THE UNDERINVESTMENT PROBLEM, RISK MANAGEMENT, AND CORPORATE EARNINGS RETENTION

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ABSTRACT

This study presents a very realistic objective of the firm, which is consistent with organizational behavior. It is being proposed that: *The firm sets as its objective the control of the optimum amount of financial capital at the minimum cost to the firm.* As evidenced by the large portfolios of marketable equity securities held by non-financial firms, the firm hoards financial capital in order to ensure future availability. There is a holding or storage cost; that is, in pursuing this objective, the firm incurs (pays) a premium to ensure control over an attained level of financial capital. This study maintains that this cost is tantamount to a premium as in the case of an insurance policy. Thus, corporate earnings retention is a case of optimization under uncertainty and dividend policy is viewed as an instrument of risk management. This objective, which addresses the underinvestment problem, fills the gap on what the firm should maximize and provides an alternative to the debatable "maximization of shareholders' wealth."

INTRODUCTION

As noted in the *Statistical Abstract of the United States of America* [1966,500;1969,482;1973,475;1992,522], during the period 1960-1991, internal finance was the preponderant means of financing investment in plant assets by manufacturing corporation. At the end of 1995, the largest 25 percent of U.S. nonfinancial corporations held $448 billion in cash and marketable securities [Harford 1999, 1971]. Apparently, when large well-managed portfolios of marketable securities have been acquired with hoarded financial capital, some firms, in addition to benefiting from a lower cost of capital, experience additional benefits from market appreciation which in great part may exceed any premium penalty due to hoarding.

It is quite clear that the large corporations organized along divisional lines, where those individuals responsible for strategic (long range planning) decisions are relieved of the responsibilities for operating and tactical decisions, take on "many of the properties of a miniature capital market" [Williamson 1981,1556]. In which case, "[c]ash flows are reallocated among divisions in an attempt to secure the high yield uses" [Williamson 1981,1556]. Furthermore, in a survey, it was found that, due to *an apparent concern about*

affecting the stock price, managers are interested in having a properly managed dividend policy. In light of that finding, the researchers concluded that management should give serious attention to dividend policy because firm value and, in turn, the wealth of shareholders can be affected by the dividend decision [Baker, Veit, and Powell 2001, 36].

Given the conditions described above, there is much debate on the relative efficiency versus inefficiency of the internal capital market [Rajan, Servaes, and Zingales 1998; Lamont 1997; Stein 1997; Berger and Ofek 1995; Baker and Montgomery 1994]. More importantly, however, earlier recent surveys found that financial executives rank *risk management* as one of their most important objectives [Rawls and Smithson 1990]. While finance theory does a good job in instructing management on implementing hedges, finance theory has not had much to say about optimal corporate financing under conditions of uncertainty--specifically the discipline does not define the role of the internal capital market in risk management. "Regardless of the effects risk management may have on systematic risk, if diversified equity holders value their firm's risk management program it is because it mitigates the side-effects of volatile cash flow" [Barrese and Scorbis 2003, 2]. It is within the context of reducing the volatility of cash flows, that finance theory offers no guidance on the significance of corporate earnings retention in dealing with *risk management*.

In a framework of risk management developed by PricewaterhouseCoopers [2004, 20], the concept and objective of risk management are defined as follows:

> Enterprise risk management provides a framework for management to effectively deal with uncertainty and associated risk and opportunity, and thereby enhance its capacity to build value.
> Enterprise risk management is a process . . . designed to identify potential events that may affect the entity and manage risks to be within its risk appetite, [and] to provide reasonable assurance regarding the achievement of entity objectives.

In line with the foregoing definitions and given evidence in many instances on the failures of risk management [Kimball 2000], this paper intends to present what can be **c**onsidered as a very realistic objective of the firm, which is consistent with organizational behavior and risk management. It is being proposed that: *The firm sets as its objective the control of the optimum amount of financial capital at the minimum cost to the firm.*

Specifically, the firm hoards financial capital (as evidenced by the large portfolios of marketable equity securities held by non-financial firms) in order to ensure future availability. Thus, corporate earnings retention is a case of optimization under conditions of uncertainty.

Naturally, in pursuing the aforementioned objective, there is a holding or storage cost, which is tantamount to a premium as in the case of an insurance policy; that is, the firm incurs (pays) a premium to ensure control over an attained level of capital. This objective fills the gap on what the firm should maximize. It provides an alternative to the debatable "maximization of shareholders' wealth." That proposition is questionable because the management of the firm, in the case of the publicly held firm, is unable to determine--without incurring unduly prohibitive costs--the varying financial objectives of the shareholders. Furthermore, if determinable, the objectives may be contradictory, and hence maximization of all shareholders' wealth would be a problematic, if not an unattainable, goal for the firm.

Apparently, sometimes manager-initiated risk programs may have a lot to do with managers' own interests and little to do with shareholder value [Barrese and Scordis 2003, 2]. However, in this paper, the objective function is constrained by one behavioral assumption: managers are motivated to increase the probability of survival of their organizations and increase the ability to finance future potential investment opportunities.

CORPORATE EARNINGS RETENTION

In general, current research focus on the sensitivity of firms' current investment to the difference between the cost of internal and external funds [Cleary 1999; Kaplan and Zingales 1997; Lamont 1997; Oliner and Rudebusch 1992; Whited 1992]. This research focuses on the amassing by corporations of free cash flow, which is the "cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital" [Jensen 1986, 323]. When firms generate substantial free cash flow, severe conflicts of interests arise between shareholders and managers over dividend-payout policies. The relevant concern is how can managers be motivated to distribute the cash rather than invest it at below the cost of capital or waste it on organizational inefficiencies [Jensen 1986, 323]. However, another view is that while the volatility of corporate cash flows creates financial risks, corporate risk management, by harmonizing the

need for and the availability of internal funds, can guarantee the realization of profitable investment projects and at the same time avoid higher capital cost [Bartram 2000, 310].

The *underinvestment problem* is characterized by the instances wherein firms are unable to fund profitable investments projects due to the lack of adequate financing [Harford 1999,1969]. Meyers and Majluf's [1984] model demonstrates that a firm's strategy differs across states when the only financing choice is equity. In particular, if equity is overvalued, firms will issue equity to finance investment projects; whereas, if equity is undervalued, firms are more likely to forego investment growth opportunities. Additionally, the Meyers and Majluf's model demonstrates that if the firm uses *internal funds* or riskless debt to finance these growth opportunities, this type of underinvestment problem is avoided.

Many early works support the contention of corporate hoarding, such as those of Rumelt [1974], Sherman [1968], Donaldson [1961], Cottle and Whitman [1959], Drobovolsky [1951], and Lintner [1949]. "There is no doubt that internal financing is the line of least resistance in most companies. These are funds over which management has complete and independent control" [Donaldson 1961,56-63]. The real ramification of such a condition is that through dividend policy, firms have usurped the market's function of resource allocation. "It is the capital markets rather than intermediate or consumer markets that have been absorbed into the infrastructure of the new type of corporation. Both investment bankers and the market for equity securities now treat the firm as a whole and leave to top management the task of deciding which business, or even which industry, should receive new infusions of capital and which should be treated as cash generators" [Rumelt 1974,155].

Hoarding, evidently, is a consequence of uncertainty as to the rate of return on the firm's investment and the future cost and availability of capital to the individual firm.

> Quite clearly, the financial policies of industrial enterprises should be meshed with their investment behavior, but exactly how remains an open question. . . [W]idespread preference for internal financing on the part of manufacturing firms constitutes an important dimension of business activity which ought to be incorporated into a systematic theory of investment. . . .[Kuh 1962,16-17].

It turns outs that two factors, the rate of return on capital and the dynamics of dividend decision-making as described by Lintner, have a role in a complete theory of internally-

financed investment as called for by Kuh [1962]. Several studies [Graham and Rogers 1999, 18; Berkman and Bradbury 1999, 17] discovered that low-liquidity firms are more prone to hedging than high-liquidity firms. Accordingly, Bartram [2000, 310] concluded that cash flow before investment spending can serve as a target variable for hedging, since high dividend payouts restrain liquidity and induce hedging. Therefore, it appears that a theory of internally-financed investment is essentially a special case of the general theory--*optimization under conditions of uncertainty with dividend policy as the vehicle*.

Risk Management and Corporate Dividend Policy

It is certain that dividend policy can be an effective instrument for risk management. Evidently, dividend policy is a critical factor in optimizing the strategic posture of the firm. The implications can be appreciated through the use of the Lintner Dividend Model (equation 1), which maintains that dividends are a function of profits and are adjusted to accommodate investment requirements [Kuh 1962,17]:

(1) $D = rcP_t + (1 - c)D_t - 1 + a$

(D = Dividends; r = Payout Rate; c = A reaction coefficient; P = Profits; t = Time Period; a = A constant.)

The following does provide some support for this behavioral assumption:

1. A firm's sensitivity to variations in liquidity inflows seems to be conditioned by size. For example, small firms are more responsive to depreciation expense and profit levels than large firms [Meyer and Kuh 1959,191].

2. It was tested and substantiated that dividends are based primarily on net income levels (after taxes and depreciation) and are adjusted slowly in response to income changes. [Brittain 1966,195].

3. The rate of profit variable, as expected, is the most consistent factor in explaining dividends over the sample period [Dhyrmes and Kurz 1967, 447].

Firm size has been found to have a statistically significant negative relationship to profitability [U.S. Congress 1971,2049,2052]. It can be speculated that the finding of the relationship between size and profitability would tend to favor a lower dividend payout on the part of the larger firms with investment in sub-par rates of return resulting in low profitability. This point is, and has been, the cause of concern for quite some time:

> The fact that corporate directors have progressively favored wholesale retention of earnings . . . gives rise to the possibility that corporate directors may be influenced by noneconomic considerations such as the . . . desire to see their corporations grow bigger. Moreover, directors familiar with the profit possibilities of expansions in their own companies may be less well informed or appreciative of the opportunities for investment in competing or alternative lines [U.S. Congress 1949,115].

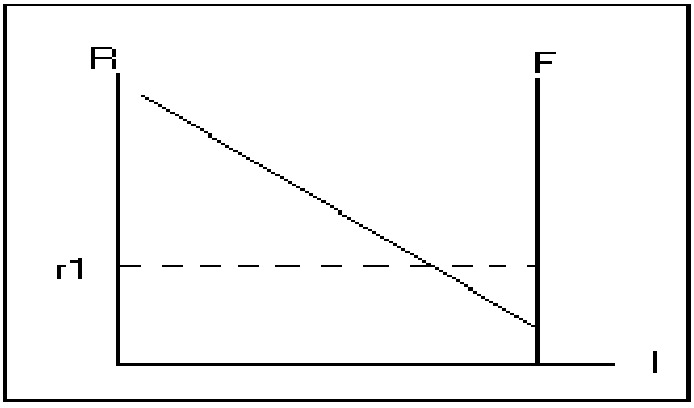
Recent empirical findings do bear out this earlier concern. In a study covering publicly traded U.S. firms for the period 1971-1994, Opler et al. [1999, 35] found that firms with high excess cash spend more on acquisition of other business and have higher capital expenditures, regardless of whether or not they had good investment opportunities. Harford's [1999,1995] finding, that firms which had accumulated large amounts of cash reserves made value decreasing business acquisitions, supports Opler et al. [1999]. Given such a condition it is necessary to review the capital budgeting/allocation process.

CAPITAL BUDGETING

In accordance with optimization theory (Figure 1), the firm allocates funds to projects with positive net present values in accordance with the expected rate of return on the investment. Projects will be selected in the order or ranking of the expected rate of return until *all available* funds have been allocated, which signifies that investment in projects with sub-par rates of returns can be experienced.

FIGURE 1

Intrafirm Allocation of Capital



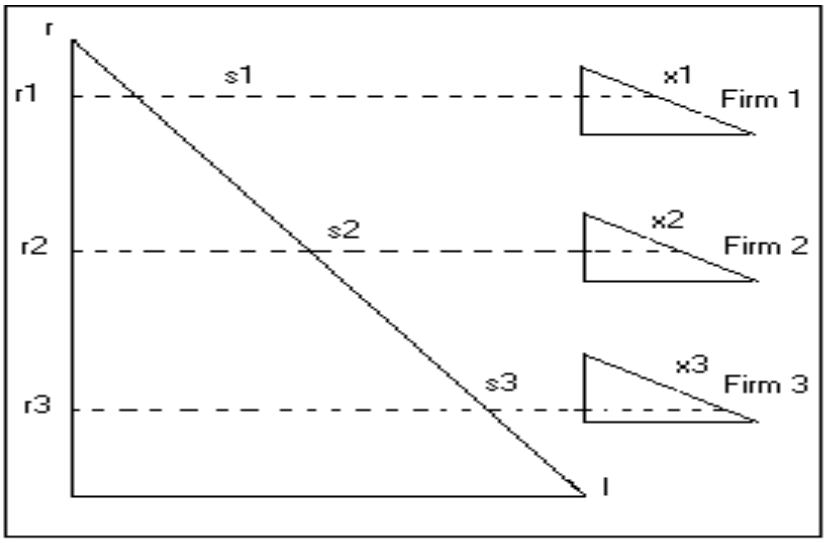
R = Internal Rate of Return; F = Available Funds; r1 = (Cut off Point); I = Investment.

The firm in any given period undertakes many projects; invariably, each project experiences its own rate of return. Clearly, the firm experiences a multiplicity of rates or return. However, when the firm goes to bid in the capital market, the relevant rate of return is its average internal rate of return--the rate of return on all projects as a combined unit [Helliwell 1968,6,7,48,49].

Figure 2 illustrates the interaction of the individual firms and the capital market. For Firm 1, x_1 is the average efficiency of capital, and thus, Firm 1 would be willing to tap the capital market at point r_1 or lower. Firms 2 and 3 would be willing to tap the capital market at points r_2 and r_3 (or lower) respectively. For Firms 2 and 3 to fund their investment projects, there must be non-corporate savings available to tap. In the absence of such savings, their investment decisions are negatively affected.

FIGURE 2

Interfirm Allocation of Capital



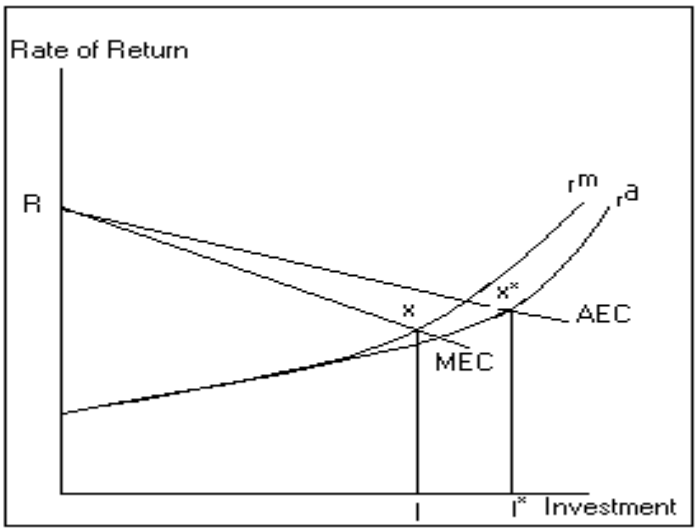
r1 . . . r3 = Firms' Cost of Capital
x1 . . . x3 = Average Internal Rate of Return (where x1> x2 > x3)
s1 . . . s3 = Non-Corporate Savings/External Finance
I = Investment

Figure 3 is derived from the work of Findlay and Williams [1972, 206], who suggested that some firms undertake investments with sub-par rates of return and advanced the concept

of sub-marginal investments. They maintain that firms use the average, not the marginal, cost of capital as the cut-off point for investment. This cost of capital, they emphasize, is the actual debt service and/or dividends paid out annually, and not the marginal cost of capital advanced in theory. In Figure 3, based upon marginal theory, the firm should invest up to point I, where x is the point at which the marginal cost of capital intersects the marginal efficiency of capital (internal rate of return). However, it is maintained that existing business practice reveal that firms in reality invest up to point I*, where x* is the point of intersection between the average cost of capital and the average efficiency of capital.

FIGURE 3

Investment: Theory Versus Practice



AEC = Average Efficiency of Capital
EC = Marginal Efficiency of Capital
I = Investment under Marginal Theory
r^m = Marginal Cost of Capital
I^* = Investment made by the Firm
r^a = Average Cost of Capital

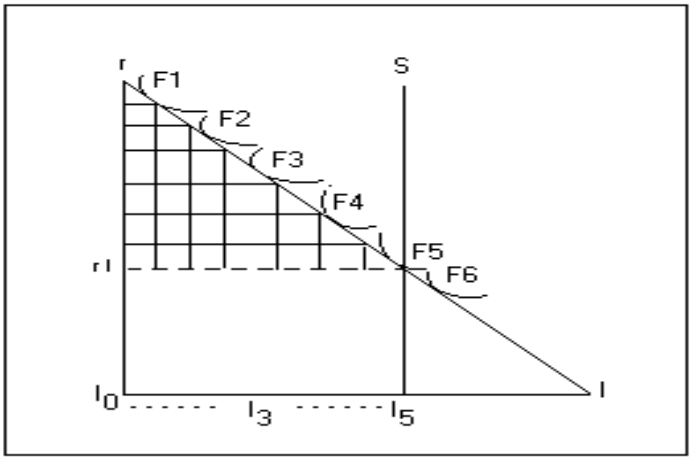
The Impact of Corporate Earnings Retention

The *marginal efficiency of capital* curve can be considered as an aggregation of all the average internal rates of return of all firms in the economy and not of all projects. If all firms had to resort to the capital market for their financing--that is if no funds were retained (hoarded) by firms, but all earnings were distributed to the investors--then there would be a

continuous movement downward along the curve (rI), but corporations retain earnings primarily to insulate themselves against uncertainty of: (1) future financing needs; and (2) future cost of financing. In Figure 4, in the absence of corporate savings, only those firms operating in the shaded area would be able to finance their investment projects.

FIGURE 4

The Allocation of Capital with No Corporate Savings

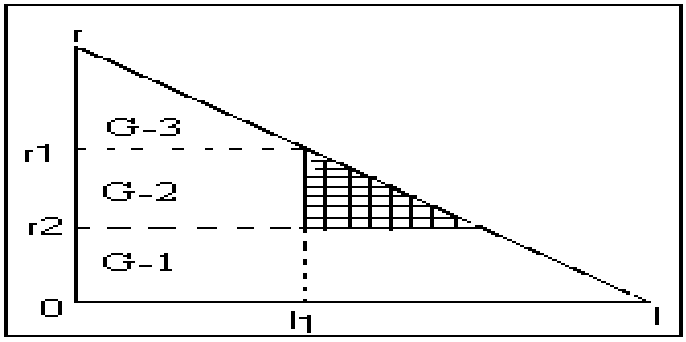


I = Investment Projects r = Average internal rate of return of firm r1 = Cutoff point
S = Total savings in the economy [--] = Firms being financed by capital market

Hoarding causes the movement along the curve (rI) to be discontinuous as is illustrated in Figure 5. The shaded area is the area of discontinuity--a vacuum for funds exists.

FIGURE 5

The Allocation of Capital with Corporate Savings



Let I_1 to I represent corporate savings in Figure 5. If the bulk of corporate savings is concentrated in the hands of those firms with internal rates of return falling between r_2 and 0 (Group 1: G-1), then those firms with internal rates of return falling between r_1 and r_2 (Group 2: G-2) would be starved for investment funds. Those firms would be precluded from expansion, because the non-corporate savings represented by 0 and I_1 would be drained from the capital market by those firms with internal rates of return falling between r_1 and r (Group 3: G-3). However, a trickle down effect does exist. When firms with rates of return falling between r_1 and r satisfy all their investment needs from internal sources and do not tap the capital market, the next highest group of bidders (firms with rates of return between r_1 and r_2) would be able to secure all or part of their investment needs from the capital market. In the long run, some firms will shift from one category to the next--back and forth.

Invariably, a firm would rather retain as much earnings as is possible to satisfy all its future financing needs, as opposed to distributing to stockholders and ultimately being caught short of internal funds for expansion. The action on the part of Group 1 firms, though apparently damaging to Group 2 firms, is simply a case of optimization of funding by Group 1 firms. Essentially, if Group 1 firms do not hoard, there will be variability in their investments due to the fact that the marginal cost of external funds increases as the demand for external funds increases; that is, they run the risk of not being able to finance projects with positive net present values or having to issue equity securities at a price that would be too low. As stated earlier, the decision by firms to forgo positive investment projects because of the periodic shortfall of internal cash flows and increasing cost of external finance is referred to as the under-investment problem [Harford 1999,1969].

Optimization and the Underinvestment Problem

If a firm's average internal rate of return is low (Figure 5 -- between r_1 and r_2) and its needs for investment funds exceeds its internal sources, that firm will be forced to pay the cost of capital commanded by firms with higher internal rates of return (between r_1 and r). The firm simply has to compete with the other firms for the available supply of investment funds. However, in doing so, the firm would be in a sub-optimizing position.

An optimal theory of financial investment and risk management must address the issue why it is more efficient for the firm to hoard an additional dollar of financial capital instead of increasing the dividend payout by some amount or the increasing the repurchase of the firm's shares. If a firm decides not to hoard financial capital, it will experience periodic shortfalls of financial capital from current operations for investment. The variability in financial capital generated by operations will result in the variability of the amount of external finance or variability in the amount of investment projects undertaken. The variability in investment can be avoided by securing external finance but the marginal cost of external capital increases as the demand for it increases. The decision to forgo external financing would entail a cost to the firm due to the loss of benefits by forgoing investment projects with positive net present values. Thus, the variability in periodic cash flows interferes with both investment and financing plans in a manner that is costly to the firm. To the degree that this variability can be reduced by hoarding (corporate earnings retention), the flow of financial capital to the firm can be increased. It is postulated that, in a world filled with uncertainty, without hoarding firms will underinvest in some states of the world because it is too costly or simply impossible to raise external finance.

Minton and Schrand [1999,425] maintain that their finding on the sensitivity of investment to cash flow volatility does not suggest that firms should necessarily reduce or eliminate cash flow volatility. Volatility emerges as a choice variable. If managers make rational decisions based on available information, then they should weigh the benefits of reducing cash flow volatility against the costs. Given the underinvestment problem, it is costly for a firm to be short of liquid assets; thus, in this study, it is postulated that the firm equates the marginal cost of holding to the marginal benefit of holding financial capital. Group 1 firms choose to reduce the cash flow volatility by hoarding financial capital in accordance with the Litner Dividend Model as described by Brittain [1966,195] and Dhyrmes and Kurz [1967, 447].

BASIC MODEL AND PROPOSITIONS

The firm is faced with an n-period investment/financing decision. In the initial period, the firm has an amount of liquid assets--LA, which corresponds to net working capital plus

long term investment in marketable equitable securities. Its investment expenditures in the initial period corresponds with its internal financing ability. At the end of the initial period it decides on the next period's investment expenditures and on the dividend payout amount consistent with its earnings retention/financial hoarding plan, which is the firm's current period income less the dividend payout.

(2) I = 1-g{LA + k(FPI)}

I = Investment expenditures
LA = Net Working Capital plus Long Term Investment in Marketable Equity Securities
FPI = The firm's periodic income
g = A liquidity coefficient
k = An earnings retention/financial hoarding coefficient

The model implies that there will be continuous increases in the book value per share in the absence of operating losses and the issuance of common stock. Furthermore, given that there are certain costs: (1) a direct cost - a decline in the rate of return below the cost of capital due to diminishing returns on investment; and (2) an indirect cost - share price reduction due to the low dividend payout associated with hoarding, as indicated by Harford [1999,1993]. These costs would be an increasing function of the amount of financial capital that is hoarded. Therefore, if hoarding is to be efficient, then two conditions must be satisfied: (1) the level of liquid assets (LA) must have a positive effect on the optimal level of investment, and (2) the increasing marginal costs of external financing must be neutralized by the returns on the marginal investments. For condition (2), decreases in share price due to hoarding must be offset by increases in share price due to increases in the accounting rate of return

In an empirical study covering the period 1950-1996, Fama and French [1999,1954] found that retained cash earnings move closely with investment (correlation of 0.56) and that long-term debt has a higher correlation (0.79) with investment. For the period 1950-1996, the internal rate of return on corporate market value was estimated to be 5.95% and the internal rate of return on the book value was estimated to be 7.38% [Fama and French 1999,1958]. In this paper, the effect of hoarding is assessed by examining the average rate of returns and the average market to book value ratios for high and low dividend payout firms.

Propositions

Based upon the foregoing, four hypotheses are developed.

- **P1**: Firms with higher dividend payout ratios experience higher accounting rates of return than firms with lower dividend payout.
- **P2**: Firms with higher dividend payout ratios experience higher market to book value ratios than firms with lower dividend payout.
- **P3**: There is no difference in average accounting rates of return between firms with high dividend payout ratios and firms with lower dividend payout ratios.
- **P4**: There is no difference in average market to book value ratios between firms with high dividend payout ratios and firms with lower dividend payout ratios.

Data and Methodology

The time period (1983-1990) is chosen because in the 1990s there has been a heavy emphasis by firms for short term operating performance to enhance stock price movement and accounting information has been modified to accommodate this end. This behavior is described as earnings management in the accounting literature. The SEC has been and still is concerned with this behavior [Dechow et. al. 1996; Chaney and Jeter 1997; Levitt 1998].

The data for the study consist of 45 firms, which were chosen, based upon a minimum of $100,000,000 of periodic reported accounting income, from an initial random sample of 150 firms selected from the Value Line Investment Survey for the years 1983 through 1990. The variables under review are: Rate of Return on Equity, Earnings Per Share, Net Income, Dividends, Share Price, and Book Value Per Share. The sample has been compartmentalized into two groups based upon the dividend payout ratio - 30 firms with high dividend payout (firms with payout ratios of 40% or more) and 15 firms with low dividend payout (firms with payout ratios of less than 40%). The data were subject to regression analysis and tests of differences between arithmetic means.

Tables 1 and 2 provide data on the three relevant variables that were subjected to the analyses for the two groups of firms. The focus is primarily on the rate of return and the market value to book value ratio as experienced by the low dividend payout firms as compared to that of the high dividend payout firms. The analysis focuses on the movements in the rate of return, the book value per share, and the share price. The results of the analysis are provided below.

TABLE 1

HIGH DIVIDEND PAYOUT FIRMS AND RELEVANT DATA: 1983-1990
(N = 30)

Firm	Average Dividend Payout Ratio %	Average Market to Book Value Ratio Times	Average Rate of Return on Equity %
Occidental Petroleum	184.1	1.11	7.8
Philip Morris	100.0	11.75	26.6
Union Carbide	96.3	2.25	15.8
Eastman Kodak	93.4	2.88	12.3
Pacific Ent	90.5	1.24	12.1
Sun Company	85.4	1.02	7.7
Allegheny Power	76.2	1.28	12.7
PS ENT. GP.	75.2	1.47	12.6
NYS E&G	75.1	1.11	12.7
Union Electric	67.1	1.24	13.8
Consld Nat Gas	65.5	2.05	11.9
Duke Power	63.7	2.39	12.5
Northern States	63.7	1.78	12.9
Con Edison	61.3	1.98	12.2
Unocal Corp	55.4	3.14	11.7
Exxon	54.8	2.13	16.4
Boise Cascade	54.4	1.40	9.5
Bristol Myers	53.8	6.33	24.1
Ashland Oil	51.8	2.23	13.2
P&G	51.4	4.98	15.9
Monsanto	51.1	2.92	11.6
Hanson PLC (ADR)	50.0	3.38	16.6
General Mills	49.6	11.05	30.2
Alcoa	47.4	1.01	9.6
American Brands	46.5	4.51	18.2
IBM	46.3	2.12	17.4
Norfolk Southern	43.3	2.05	10.5
General Electric	41.1	3.95	18.0
Johnson & Johnson	41.0	6.29	21.2
Syntex Corp	40.8	17.85	33.9

TABLE 2

LOW DIVIDEND PAYOUT FIRMS AND RELEVANT DATA: 1983-1990 (N = 15)

Firm	Average Dividend Payout Ratio %	Average Market to Book Value Ratio Times	Average Rate of Return on Equity %
Digital Equipment	0.0	2.19	11.3
FMC Corp	11.8	6.92	6.6
McDonalds Corp	16.7	8.84	19.3
Northern Telecom	17.3	4.49	13.9
Delta Airlines	18.1	1.31	12.2
Reynolds Metal	24.1	1.33	10.6
Waste Mgt	24.9	12.90	17.4
Honeywell	28.9	3.01	10.7
Marion Merr	29.9	19.98	28.6
Masco Corp	30.6	3.13	14.6
Browning Ferris	33.4	7.29	20.9
Westinghouse	34.2	4.20	19.7
Westvaco Corp	35.0	1.89	11.6
CSX Corp	35.8	1.03	9.4
Abbott Labs	35.9	11.92	28.9

RESULTS

Table 3 provides relevant data pertaining to propositions 1 and 2, while Table 4 provides relevant data pertaining to propositions 3 and 4. The results are the opposite of that which had been predicted for P1 and P2, whereas P3 and P4 are supported. The results reported in Tables 3 and 4 are consistent with other research findings. Harford [1999,1976] found that cash rich firms are insignificantly different in size from the total population of firms, and while the median market to book value ratios for those two samples are economically similar, they are statistically different. In this research, low-dividend payout firms are insignificantly different in size from the high-dividend payout firms; and while the average market to book value ratios for those two samples are economically different, they are statistically similar.

TABLE 3

COMPARATIVE DATA - MEAN VALUES
Dividend Payout Ratios, Market to Book Ratios, and Accounting Rates of Return

Firms	Dividend Payout Ratio %	Market to Book Value Ratio Times	Rate of Return on Equity %
High Payout	61.3	3.45	14.70
Low Payout	28.0	6.66	16.80

TABLE 4

Z TEST FOR DIFFERENCES IN MEAN VALUES BETWEEN FIRMS WITH HIGH AND LOW DIVIDEND PAYOUT RATIOS
Test: Standard Error of the Difference Between Two Means

	Market to Book Value Ratio	Rate of Return on Equity
z Value	1.271	1.095
Significance Level	0.204	0.276

The results of regression analysis, wherein the dividend payout ratio (a proxy for financial reserve) is the independent variable and the accounting rate of return and the market to book ratio are dependent variables, were not significant and are not reported. However, the results for the regression analysis wherein the accounting rate of return is the independent variable and the market to book value ratio is the dependent variable are presented in Table 5.

As expected, the t-statistic for the low dividend payout firms reveals that there is a significant relationship between the variables - the accounting rate of return and the market to book value ratio, however the t-statistic for the high dividend payout firms reveals a much more significant relationship between the two variables.

TABLE 5

REGRESSION ANALYSIS FOR HIGH AND LOW DIVIDEND PAYOUT FIRMS

Independent Variable: Rate of Return on Equity ***Dependent Variable:*** Market to Book Ratio

Panel A: Results for High Dividend Payout Firms (n=30)

Regression Statistics

Multiple R	R Square	Adjusted R^2	Standard Error
0.9236	0.8531	0.8479	1.4766

A N O V A

	DF	SS	MS	F	Significance F
Regression	1	354.6170	354.6170	162.6453	3.4959E-13*
Residual	28	61.0486	2.1803		
Total	29	415.6656			

	Coefficients	Std. Error	t-Statistic	P-Value	Lower 95%	Upper 95%
Intercept	-4.9422	0.7242	-6.8245	2.0528E-07	-6.4256	-3.4588
X Variable	10.5571	0.0437	12.7532	3.4959E-13	0.4676	0.6466

Panel B: Results for Low Dividend Payout Firms (n=15)

Regression Statistics

Multiple R	R Square	Adjusted R^2	Standard Error
0.7836	0.6139	0.5842	3.4946

A N O V A

	DF	SS	MS	F	Significance F
Regression	1	252.5071	252.5071	20.6758	0.0005*
Residual	13	61.0486	2.1803		
Total	14	415.6656			

	Coefficients	Std. Error	t-Statistic	P-Value	Lower 95%	Upper 95%
Intercept	-3.9517	2.3731	-1.6652	0.1197	-9.0785	1.1751
X Variable	10.6351	0.1397	4.5470	0.0005	0.3334	0.9369

* Highly significant

To determine whether refinement of the study would yield different insights, the sample firms were classified by income levels; also the dividend payout groups were subdivided into two additional groups to produce four groups. The data so classified and subjected to additional tests are presented in Table 6.

TABLE 6

REGRESSION ANALYSIS FOR RECLASSIFIED AND SUBDIVIDED DATA

Independent Variable: Rate of Return on Equity ***Dependent Variable:*** Market to Book Ratio

Panel A: Results for New Grouping of Dividend Payout Firms (n=45)
Regression Statistics

Payout Level %	Multiple R	R Square	Adjusted R^2	Standard Error	F	Level of Significance
=> 75 (n= 9)	.9189	.8444	.8221	2.350	37.977	0.000462*
=> 50 (n=13)	.7910	.6256	.5916	2.342	18.383	0.001283*
=> 25 (n=16)	.9026	.8147	.8014	3.540	61.539	1.72E-06*
< 25 (n= 7)	.5569	.3101	.1722	3.897	2.248	0.194073

Panel B: Results Based upon Classification by Income Levels (n=45)
Regression Statistics

Income Level ($000,000,000)	Multiple R	R Square	Adjusted R^2	Standard Error	F	Level of Significance
=> 1.0 (n= 9)	.8506	.7235	.6840	1.705	18.318	0.003655*
=> 0.5 (n=10)	.7855	.6169	.5691	2.909	12.886	0.007087*
=> 0.2 (n=15)	.9245	.8546	.8434	2.429	76.439	8.35E-07*
< 0.2 (n=11)	.4300	.1849	.0943	1.604	2.041	0.186863

* Highly significant

In Table 6, the results of the tests reveal that, except for two cases--dividend payout level less than 25% and income level less than $0.2 billion, a very significant relationship exists between the accounting rate of return and the market to book value ratio.

DISCUSSION ON UNCERTAINTY AND OPTIMIZATION

At first blush a high dividend payout policy, which should be associated with higher accounting rates of return and higher market to book value ratios, would be consistent with optimization theory, while a low dividend payout policy would not. However, a low dividend payout policy is not inconsistent, for the following reasons: (1) the risk exposure of the firm is minimized, and (2) the cost of doing business to the firm is minimized. The firm, by retaining

funds under its control, particularly in a growing industry, does minimize: (a) its risk of not being able to expand with the growth of its market; and (b) its cost of capital.

While no attempt has been made in this study to determine the efficiency of the internal capital market, the tests' results do suggest that low dividend payout firms are not penalized by the market as has been expected. One possible explanation is that investors seek a particular philosophy when they make their equity investment decisions, and they do recognize that the purpose of hoarding is to insulate the firm against uncertainty--the firm wants to ensure itself as to the availability of funds for future expansion and the reasonableness of the future cost of said funds. The investor-clienteles of these firms view the low dividend payout as a risk management strategy. This position is inline with the view of Barrese and Scordis [2003,2]: "Investors do not accept a lower rate of return for the stock of a firm that does, through a risk management program, what the shareholders can do for themselves at lower cost through portfolio diversification." Although corporate earnings retention may be deemed to be sub-optimal, optimization is achieved due to market failure.

Market Failure

The manner in which capital is made available is essentially in part due to market failure--imperfection in the capital markets. Given this market imperfection, low dividend payout firms are no more likely to have lower accounting rates of return than high dividend payout firms. Market failure, as alluded to herein, is attributable to uncertainty and the lack of a future market for equity capital, which is risk-bearing.

"Markets for many forms of risk-bearing and for most future transactions do not exist and their absence is surely suggestive of inefficiency" [Arrow 1970,67]. Thus, the availability of capital as made possible through corporate earnings retention is essentially an attempt on the part of corporations to deal with:

1. uncertainty as to the cost and availability of capital in the future; and
2. the non-existence of a future market for capital.

In normal circumstances, the inability of corporations to predict their future demands (for materials, labor, etc.) is not of great consequence. These demand items are supplied by the market and are utilized according to corporations' preferences at that time. It is,

therefore, the ability to pay for these demand items that has far reaching consequences. In this regard, the firm takes action in the present to ensure an efficient level of available funds for the procurement of future demands of materials, etc.

Firms are risk averters; therefore, they are willing to pay a premium to ensure the availability of funds, and thus reduce the variance in their profits. Firms like and derive a positive utility from the fact that funds are kept available. From the discussion in the preceding paragraphs, can it be conjectured that the amount that these corporations are willing to pay to retain the availability of these funds is well in excess of the expected value to them? To answer that question the position of the corporation can be considered similar to that of the individual in the following situation:

> When one takes out an insurance policy, one sacrifices current assets in exchange for a contingent claim to be paid, if at all, in the future. An insurance policy represents a trade in a contingent claims market, that is restricted in two ways. (1) In an open contingent claims market, future as well as present payments can be used to purchase contingent claims. This restriction will not be of consequence if there are perfect capital markets and if borrowing and lending rates are identical. (2) In an unrestricted contingent claims market, one can exchange a contingent claim for a contingent claim.
>
> The transfer of resources from present to future, what is commonly called savings, is both an intertemporal shift and a shift from a period in which income is known to one in which income is an uncertain variable. The greater is uncertainty about future income, expected income constant, the more a risk-averse individual will wish to transfer to the future. [Zeckhauser 1970,98-105].

The management of the corporation has an aversion to risk; hence, in the absence of insurance for future capital needs, corporate hoarding of funds in the form of cash balances and securities portfolio is a definite attempt to shift from the future to the present -- funding at the present for future need. Evidently, corporate earnings retention is a practice of risk management.

CONCLUSION

Risk, invariably, is deemed to be the existence of uncertainty concerning future outcomes. Risk management is viewed as the management of a firm's operations, activities, and financing practices to produce a portfolio of risks which would result in an

average payoff. Mitigating risk involves real costs. The two most common forms of risk mitigation, which are insurance and hedges, do not address the underinvestment problem.

As established in this paper, corporate earnings retention by means of dividend policy (the hoarding of financial capital) provides a firm with an important means of risk mitigation. The cost associated with hoarding is no different from the cost associated with the purchase of insurance to mitigate a particular risk. The efficiency of such an approach (the hoarding of financial capital) has been empirically established since the expected penalties associated with low dividend payout were not found to exist. The reason lies in the fact that investors are perceptive enough to recognize those instances where the managers of firms are merely acting in their own best interest as opposed to providing for financial capital for the future financing of profitable investment projects. Therefore, in so doing, the underinvestment problem is minimized. Low dividend payouts are viewed as a risk management strategy by the investor-clienteles of these firms.

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