions in LBOs, the sample firms are examined in two ways. First the entire sample of firms is analyzed. Then the sample of LBO firms is partitioned into those with announcements before 1986 and those during and after 1986.

III. Model Specification

The premium paid for the bought-out firm's stock is the first dependent variable of interest. This variable is defined as the annualized premium paid over the firm's market value prior to the LBO announcement, stated as a percentage of that market value. The announcement date is the date on which the publication of the LBO news appeared in the investment dealers' digest. The premium is defined as:

$$PREMIUM = (MV_{BO} - MV_{30})/(MV_{30})$$

where: MV_{BO} is the market value of the firm at the time of the buyout.

MV_{30} is the market value of the firm 30 days prior to announcement of the buyout attempt

This premium is then annualized to account for differing lengths of time between the announcement of the LBIO and its completion:

$$ANUPREM = PREMIUM \times (365/NDAYS)$$

where NDAYS is the number of days from the buyout announcement to the buyout completion.

The measure of stock price reaction is based on a market adjusted returns model of excess returns (brown and warner, 1985). Here the excess return on a security is measured relative to the return on the CRSP equally weighted market index for day t (Rm,t):

$$A_{i,t} = R_{i,t} - R_{m,t}$$

where $A_{i,t}$ is the excess return on security i for day t

$R_{i,t}$ is the return of firm i's stock on day t

The dependent variable CARMKT is the cumulative abnormal return, given by the sum of the firm's excess returns during the event period from five days before the buyout announcement to five days after announcement.

The effect of the explanatory variables on the premium paid and the stock price reaction for the bought-out firm is estimated using cross-sectional multiple regression analysis. Because of the cross-sectional nature of the data, heteroscedasticity is likely to occur (pindyck and rubinfeld, 1981). That is, a violation of the ordinary least squares (OLS) assumption of equal variances for all residual terms is probable. To adjust for this, the Glesjer (1969) procedure is used[1]. The GLS (Glesjer Least Squares) estimators

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1- This Statistical Method Entails Generating Residuals from an OLS Regression, the Absolute Values of Which are then Regressed by an OLS Procedure on the Explanatory

for coefficients are best linear unbiased estimators (johnston, 1984). The estimated equations have the following forms:

$$ANUPREM = A_0 + A_1 * CORR + A_2 * HERF + e$$
$$CARMKT = B_0 + B_1 * CORR + B_2 * HERF + e$$

IV. Sample Selection and Data Sources

Lehn and Poulsen (1989) provide a list of companies that were involved in LBOs 1980 through 1987. Their sample was collected by a search in the **wall street journal index** corporate entries. Since this study includes LBOs for the period 1980 the disclosure CD-ROM data base was searched for firms which filed form 13E-3 during the period, to find LBO-firms for years 1987-1990. Filing the 13E-3 with the SEC is required when a buyout is proposed. Each of the buyouts was then confirmed by a search in the **investment dealers' digest** (IDD) for details of the transaction.

Daily returns data for each stock during the buyout period were obtained from the center for research in security prices (CRSP) daily data tape. Details about firms' cash flows and sales were obtained from standard and poor's COMPUSTAT tapes. For some firms, cash flow data were not available on COMPUSTAT. In such cases the DISCLOSURE microfiche collection of annual reports was used.

Variables. The Squared Reciprocals of the Predicted Residuals from this Regression are the Weights that are Used to Transform the Data for the Final OLS Regression.

Industry sales were constructed from information contained on the COMPUSTAT tapes by aggregating firms according to 3-digit SIC codes. That is, all firms with the same 3-digit SIC codes were identified and their sales figures were added to derive total sales for the industry. The firm and industry sales data are used to calculate the herfindahl index. Annual GNP for years 1969 through 1990 was collected from the february 1992 issue of the **survey of current business.**

Annualized premiums paid for the common stock of bought-out firms range from - 70.4% to 430. 4%, with an average premium of 106. 6%. CORR ranges from-0.98, which would indicate a counter-cyclical firm, to 0.98, which represents a firm whose cash flows closely follow the overall pattern of the united states economy as measured by GNP. HERF ranges from 0.037, which indicates a relatively competitive market situation, to 0.6, representing a much less competitive (more concentrated) market.

A total of 41 different industries are represented in the sample. The paper and allied products industry experienced the most buyouts with 8 sample firms, followed by food and kindred products and electric equipment, each with 7 bought-out firms. The sample is representative of the overall pattern of LBO's during the decade with respect to industries.

V. Results of The Tests

The results for the models are presented in tables 3 and 4. Each table has three panels: A, B, and C. The regression results when all companies are included in the sample are presented in panel A (Model for The Full Sample). That is, panel A includes all companies that experienced buyouts from 1980 to 1990. Panel B shows the results for companies that experienced buyout announcements before 1986, and panel C offers the results for companies whose buyouts were announced between 1986 and 1990. Consequently, panels B and C partition the data base into the two sub-samples of before and after the tax reform act of 1986.

Panel A of table 3 shows a significant negative relationship between market concentration (HERF) and the annualized premium (ANUPREM) paid for the firms. This suggests that for more market concentration, lower premiums are paid, which is consistent with the hypothesized relationship. The cyclicality of the firm's cash flows (CORR) is not a significant variable.

For firms with an announced buyout before 1986 (Panel B, table 3) neither CORR nor HERF are significant, suggesting that acquirers were not considering cash flow cyclicality or market concentration in determining the premiums paid during the 1980-1986 interval.

After 1986, however, both CORR and HERF were significant in determining the premiums paid (panel C, table 3). The sign of

PANEL A. ESTIMATED MODEL FOR THE FULL SAMPLE.

Number of observations: 105 R^2 = 0.0710   F value = 3.898**

Independent Variable	Coefficient	t-statistics
Intercept	+ 1.218	+ 8.472***
CORR (-)@	+ 0.154	+ 1.268
HERF (-)	-1.013	-2.393**

PANEL B. ESTIMATED MODEL FOR FIRMS WITH ANNOUNCEMENT DATES
        BEFORE 1986.

Number of observations: 52 R^2 = 0.0218   F value = 0.547

Independent Variable	Coefficient	t-statistics
Intercept	+ 1.043	+ 6.474***
CORR (-)	-0.153	-1.022
HERF (-)	+ 0.060	+ 0.107

PANEL C. ESTIMATED MODEL FOR FIRMS WITH ANNOUNCEMENT
        DATES
        1986 AND AFTER.

Number of observations: 53 R^2 = 0.6186   F value = 40.555***

Independent Variable	Coefficient	t-statistics
Intercept	+ 1.437	+ 6.219***
CORR (-)	+ 0.260	+ 1.775*
HERF (-)	-1.705	-3.098**

Notes: @ = The expected signs.
         *** = Statistically significant at the 1% level
         ** = Statistically significant at the 5% level.
         * = Statistically significant at the 10% level.

Table 3 : Regression of Anuprem on Herf and Corr

PANEL A. ESTIMATED MODEL FOR THE FULL SAMPLE.

Number of observations: 105 R^2 =   0.0285   F value = 1.499

Independent Variable	Coefficient	t-statistics
Intercept	+0.180	+6.290***
CORR (-)@	+0.044	+1.666**
HERF (-)	-0.067	-0.655

PANEL B. ESTIMATED MODEL FOR FIRMS WITH ANNOUNCEMENT DATES
        BEFORE 1986.

Number of observations: 52 R^2 = 0.0103   F value = 0.255

Independent Variable	Coefficient	t-statistics
Intercept	+0.217	+6.060***
CORR (-)	+0.024	+0.642
HERF (-)	-0.060	-0.425

PANEL C. ESTIMATED MODEL FOR FIRMS WITH ANNOUNCEMENT
        DATES
        1986 AND AFTER.

Number of observations: 53 R^2 = 0.0881   F value = 2.417*

Independent Variable	Coefficient	t-statistics
Intercept	+0.207	+4.235***
CORR (-)	+0.038	+0.983
HERF (-)	-0.242	-1.492

Table 4: Regression of Carmkt on Two New Independent Variables

the Corr regression coefficient is the opposite of the negative

hypothesized sign, while the sign of the HERF coefficient is

negative, as expected.

Panel A of table 4 shows that CORR is a significant variable with respect to stock price increases at the announcement of a buyout when the full sample is considered. However, it again shows the opposite of the expected negative relationship. Panels B and C indicate that neither CORR nor HERF play a significant role in determining stock price movements when the before and after tax periods are considered separately.

VI. Summary and Conclusions

For the full sample of firms, concentration within an acquired firm's industry is negatively related to the premium paid. The higher the concentration, the lower the premium paid. This is consistent with the stated hypothesis of the paper. Firms with higher degrees of concentration are less likely to be overvalued because their market position and the value of their economic rents are known prior to the buyout, and should be relatively stable.

Cash flow cyclicality was not significant in relation to buyout premiums paid over the full sample period. It appears that overall, acquirers were not considering the potential impact of changing economic conditions on their ability to service the debt acauired during an LBO.

When the sample is partitioned, some interesting results occur. Prior to 1986, buyout premiums and stock price reactions do not

seem to have been affected by either industry concentration or cash flow cyclicality. During and after 1986, however, both of these factors seem to be important. Concentration has the expected negative association with premiums. But cyclicality has the opposite of what would be expected if firms' purchasers want to leave room for an economic downturn. One possible interpretation of this result is that LBO acquirers were indeed "carried away" by the vigorous economic growth of the middle and late 1980's. As economic expansion continued and firms' cash flows increased, a sense of optimism was instilled. The optimism spilled over into the assessment of bought-out firms' values.

With regard to stock price reactions during the full sample period, cash flow cyclicality is significant and is positvely related to abnormal returns. Abnormal returns were higher for firms with greater cyclicality of cash flows relative to nominal GNP. This again is presumably due to the optimistic outlook of the 1980's. Concentration was not a significant factor in determining stock price increases for the full sample.

The results for stock price reaction prior to 1986 are similar to those for premiums paid prior to 1986 with respect to the independent variables. Neither cash flow cyclicality nor industry concentration appear to have significantly influenced stock prices in LBOs. This insignificance carries over into the post-1986 period. This is different from the premium results for this subsample, where both cash flow cyclicality and industry

concentration appear to have been important factors.

In conclusion, it seems that industry concentration was properly considered in establishing buyout premiums, especially after the 1986 tax reform act became a factor. Cyclicality of cash flows, however, was either ignored or was incorporated into premium decisions on the basis of short-term optimism rather than considered with caution. This could lead to debt servicing problems for the bought-out firms in the future.

It also appears that market participants did not put much emphasis on cash flows or concentration when evaluating the value of LBO firms' stock around the announcement date of a buyout proposal. Cash flow cyclicality does appear to have had an influence for the whole sample period, but again it seems to be based on the expectation that the good times will continue. This may be more appropriate in the case of stock price reaction than for the determination of premiums. A portion of market participants would be interested in only the immediate gain, then bail out and have no reason to consider the long-term implications.

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