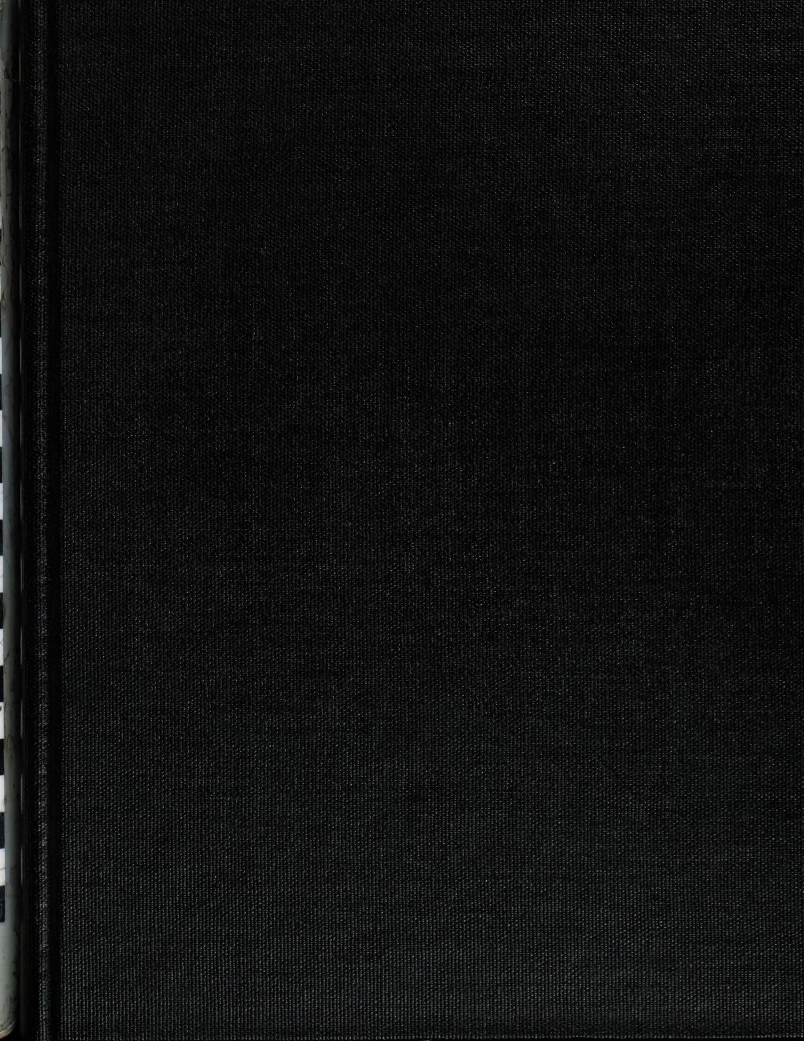




24640751



This is to certify that the

dissertation entitled

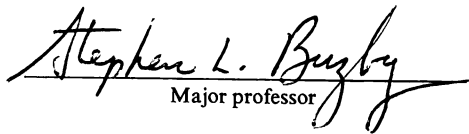
AN EMPIRICAL EXAMINATION OF THE ASSOCIATION
BETWEEN FIRM CHARACTERISTICS AND
THE ADOPTION OF LONG-TERM PERFORMANCE PLANS

presented by

Young-Ho Nam

has been accepted towards fulfillment
of the requirements for

Doctor of Philosophy degree in Accounting


Major professor

Date May 16, 1990

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.

DATE DUE	DATE DUE	DATE DUE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

MSU Is An Affirmative Action/Equal Opportunity Institution

**AN EMPIRICAL EXAMINATION OF THE ASSOCIATION
BETWEEN FIRM CHARACTERISTICS AND
THE ADOPTION OF LONG-TERM PERFORMANCE PLANS**

By

Young-Ho Nam

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Accounting

1990

6059909

ABSTRACT

AN EMPIRICAL EXAMINATION OF THE ASSOCIATION BETWEEN FIRM CHARACTERISTICS AND THE ADOPTION OF LONG-TERM PERFORMANCE PLANS

By

Young-Ho Nam

This study examined certain theoretically significant differences between firms which adopt a type of executive incentive program called a long-term performance plan (PP) and those which do not. For the first decade or so after the introduction of PPs their adoption spread quickly, though not uniformly, through industry. Since 1984 adoption has slowed, and further, some industry types have been very reluctant to adopt them at all. This implies that there are some firm characteristics which favor or inhibit PP's adoption.

Recently, practitioners have suggested that current theories concerning the adoption of Pps, which focus on owners' interests, may fail to properly consider the impact that managers have in the adopting process. This study examined the impact of both owners and managers interests prior to adoption, and derived five firm characteristics: Managers' ages and turnover which affect managers' decision horizons; Environmental uncertainty which alters risk-sharing scheme; Managers' own-firm stockholdings and growth

rates which are related to performance measurement.

Further, since it is quite likely that differences in the tax law affected incentive plan designs, these differences were controlled for.

Sample firms were taken from the Fortune 200 list over period 1978 to 1986. The t-test, Wilcoxon test, and a Logit analysis were done between the characteristics of adopters and non-adopters. It was found that in the univariate analyses all variables except the turnover variable were negatively related to PP's adoption. In the multivariate analyses, it was found that environmental uncertainty seemed to be a less important factor than other variables in the adoption decision, and the magnitude of the R value in the period of 1982-86 was larger than the period of 1978-81. These results indicate that (1) managerial influence plays a larger role in the adoption decision than suggested by previous research; and (2) the taxation difference may be a factor in the adoption decision.

diss

Mar

thre

ack

fat

ins

pro

fri

the

yea

whe

ACKNOWLEDGEMENTS

I would first like to thank the members of my dissertation committee, Professors Stephen L. Buzby, Ronald Marshall and Kirt Butler for their guidance and input throughout the dissertation process. I would also like to acknowledge a special debt to Professor Buzby for his fatherly encouragement, and to Professor Marshall for many insightful comments at the proposal stage.

Second, I would like to thank Robert Clark for his professional editing and Professor Sanjay Gupta for his friendly support and exchange of valuable ideas.

Finally, I am grateful to my mother and father for their continuous financial and moral support during my six-year Ph.D. program. Their advice has strengthened me whenever I was frustrated by living away from home.

TABLE OF CONTENTS

	Page
LIST OF TABLES	ix
LIST OF FIGURES	xi
Chapter	
I INTRODUCTION	1
II LONG-TERM PERFORMANCE PLANS	
1 Popularity of Performance Plans	9
2 General Features of Performance Plans	14
2.1 Budget-based Plans	14
2.2 An Example of Performance Share Plans ...	16
3 Performance Plan Adoption Practices	
3.1 Compensation Committees and Their Roles	18
3.2 Managers' Influence on Adoption Decision	18
III PREVIOUS RESEARCH	
1 Studies of Determinants of Executive Compensation	21
2 Studies Concerning Compensation Plan Adoption	23
3 Studies of Compensation Plans' Motivational Effects	
3.1 Performance Plans' Motivational Effects	25
3.2 Stockholdings and Their Incentive Effects	27
4 Implication for This Study	28

IV HYPOTHESES

1 Agency Framework

1.1 Agency Cost	32
1.2 Motivation Hypothesis and Managers' Interests	33

2 Time-horizon Dimension

2.1 Time-horizon Problem	34
2.2 Evaluation of Compensation Plans	34
2.3 Hypotheses	35
2.3.1 Executive Turnover	36
2.3.2 Ages of Managers	39

3 Risk-aversion Dimension

3.1 Risk-aversion Problem	43
3.2 Evaluation of Compensation Plans	45
3.3 Hypotheses	
3.3.1 Environmental Conditions	46

4 Performance Measurement Dimension

4.1 Performance Measurement Problem	50
4.2 Evaluation of Compensation Plans	51
4.3 Hypotheses	
4.3.1 Future Impact Consideration	53
4.3.2 Managers' Own-firm Stockholding	54

V DATA

1 Sample Firms

1.1 <u>Fortune</u> 200 Firms	59
1.2 Test Periods	
1.2.1 Control for Difference in Adoption Years	60
1.2.2 Test Firms	62

2	Measures of Firm Characteristics	
2.1	Data Collection Consideration	65
2.2	Time-horizon Variables	67
2.3	Risk-aversion Variable	69
2.4	Performance Measurement Variables	
2.4.1	Growth Rates	71
2.4.2	Own-firm Stockholdings	72
3	Descriptive Statistics of Sample Firms	
3.1	Distributional Properties of the Variables	73
3.2	Adoption Variable	
3.2.1	Differences in Adoption Rates	79
3.2.2	Statistical Analysis of Size Covariate	82
3.2.3	Control for Size and Industry Differences	84

VI RESULTS AND DISCUSSION

1	Dimensional Analyses	
1.1	Time-horizon Dimension	
1.1.1	Correlation Analyses	86
1.1.2	Turnover	89
1.1.3	Ages	92
1.1.4	Discussion	93
1.2	Risk-aversion Dimension	
1.2.1	General Results	96
1.2.2	Discussion of R & D Ratio	98
1.3	Performance Measurement Dimension	
1.3.1	Growth Rates and Stockholdings	100
1.3.2	Discussion	102
1.3.3	Deletion of Mergers and Acquisition Active Firms	104
1.4	Sensitivity Analyses	
1.4.1	Sensitivity of Period-division	108
1.4.2	Sensitivity of Measurement	112
1.4.3	Sensitivity of Firm Size	114
1.4.4	Different Types of PPs	115

VI

Ap

Ap

Ap

1.5	Summary of Major Findings	122
2	Multivariate Analyses	
2.1	Logit Regression Analyses	124
2.2	Analyses in Period I	
2.2.1	Dimensional Analyses	127
2.2.2	Combined Logit Models	130
2.3	Analyses in Period II	
2.3.1	Dimensional Analyses	134
2.3.2	Combined Logit Models	137
2.4	Summary of Major Findings	139
VII	Summary and Conclusions	141
Appendix A.	Stock Option Plans	145
Appendix B.	The 199 Available Sample Firms	147
Appendix C.	Summary Statistics of Variables	151

Ta

2.

2.

2.

2.

2.

4.

4.

5.

5.

5.

5.

5.

5.

6.

6.

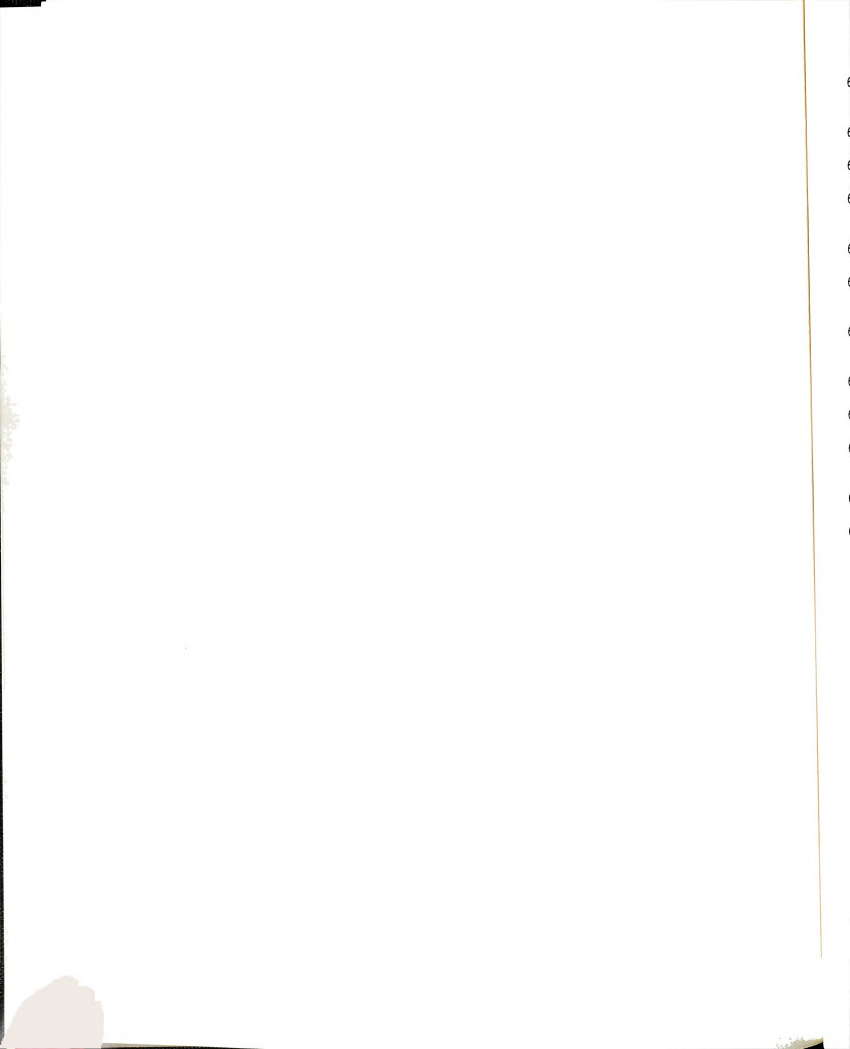
6.

6.

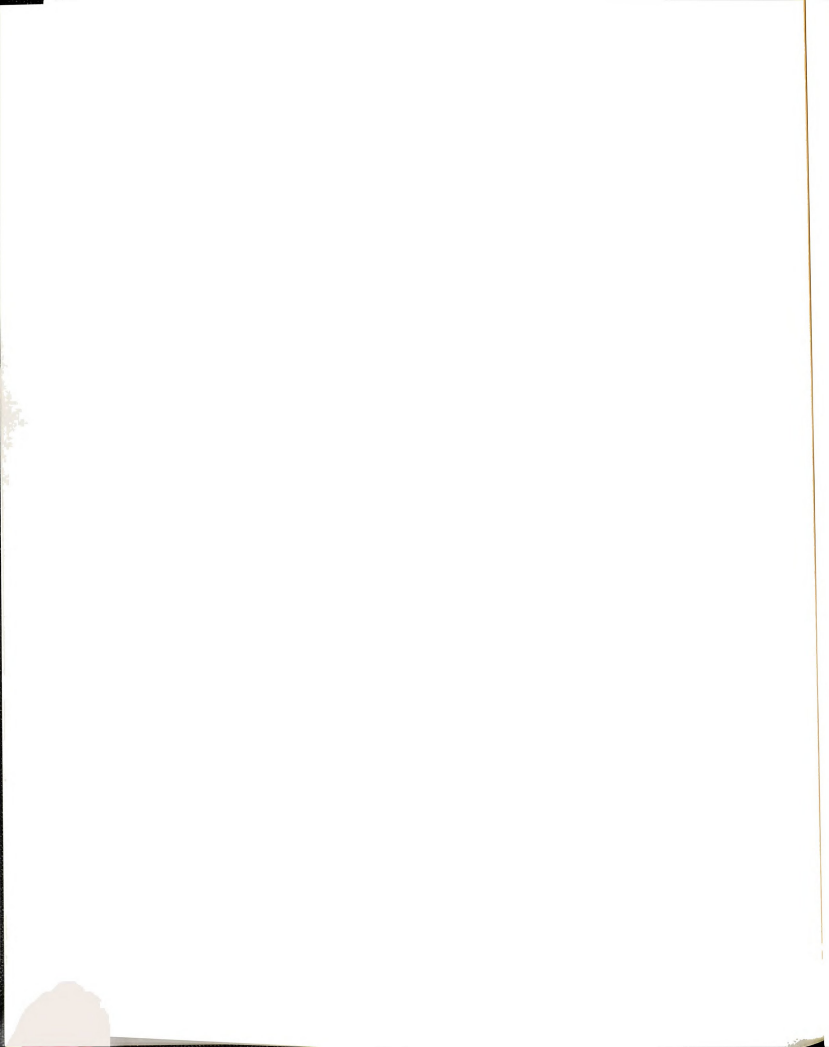
6.

LIST OF TABLES

Table	Page
2.1 Summary of Long-term Incentive Plans	10
2.2 Number of Firms Using Long-term Incentive Plans	11
2.3 Number of Long-term Incentive Plans during 1974-87	12
2.4 Business Types versus Number of Companies Using Incentives	13
2.5 An Example of Performance Share Plan	17
4.1 Number of Executive Resignations	40
4.2 Firm Characteristics and Their Association with Pps Adoption	58
5.1 Number of Firms Adopting or Dropping Performance Plans	64
5.2 Description of Independent Variables (1)	52
5.3 Summary Statistics of Variables for Periods I and II	77
5.4 Number of Adoptions by Sales Rank Groups and Periods	80
5.5 Number of Adoptions by Industry Groups and Periods	81
5.6 Univariate Tests of Size Difference	83
6.1 Correlation Coefficients for Periods I and II	87
6.2 Univariate Tests in Time-horizon Dimension ...	90
6.3 Univariate Tests of Age Variables without CEO-change Firms	95
6.4 Univariate Tests in Risk-aversion Dimension ..	97
6.5 Number of Firms with Missing R & D Data	99



6.6	Univariate Tests for the Performance Measurement Dimension	101
6.7	Number of M & A Active Firms	106
6.8	Univariate Tests without M & A Active Firms ..	107
6.9	Comparisons under Different Measurement and Period-division	110
6.10	Description of Independent Variables (2)	113
6.11	Univariate Tests after Deleting Firms of Extreme Size	116
6.12	Univariate Tests of Each Type of Performance Plan	119
6.13	Dimensional Logit Analyses in Period I	128
6.14	Multivariate Logit Models in Period I	132
6.15	Correlation Coefficients among Selected Variables	133
6.16	Dimensional Logit Analyses in Period II	135
6.17	Multivariate Logit Models in Period II	138



LIST OF FIGURES

Figure	Page
5.1 Revision of Tax Act and Sample Periods	63

I INTRODUCTION

This study proposes to examine which factors influence the adoption of a type of executive incentive program called a long-term performance plan. Long-term performance plans ('PPs') are three-to-six year programs which reward top managers to the extent that their companies achieve certain performance goals determined by accounting numbers (usually earnings per share). PPs differ from bonus plans by their extended time frame. This extended time frame is thought to enhance managers' long-range planning. PPs differ from stock option plans in that they provide cash incentives that are not affected by the vagaries of the stock market.

Research into PPs (Larcker, 1983; Tehranian, Travlos and Waageleijn, 1987a, 1987b) has studied the post-adoption effects of PPs on managers' behavior and on the stock market. These studies typically "postulate that the observed contracts are efficient and investigate the stock market and managerial response to these contracts" (Raviv, 1985, p. 240). However, without theoretical analysis and empirical evidence about the reasons for adoption and the way PPs influence managerial decisions, it is difficult to construct definitive predictions about the effects of PPs (Johnson, 1987, p. 81). By empirically investigating the characteristics which firms have before the adoption of PPs, rather than solely studying the post adoptive effects, as

has been the previous practice, this study hopes to make the behavior of managers more predictable with respect to the incentives provided by PPs under various firm-specific environments.

Three problems in the literature have suggested this investigation of firm characteristics. First, no study has sought to empirically investigate the reasons why PPs are, or are not, adopted in the first place. Second, no well-supported explanation has been presented as to why the adoption of PPs has been so uneven over various industry types. Adoption in the industrial and farm equipment industry is, for instance, practically universal, while in the computer industry it is very rare (see Table 5.2). Finally, all prior research about incentive plans has looked at the plans from only the owners' perspective and postulated that owners adopt incentive plans to maximize their wealth (this is called the motivation hypothesis). However, there have been several articles by practitioners that suggest that managerial influence plays a larger role in adoption decision-making than previous research has suggested. Thus, it might be of value to reexamine the motivation hypothesis from both the owners' and managers' standpoints.

In agency theory managers are assumed to have perspectives which often differ from those of the shareholders' in three ways. First, they are likely to have

a shorter-term view concerning investment projects (this is called the "time-horizon difference"). Second, they are likely to be more conservative in regards to risk (this is called the "risk attitude difference"). Third, a divergence in the managers' and owners' interests may result from the inability to precisely measure managers' performance. Thus, changes in the firm's value may not be consistent with the evaluation of the managers' performance (this is called the "performance measurement difference"). These three differences, time-horizon, risk-aversion, and performance-measurement, offer a three-dimensional framework for analyzing incentive contracts.

In the time-horizon dimension, executive turnover and age could be factors which influence PPs adoption. From the owner's perspective, since PPs ought to be adopted by firms whose ownership is seeking to reduce high turnover, we would expect to see such firms adopting PPs. However, managers who are leaving a firm or retiring in the near future do not expect to get as much benefit from them as from short-term plans. Concerned managements might work against adoption. If so, firms with high turnover or older managers would be less likely to adopt PPs.

Two arguments similar to managers' turnover can be given regarding the association between managers' ages and PPs adoption. First, owners of a firm with older managers should want to adopt PPs for their longer-range disciplining

power, since older managers might be less disciplined by the labor market (the "ex post settling-up process") than younger managers (Lewellen, Loderer and Martin, 1987).

Second, from the managers' perspective, if they are expecting to leave their firms before the PPs award period, they may discourage the adoption of PPs since PPs are likely to be less beneficial to them than any of the short-term plans. Older managers who will retire soon would dislike the adoption. Thus, if managers significantly influence the adoption procedure, age may be negatively related to the adoption. Since nothing a priori eliminates either of these arguments, only an empirical inquiry can determine which is correct.

In the risk-aversion dimension, the adoption of PPs, in principle, brings benefits to both owners and managers. The adoption reduces the moral hazard problem since forecasted goals and actual long-term results (regarded as signals from the PP monitoring system) reflect managers' long-term performance beyond that conveyed by annual incomes (and thus are more informative). However, if the environmental uncertainty faced by management is high, the information concerning managers' efforts is garbled by noise generated from unpredictable events. Thus the ability of a PP to reduce the moral hazard problem is weakened. Moreover, in an uncertain environment managers may face a higher risk in setting inflexible long-term goals and the goal setting can

become expensive. In all, the net benefit of additional informativeness can be partially or totally offset by the additional compensation required by higher forecasting risks and the high cost of setting appropriate goals. Thus, as the uncertainty of the environment increases the likelihood of using PPs as a part of the compensation package decreases.

In the performance measurement dimension, growth rates of firms should be related to the likelihood of PPs adoption. Managers of rapidly-growing firms are more likely to be involved in new projects whose results do not produce immediate increases in net income or other accounting (profitability) measures. In this case, the managers' performances cannot be evaluated correctly by accounting measures. Thus, firms with potentially high future growth rates are less likely to adopt PPs. On the other hand, if a firm's growth rate is low, a large portion of investment goes toward replacement investment. Hence, there is a close similarity between accounting-based compensation and the managers' real performance. Thus, slowly growing firms may prefer accounting-based incentive plans such as PPs. Growth rates, then, may be negatively related to the adoption of PPs.

Another aspect in the performance measurement dimension is the managers' own-firm stock ownership. If managers hold large amounts of their firm's stock it can be assumed that

they expect their firm to yield higher returns than other elements of their portfolios. This in turn is likely to be a result of the private information generated by their intimate knowledge of their firm's activities. Such managers may want SOPs in order to acquire more of their own-firm stock. In this case, PPs adoption would be negatively related to managers' own-firm stockholdings. In addition, this variable is related to the risk-aversion dimension. Theoretically, own-firm stockholdings could either reduce managers' risk-avoiding behavior or reinforce it. However, existing empirical research (e.g., Agrawal and Mandelker, 1987) indicates that own-firm stockholdings and stock-related plans are positively related to the undertaking of variance-increasing investments. Thus the owners may want, or at least they might not dislike, their managers having SOPs.

Sample firms were taken from the annual reports concerning management compensation issued by Frederic W. Cook & Co. Inc., over the period 1972 to 1987. During this 16-year period, two time periods (1978-81 and 1982-86) were used as test periods in order to control for the presence or absence of stock option tax benefits and to compensate for gross changes in the economic climate. For each period, univariate comparison tests between firm characteristics of the adoption and non-adoption firms were done. Statistical methods used in the univariate tests were the t-test and

non-parametric Wilcoxon test. To examine the sensitivity of the results, comparison tests were repeated using different measurement methods, different period-divisions and different sample firms. In addition, the homogeneity of the different types of PPs were examined by separating unit-plan adopters and share-plan adopters, and comparing them with non-adopters. In addition to the univariate tests, the multivariate logit model was used in regressing the adoption decision variable on the firm characteristic variables after controlling for size difference. The logit regression was used because the adoption decision variable takes a binary form.

This study is divided into seven chapters. Chapter 2 describes the characteristics of performance plans. Chapter 3 discusses the previous research on incentive systems and their implications for this study. Chapter 4 discusses the nature of agency problems in three dimensions; i.e., the time-horizon, risk-aversion, and performance measurement dimensions. In each dimension, firm characteristics are hypothesized in relation to PPs adoption. Chapter 5 discusses the procedure for selecting sample firms and collecting data on the firm characteristics. Chapter 5 also suggests appropriate statistical tests and discusses the ways to control for size and industry differences. Chapter 6 reports and discusses univariate results of the original research design and the results of several sensitivity

analyses. Next, chapter 6 develops the multivariate logit model and reports the results obtained by applying the multivariate logit regression. In the multivariate analysis section, results after control for firm size are discussed. Chapter 7 summarizes the findings and lists the study's limitations and contributions.

Finally, Appendix A explains the general features of stock option plans and Appendix B lists the available sample firms and their adoption information.

II LONG-TERM PERFORMANCE PLANS

Annual bonus plans (BPs) and stock-related long-term plans [e.g., stock option plans (SOPs)] have been widely used by large companies for several decades. In 1971 long-term performance plans (PPs), which differ from the other long-term plans in terms of how performance is measured, were introduced in some large corporations and have since gained in popularity. Tables 2.1 and 2.2 show definitions of various long-term incentive plans and the number of companies that added, dropped and used them in 1985. About 90 percent of the largest 200 U.S. industrial companies had stock options or stock appreciation rights plans, while 58.5% of them had PPs. (The characteristics of SOPs are explained in Appendix A.)

1 Popularity of Performance Plans

Table 2.3 shows the growth in popularity of PPs among the largest 200 U.S. manufacturing firms. While the percentage of firms using SOPs reached 92% in 1975, only 29 firms had PPs by then. Until 1984 the percentage of firms having PPs grew tremendously but this growth has since slowed.¹ However, this popularity is not universal across all industry types, as shown by Table 2.4. The plans are not common outside of manufacturing and diversified services. As of May, 1986 approximately half of the firms

Table 2.1
Summary of Long-term Incentive Plans

Market-Based

Investment Type

Stock Options: Rights to purchase shares of a company's stock at a specified price over a stated period, usually ten years; typically, price is 100% of market value at time of grant, but can be less.

Stock Purchases: Short-term rights to purchase(1) company stock, which may be sold below market value subject to restrictions, or(2) securities convertible into company stock.

Non-Investment Type

Appreciation Rights: Rights to receive the gain in market price since grant of a company stock option; generally known as "SARs".

Restricted Stock: Grant of actual stock or stock units subject to restrictions on transfer and subject to risk of forfeiture until earned by continued employment; typically carry full voting rights and pay dividends or dividend equivalents.

Performance-Based

Performance Units: Grants of units whose payment or value is contingent on performance as measured against predetermined objectives over a specified period of time.

Performance Shares: Grants of actual stock or stock units whose payment is contingent on performance as measured against predetermined objectives over a specified period of time.

Source: Frederic W. Cook & Co. Inc. (1987, p. 24)

Table 2.2
Number of Firms Using Long-term Incentive Plans¹

Types	Number of Firms			1985
	1984	Addition	Drop	
Stock option plan	185	1	0	186
Stock purchase plan	15	3	1	17
SAR	153	5	0	158
Restricted stock	60	12	1	71
Performance units	88	6	3	91 ²
Performance shares	43	2	3	42
Others ³	14	0	0	14

Source: Frederic W. Cook & Co., Inc. (1985, Exhibit 1)

¹ Numbers of firms were counted out of the 200 largest U.S. industrial companies. The top 200 companies were collected by Frederic W. Cook & Co., Inc. from Fortune in April 1985.

² Sixteen companies have both performance unit plans and share plans. Thus the number of firms which have performance plans is 117 (58.5%).

³ 'Others' category includes purchase/appreciation grants, full value grants and dividend units.

Table 2.3
Number of Long-term Incentive Plans during 1974-87¹

Year	Stock Option	Performance Plans		
		Unit	Share	Both Plans ²
1974	183	9	8	0
1975	183	17	12	0
1976	183	24	13	0
1977	180	30	15	0
1978	180	36	16	1
1979	178	42	23	2
1980	177	53	25	4
1981	183	62	28	6
1982	194	75	33	8
1983	195	76	36	11
1984	194	83	40	14
1985	195	91	42	16
1986	197	87	54	24
1987	197	89	59	25

Source: Frederic W. Cook & Co., Inc. (1974-1987)

¹ Numbers of firms were counted among the largest 200 manufacturing companies. The 200 companies were collected based on Fortune annual revenue rankings for 1974-1987.

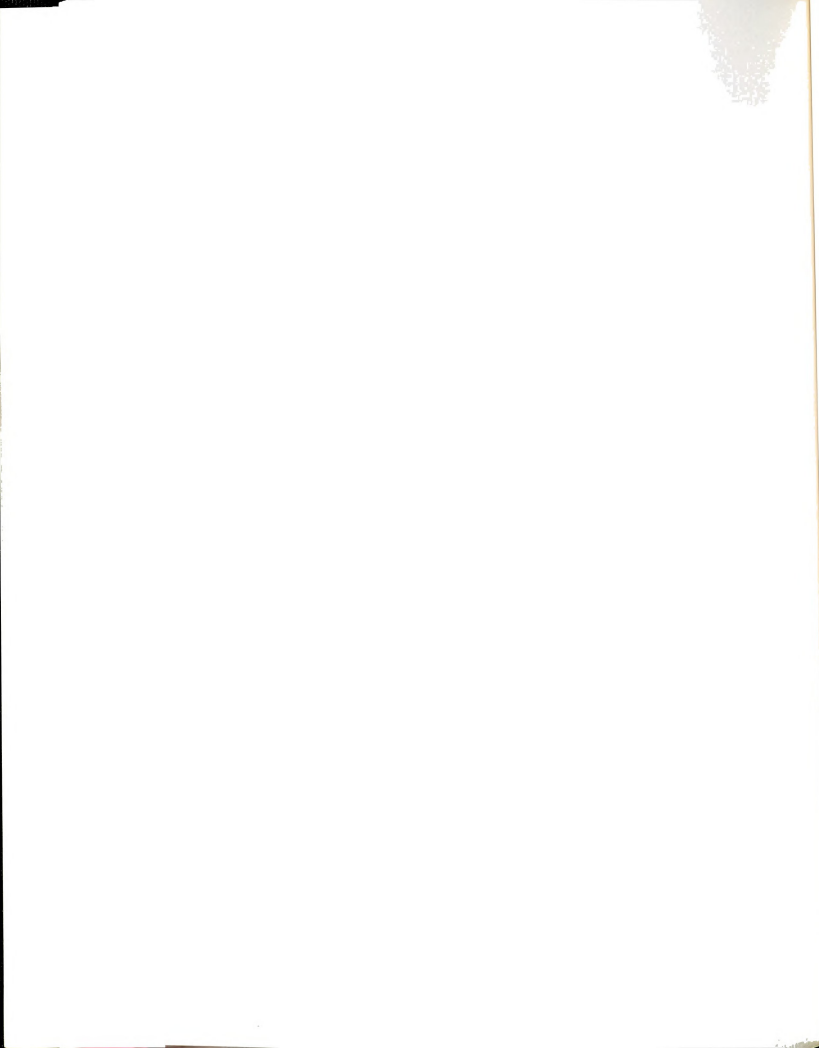
² The numbers for "Both Plans" are already counted in "Unit" and "Share" columns. Thus, the number of firms with PPs is calculated by "Unit" plus "Share" minus "Both Plans".

Table 2.4
Business Types versus Number of Firms Using Incentives¹

Business Types	Total Firms	May, 1986			May, 1982
		BP	SOP	PP	PP
Diversified service	23	91%	100%	52%	No data
Manufacturing	404	91	82	38	32 %
Retail Trade	52	86	73	19	16
Commercial banking	153	82	61	18	15
Construction	51	84	56	8	5
Insurance	114	68	45	19	17
Utilities	86	48	24	19	3

Source: Top Executive Compensation, (1987 Edition, The Conference Board)

¹ BP, SOP and PP are abbreviations for bonus plan, stock option plan and performance plan, respectively.



in diversified service businesses used PPs; however, only four out of 51 construction companies used such plans. BPs and SOPs are very popular in manufacturing, diversified service and retail trade, but insurance and utility companies have a lower percentage of both. This pattern is not paralleled by PPs, however, which the latter two industries use almost as much as retailers and bankers. In addition, PPs are becoming more prevalent in the utility industry (19 currently in contrast to 3 in 1982). The unequal distribution of PPs across industries, and the recent increase in adoption of the plans among less-incentive-pay oriented industries imply that there may be industry-specific factors which affect the adoption of the plans.

2. General Features of Performance Plans

2.1 Budget-based Plans

PPs are budget-based incentive plans by which managers are rewarded for the extent to which their firm achieves pre-set performance goals. These goals are usually linked to company-wide accounting measures such as earning per share (EPS) or return on equity (ROE). The most common measure is a cumulative growth rate of EPS over a period of four to six years (Crystal, 1984).² Based on a budget formula which is set at the beginning of an award period, a manager's actual level of performance is evaluated and

rewarded. This formula usually has a lower and upper bound (the goal) and takes the form of a piecewise linear function. Managers generally receive (or "earn out") no additional award after the actual level exceeds the goal but they earn out a fraction of the maximum award if the actual level is higher than lower bound. There are two types of PPs, performance unit plans and performance share plans. Both types of plans are similar in all respects except for the kind of award allocated to managers.

Performance Unit Plan: Before an award period begins, managers in the unit plan are allocated the maximum numbers of units which they can earn out. The value per unit is a predetermined, fixed amount and, in general, the higher their positions, the more units they are allocated. At the end of the period, the number of units earned out is decided by comparing the achieved level with the goal. The award amounts from the unit plan are determined by the number of units earned times the fixed value of a unit.

Performance Share Plan: The share plan differs from the unit plan in that, instead of being allocated units, the manager is allocated shares of the company's stock. The award amount of the manager's compensation is then determined by the number of shares earned out and the market value of the shares at the end of the award period. Therefore, unlike the unit plan, the compensation of a performance share plan is affected by changes in stock

prices during the award period (Smith and Watts, 1982).

2.2 An Example of Performance Share Plan

As displayed in Table 2.5, a fictitious firm, ABC Co. adopts a performance share plan which is effective from the 1979 fiscal year. The award period terminates at the end of the 1982 fiscal year. The award amounts will be paid in the form of cash(20%) and stock(80%). The firm employs the cumulative EPS growth rate as a performance measure and the EPS of the 1978 base-period is \$1.

Suppose a manager who is eligible for this share plan has been allotted 200 performance shares, and the price of a performance share is to be the average market value of the company's stock in the final award year. If EPSs in the period from 1979 to 1982 were \$1.10, \$1.21, \$1.33 and \$1.46, for the respective award years, the annual EPS growth rate under the compounded cumulative method would be 10 percent per year.³ According to the plan formula he/she would have earned out 100 shares, which is 50% of the maximum awarded shares ($200 \times 50\%$). If at the end of award period in 1982 the stock price was \$75, then he/she would be entitled to a total market value of \$7,500. Since the form of payment was set as 20% in cash and 80% in stock, the total earned-out amount, \$7,500, will be paid in cash of \$1,500 and 80 shares of common stock.

Table 2.5
An Example of Performance Share Plan

 ABC company
 Adoption year: 1978 fiscal year
 Type of plan: performance share
 Award period: 4 years (1979-82)
 Performance Measure: Cumulative EPS growth
 Form of payment: 20% in cash and 80 % in
 common stock

Budget formula:

Cumulative EPS Growth (X)	Percentage of Shares Earned Out
X > .14	100%
.14 > X > .11	70%
.11 > X > .08	50%
.08 > X	0%

3 Performance Plans Adoption Practices

3.1 Compensation Committees and Their Roles

Almost all publicly owned companies have formed compensation committees whose function is to design and administer executive compensation programs. Typically, the committee is comprised of three to five outside directors none of whom are eligible to participate in any of the company's regular compensation plans (Crystal, 1984, p. 186).

The plans, initially, are proposed by the directors who are in charge of the compensation and benefit programs. After being given the approval of the board of directors, the plan proposal is submitted to an annual meeting where stockholders vote on the adoption.⁴ If the proposal is ratified, the compensation committee establishes a performance target and determines the number of eligible managers and appropriate award amounts. During this process data, such as competitors' compensation packages and/or the company's long-range forecasts, are provided by the CEO or other managers to the board of directors and/or the compensation committee.⁵

3.2 Managers' Influence on Adoption Decision

The above discussion might give the impression that there is a built-in mechanism of checks and balances, at least in the adoption process. Some practitioners, however, contend otherwise. In view of the fact that compensation committee

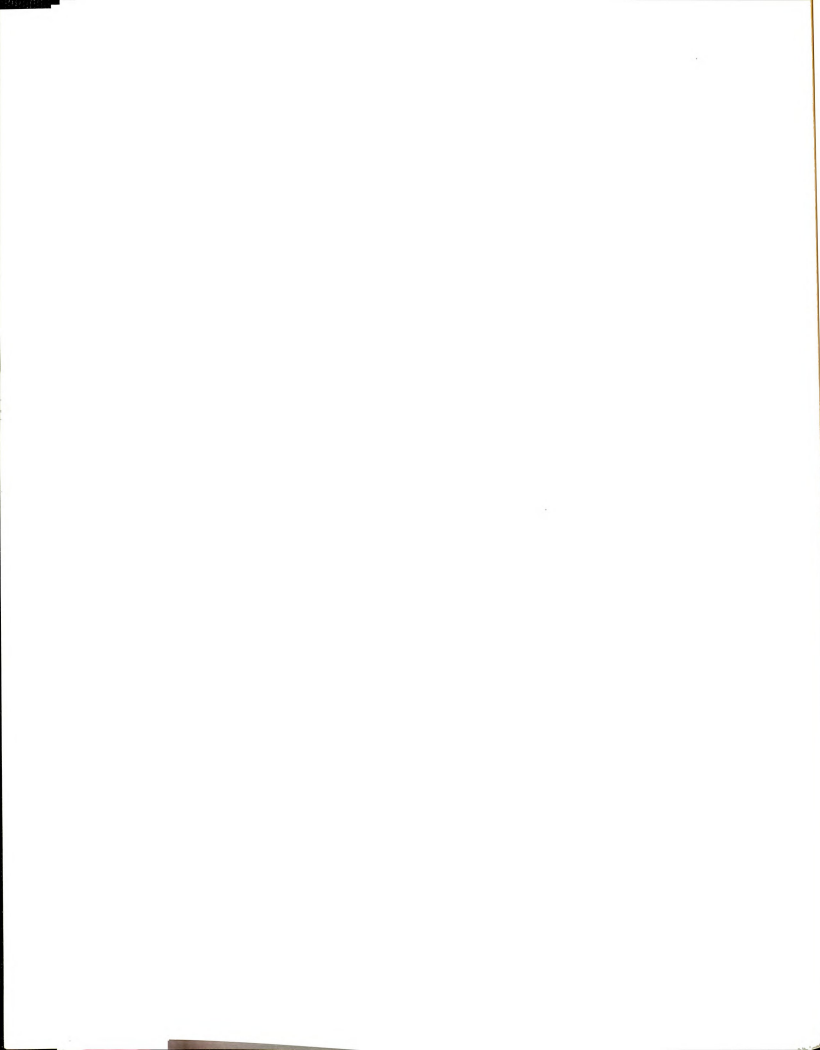
members are annually appointed by CEOs, Patton (1983) raises doubts about the committee's independent function:⁶

Executive self-interest no doubt influenced many of those who today have a major voice in top management compensation decisions: company directors, chief executives, and consultants . . . over the years, directors' responsibility for compensation of officers has been increasingly delegated to a committee of board members. Compensation committee members are usually chosen by the CEO. Needless to say, such appointees are on friendly terms with the CEO. Not infrequently, each is on the other's board of directors. (p. 24)

In addition, since most outside directors come from different industries, their understanding of the company's economic future may be limited. The committee members have little day-to-day knowledge of individual jobs so they rely heavily on the information and opinions passed to them by the CEO. So, in reality, "top management itself usually devises the executive compensation plan--hiring the consultants whose scheme is then ratified by the board of directors and shareholders" (Louis, 1984, p. 65). Typically, the objectivity of goal-setting has been criticized because managers' interests are often involved. Rich and Larson (1984), which pursued the reason why some long-term incentives fail, reported,

In fact, nearly 20 percent of the survey respondents had no idea how targets were established. Typical comments were: 'Our EPS target is set by the CEO and is based on his philosophy . . . there is no formula or rationale; We use a seat-of-the-pants approach to target setting'. (p. 32)

The fact that managers may influence the goal-setting process and the actual selection of plans for their own



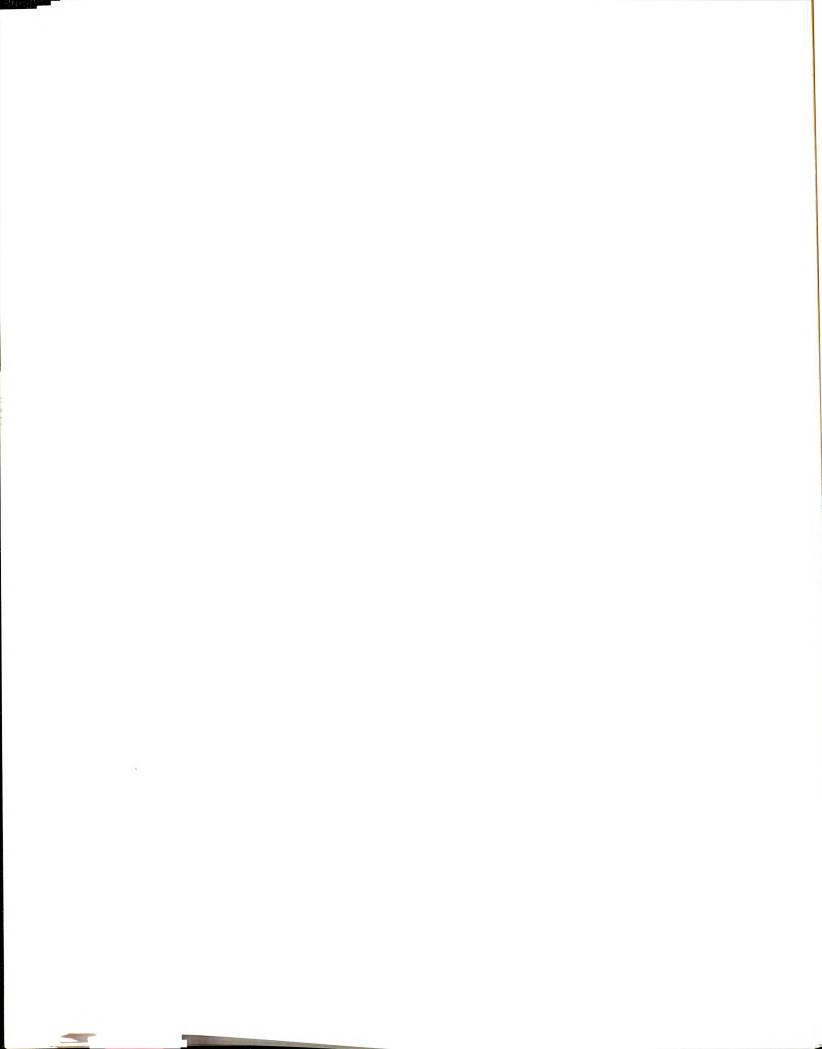
compensation packages manifests the need to examine managers' interests in having PPs in their packages.

III PREVIOUS RESEARCH

1 Studies of Determinants of Executive Compensation

Lewellen, Loderer and Martin (1987): Lewellen et al. were the first to study the composition of executive compensation packages rather than total compensation alone.⁷ They examined various firm characteristics which were thought to determine the proportion of the salary-plus-bonus and the stock-related plans to total compensation. They hypothesized that a major motivation for the creation of these plans is to solve various aspects of owner-manager conflicts. Thus the larger the divergences between the owners' and managers' interests, the larger proportion of stock-related plans the firm would use. A firm's long-term investment opportunities, the manager's age and own-firm stockholding were seen to be factors related to the horizon dimension. The debt/equity ratio, variance of firm value, dividend-payout ratio, and market BETA were used as firm characteristics for the risk exposure dimension. Their findings were generally consistent with their hypotheses that the mix of executive compensation components chosen by firms were related to these characteristics in the direction of solving owner-manager conflicts.

Discussion on Lewellen et al. (1987): Their study does not provide conclusive findings as to whether compensation plans were established to reduce agency cost. The first



difficulty arises from their combining salary and bonus. The incentive effects of salary and BPs are generally taken to be different. For instance, they may differ as to whether they resolve the risk exposure problem. For the short-run, BPs are alleged to provide work incentives to managers which, in principle, salaries do not (Kaplan, Ch. 16). Therefore, a measure which combines salary and bonus would not be conceptually proper to test for agency problems. The second difficulty arises because their data reflect only periods after the plans had been implemented. Any study that seeks to investigate a reduction in agency cost should compare firm characteristics before and after the composition of the package is altered. For example, Lewellen et al. insist that the significant and positive relationship between stock return variance and the proportion of stock-based plans "support the propositions that stock-based pay is emphasized in order to prevent excessively conservative investment policies". However, without controlling for the stock return variance before adopting (or increasing) a stock-based pay scheme, it is impossible to distinguish whether the high percentage of stock-based pay induces high stock return variance or vice versa.

2 Studies Concerning Compensation Plan Adoption

Larcker (1983) and Related Studies: Larcker investigated the association between the adoption of long-term PPs and changes in managers' decision behavior. Twenty-five firms which adopted PPs from 1971 to 1978 were matched with non-adopting firms based on fiscal year-end, the 2-digit SIC code and sales. He found a significant positive association between adoption and growth in capital expenditures (used as a proxy for managers' behavior changes).

Sopariwala (1985), in his dissertation, failed to confirm Larcker's findings when he reexamined the above association using the same research design but a different sample. His experimental group consisted of 47 firms that adopted PPs during the period of 1978-82. The matching criteria were very similar to Larcker's. The results of his research showed no significant difference in the growth of capital expenditures between the two groups. He also used expenditures on R & D as another proxy for managers' behavior but, here again, no significant difference was found.

Whereas Sopariwala failed to confirm manager behavior change after PPs adoption, Waegele (1988) showed significant relative increases in capital expenditures after the adoption of BPs. In his study, 64 firms adopting BPs for the years 1970-80 were matched using criteria very similar to Larcker's, with firms which had already adopted

Aug 28, 1944

them.⁸ He concluded that "it appears that short-term bonus plans . . . may better align the interests of managers and stockholders" (p. 61).

Discussion of Behavior Change Studies: Empirical results of Sopariwala and Waegelein are inconsistent with the general notion that PPs are successful in increasing managers' decision horizon while BPs are not (Smith and Watts, 1982). The inconsistency of these studies might result from a common set of problems shared by the studies. First, using the matched-pair analysis without controlling for pre-adoption characteristics may cause a self-selection problem. That is, there may be a systematic difference between the experimental and control groups other than differences caused by the adoption of a bonus plan (Waegelein, p. 47). For example, suppose a fast growing firm was likely to adopt BPs and Waegelein's sample had many fast growing firms, then the increase in capital expenditures after BPs adoption results from the nature of the firms and not from the adoption.⁹

Second, a construct validity problem arises from the choice of the surrogates which were used to represent changes in managers' behavior. Neither capital expenditures nor expenditures on R & D can be applied to all types of firms. They cannot completely describe all of the important aspects of managers behavior changes. For example, a firm which specializes in marketing would be more likely to



increase investment in training or reorganizing marketing channels than to increase capital expenditures.

Finally, the changes in the tax status of SOPs may have influenced the PP adoptions studied. Clearly, during the period when SOP's were given tax advantages they were likely to be relatively more attractive than PPs. Larcker's sample firms adopted PPs from 1971 to 1978 during the time when SOPs possessed tax benefits whereas Sopariwala's sample period (1978-82) coincides with the no-benefit period.¹⁰ It can be conjectured that the difference in sample periods in the two studies might create the differing results.

3. Studies of Compensation Plans' Motivational Effects

3.1 Performance Plans' Motivational Effects

Tehranian, Travlos and Waegelein (1987a) studied the motivational effect of PPs' in merger and acquisition activities on the acquiring firm's stock price change at the announcement of acquisition proposals. The basis for their hypothesis is that PPs "motivate managers to make decisions that are consistent with the stockholders' interests" (p. 52). Their results indicated that firms with PPs had a favorable abnormal stock return at the announcement of acquisition proposals but firms without such plans experienced a significant unfavorable reaction. The same authors (1987b) also examined the association between PPs and the wealth effect to shareholders of divesting firms at

the announcement of sell-off proposals. The results provided similar evidence that firms with PPs experienced a significant favorable stock market reaction at the announcement of sell-off proposals but firms without PPs had a negative stock market reaction.

Discussion of Tehranian et al. (1987a, 1987b)

Both studies appear to fail to answer their main question as to whether PPs reduce the discrepancy in decision horizons of managers and owners (i.e., the absence of PPs indicates unresolved horizon conflicts). First, the changes in accounting profits after the acquisition year did not confirm their expectation. Table 8, Panel B (Tehranian et al, 1987a, p. 71) shows that firms without PPs exhibit increased EPS's for the consecutive five years following the acquisition relative to the pre-acquisition average, but firms with PPs show a pattern of decreasing EPS's after acquisition. Thus, these empirical results seem to contradict the authors' assertion that "managers whose compensation is based mainly on short-term profits may be motivated to make acquisitions that increase the firm's short-term profit" (1987a, p. 51).¹¹

Second, their stock market result was interpreted as evidence that "adoption of a long-term performance plan lengthens a manager's decision-making horizon" (p. 54). However, it is difficult to preclude other interpretations without pinpointing exactly why PPs are in managerial

compensation contracts. It could be claimed that the adoption of PPs may be entirely unrelated to horizon conflicts. Suppose, for example, PPs are simply being adopted by stable firms. Then the acquisition, which is by nature a risky decision, would tend to be more welcomed by firms with PPs because the firm's stability reduces the risk involved in the acquisition. Thus, favorable market reactions could be due to investors' differing perception as to the stability of the two types of firms.¹²

3.2 Stockholdings and their Incentive Effects

Lewellen, Loderer and Rosenfeld (1985) hypothesized that managers having large own-firm stockholdings and stock-related compensation are less likely to engage in acquisitions that reduce shareholder wealth. They compared managers' stockholding of acquiring firms experiencing positive abnormal returns with stockholding of firms experiencing negative abnormal returns. However, their results are weak, failing to confirm the hypothesis. Agrawal and Mandelker (1987) also investigated the effects of stock-related compensation on reducing agency costs. They examined the relationship between managers' own-firm stock and option holdings, and the variance of firm returns and the debt-equity ratio after mergers and acquisitions. Their hypothesis is that manager holdings of common stock and options in the firm have a role in reducing managerial incentive problems. Specifically, large stock and option



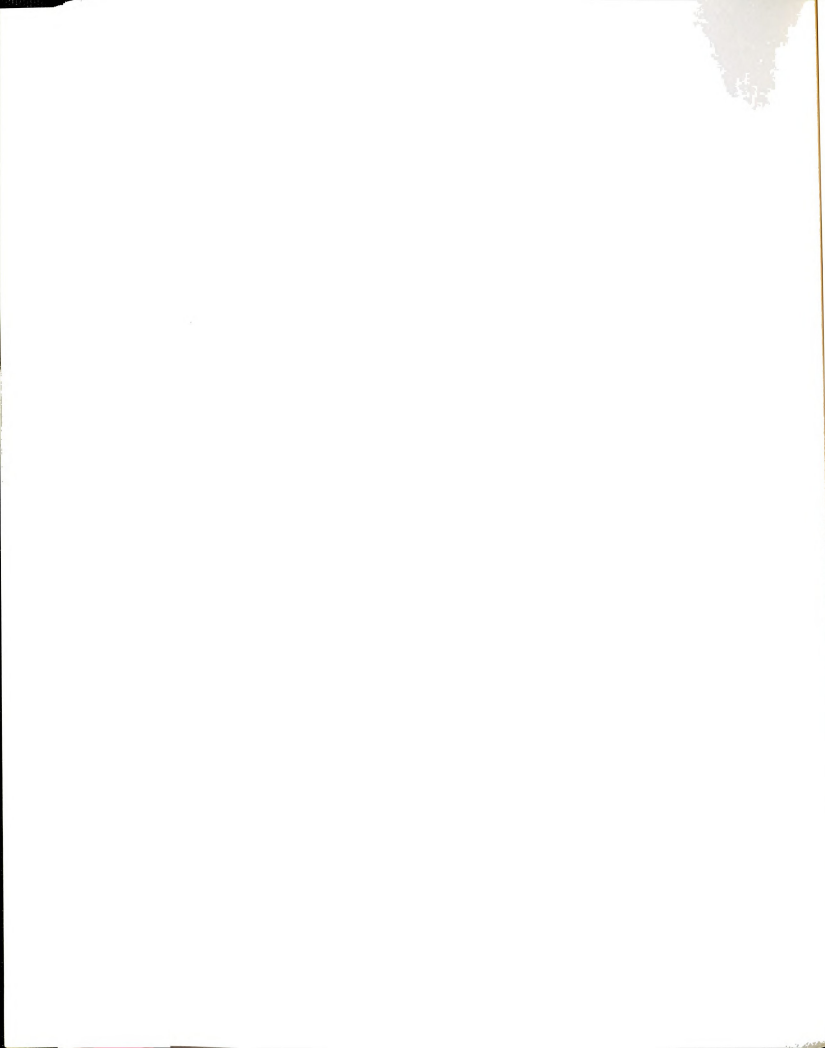
holdings by managers induce them to select (1) corporate investments that increase the variance, and (2) financing decisions that increase the debt-equity ratio. Their findings are consistent with their hypotheses but, as they mentioned, the results can be interpreted differently: "The evidence does not rule out other hypotheses . . . such as signalling or sorting" (p. 836).

4 Implications for This Study

Demand for Pre-adoption Study: The main theme of the studies reviewed in this chapter seems to provide empirical evidence on the motivation hypothesis that "the plans do indeed encourage the managers to maximize the value of the firm" (Smith and Watts, p. 140). However, it is still difficult to assert whether PPs reduce the discrepancy in the decision horizon and risk-aversion dimensions. This is mainly because the matched-pair design, which all studies except Lewellen et al. (1987) have employed, have a self-selection problem. Larcker mentioned this:

The self-selection problem confronts all empirical studies of this type and makes it extremely difficult to conclude that the empirical results are due to incentive . . . effects rather than some (unspecified) confounding variable [underline added].(p. 28)

By examining the economic reasons for the adoption of PPs instead of their effects, it is hoped that this study may shed new light on some possible confounding variables. In fact, Raviv (1985) and Johnson (1987), in their reviews of



incentive plan studies, asserted the need for investigating such variables related to adoption:

Why, and under which firm- or industry-specific characteristics, the various contracts will be employed . . . has not been answered. In fact, the conference papers do not attempt to explain the characteristics of the executive compensation contracts. Instead, the authors postulate that the observed contracts are efficient and investigate the stock market and managerial response to these contracts. (Raviv, p. 240)

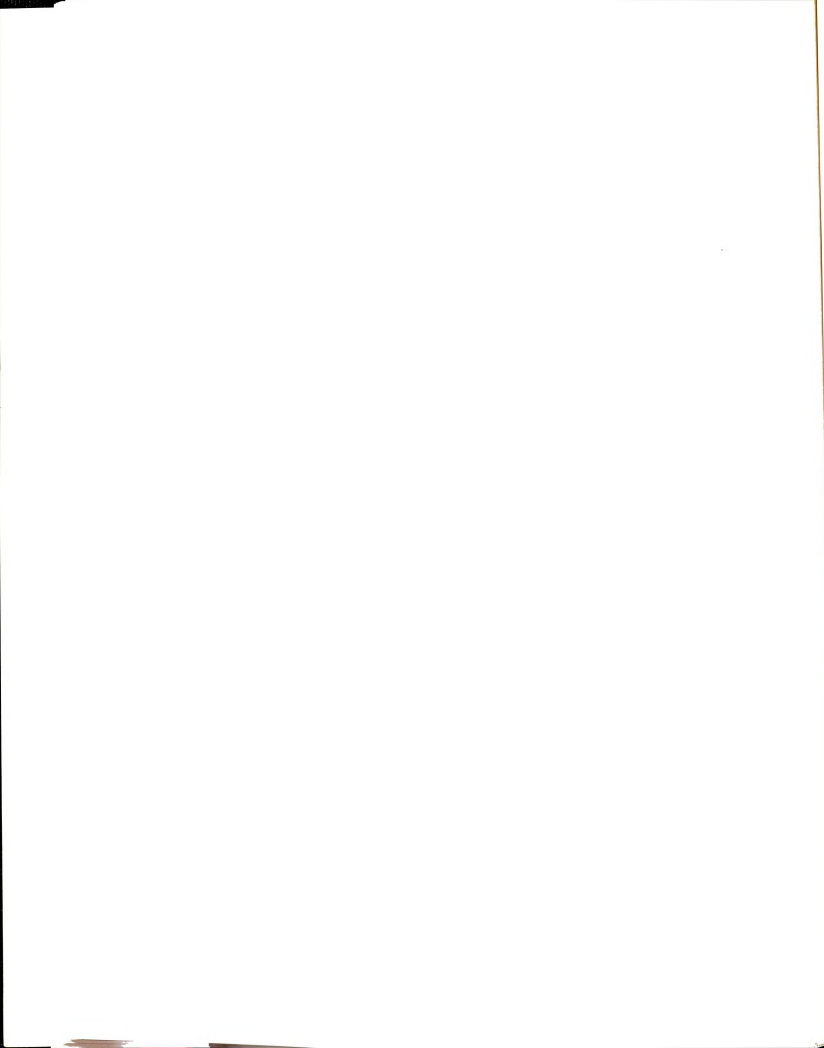
Scant theoretical or empirical evidence exists to indicate why firms adopt performance plans or precisely how those plans (in combination with other components of the compensation package) influence managerial decisions . . . it was difficult to construct definitive predictions about the effects of performance plans on corporate acquisition decisions given the current state of the literature. (Johnson, p. 81)

Consideration of Managers' Interests: Lewellen, Loderer and Martin (1987) and Larcker (1983) provide a basis for the investigation of characteristics before the adoption of PPs but their findings need to be reexamined from a different perspective. Like most studies on incentive systems, Lewellen et al. (1987) have interpreted their results from the owners' (wealth-maximization) standpoint only. For example, they observed a positive relationship between stock return variance (σ^2) and the use of stock-based plans and explained that "stock-based pay is emphasized [by owners] in order to prevent excessively conservative investment policy" (p. 302). Their reasoning is that "if managers have a predominant fixed income claim" (p. 291) they will be unwilling to take on risky investment projects. Thus owners

adopt such plans or use them heavily to counterbalance managers' conservative attitudes.

However, such a positive association between σ^2 and use of stock-based plans can also be explained from the managers' perspective. From option-pricing models (Black and Scholes, 1973) it is known that the value of a stock option increases as σ^2 goes up. In this model, higher σ^2 provides managers with opportunities to take advantage of potentially large capital gains from stock-related plans. Thus, the managers' financial interest may be what causes adoption or intensive use. That is, high variance of returns may encourage managers to influence their firm to adopt stock-related plans or increase their proportion. Under a research design like Lewellen et al.'s (1987) which only considers post-adoption variables, this plausible viewpoint cannot be evaluated. Since some practitioners have contended that the PPs adoption decision is influenced by top managers, consideration of both viewpoints is important.

Tax Issues: Even though PPs adoption is not directly affected by changes in the tax code, there could be indirect effects (Lewellen et al., 1987). None of the studies reviewed in this chapter investigated the influence of the capital gains tax on compensation plans. This is mainly because it is difficult to construct a tax argument to explain forms of compensation plans and their incentive



effect (Hite and Long, 1982). However, "tax effects represent an important area for future research" (Larcker, p. 28). This study will partly control for the existence of tax benefits through a research design method which divides sample firms into two sub-samples in terms of the existence of tax benefit for SOPs.

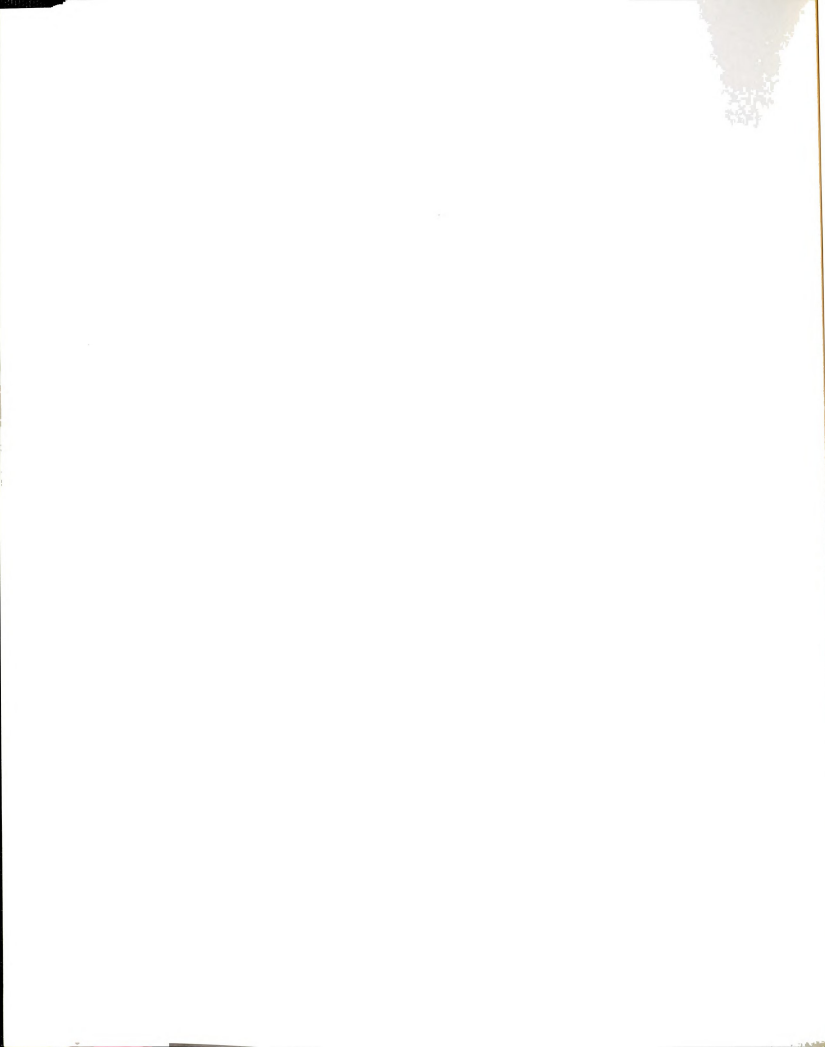
IV HYPOTHESES

1 Agency Framework

1.1 Agency Cost

According to agency theory, a firm's owners and managers can be viewed as having a relationship in which one or more persons (the principals) engage other persons (the agents) to perform some service on their behalf. There may be some divergence of interest between the principal and agent since there is likely to be differences in their risk attitude and decision time-horizon as well as the principal's inability to observe the agent's performance directly. The principal attempts, therefore, to eliminate or control any such divergence by monitoring management and by establishing appropriate incentives for them. Even with costly incentives and monitoring systems the agent's decisions may still differ from those that would maximize the principal's wealth. Such a difference is called the residual loss. This residual loss, along with the costs of incentive plans and monitoring systems, are called the agency cost (Jensen and Meckling, 1976).

Since incentives are thought to be adopted to reduce this cost, any study of incentive plans needs to examine the cost's fundamental sources; i.e., the time-horizon difference, risk attitude difference and performance measurement. Each of these three sources will be discussed



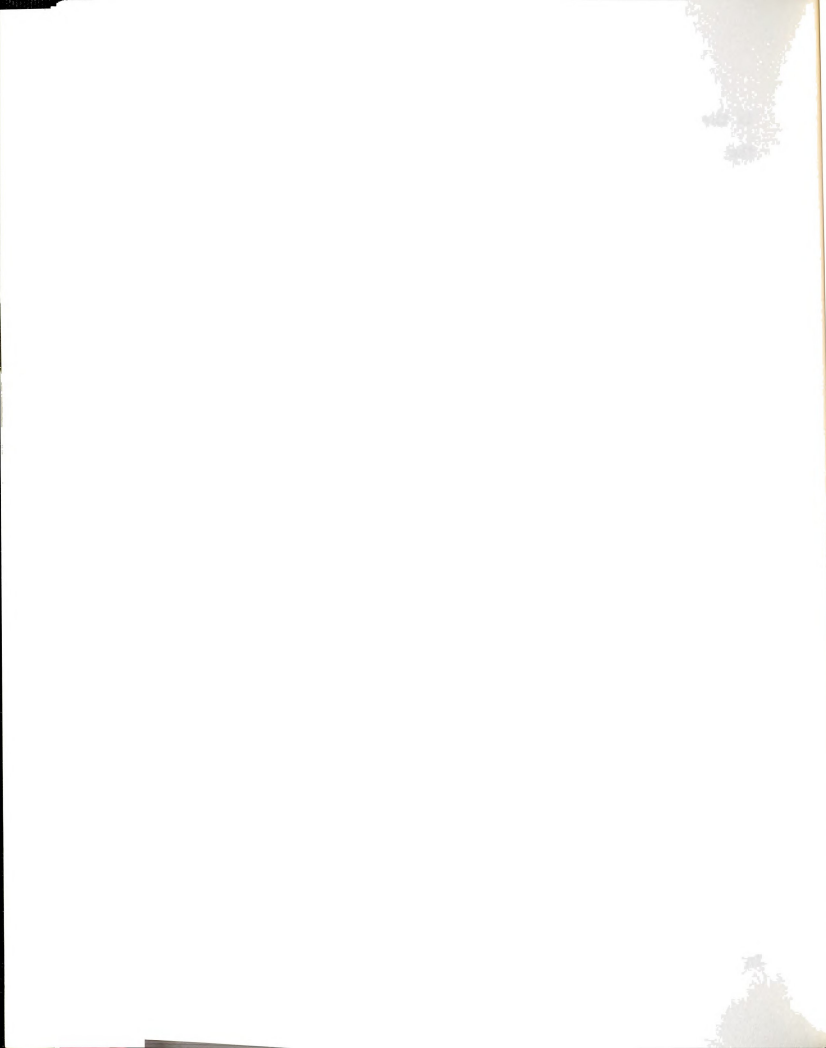
in the following sections (sections 2 to 4) with respect to the agency relationship.

1.2 Motivation Hypothesis and Managers' Interests

Agency theory provides not only a framework for the examination of agency costs but also a conceptual basis for the motivational effects of incentive plans on reducing agency cost. Several studies of executive compensation (e.g., Antle and Smith, 1986) set up hypotheses using this conceptual basis and empirically tested the hypothesis that incentive plans have motivational effects. Lewellen et. al (1987) describes this motivation hypothesis:

The design of senior executive pay packages may well be motivated by an effort to encourage managerial behavior which is congruent with shareholder wealth maximization. (p. 302)

However, as examined in the previous chapter, empirical studies based on this hypothesis have not been completely successful in elucidating the motivational effects of PPs and other incentive plans. One of the reasons why the empirical results are not sufficient to explain the current incentive plan usages may be that this hypothesis has been interpreted only from the owners' perspective, as if owners (or boards of directors) could select a specific plan and impose it on managers without considering the managers' interests. As we have seen in Chapter 2, however, some practitioners argue otherwise. Managers may have a strong influence in deciding the kind of incentive plans adopted. In particular, PPs cannot be implemented successfully

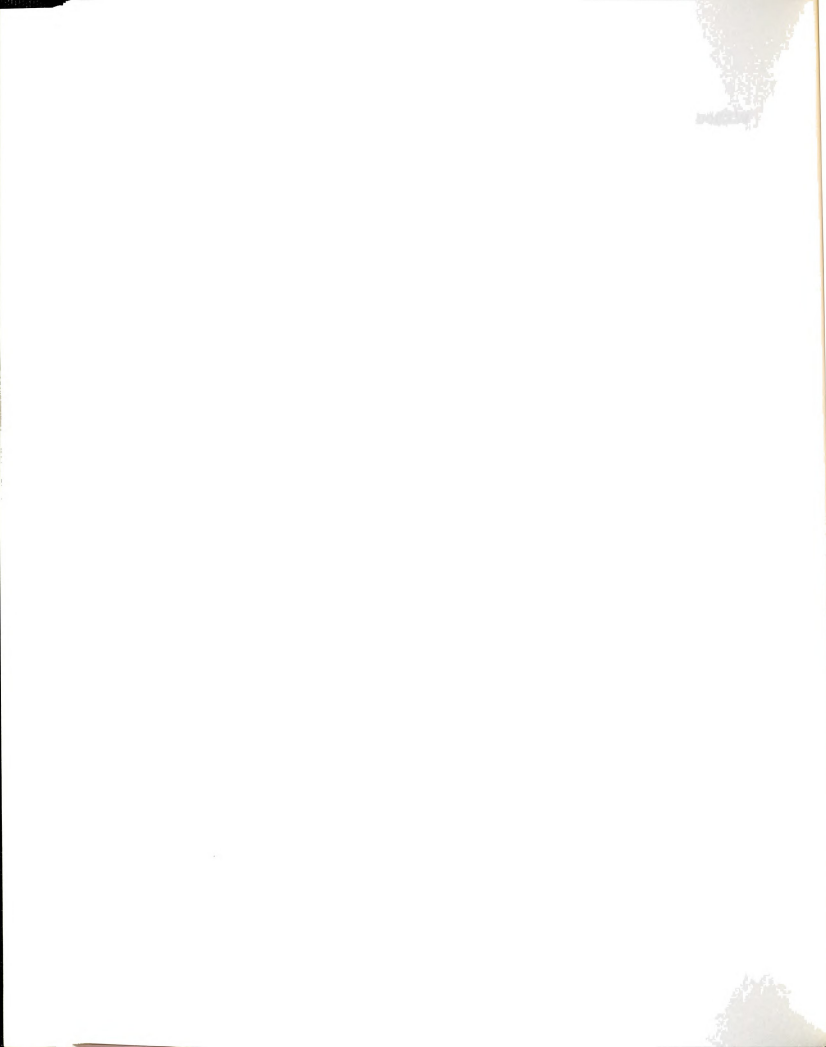


without the support of management. For example, it is management that provides the data essential for goal-setting. This study proposes to investigate how both owners' and managers' interests could have an effect on PPs adoption with respect to the individual dimensions of agency conflicts.

2 Time-horizon Dimension

2.1 Time-horizon Problem

Managers are often alleged to have a shorter decision time-horizon than owners (Smith and Watts, 1982; Larcker, 1983; Lambert and Larcker, 1985; Lewellen et al.; 1987). Shareholders are concerned about the value of their stock which means that they are likely to view all projects over the projects' lifetimes. By contrast, managers' decision time horizons for investment projects may not cover the projects' lifetimes for various organizational and personal reasons. If, for example, a firm heavily relies on short-term incentives, managers might be induced to maximize short-term payoffs and, thus, their decision horizons would be shortened. Managers' short-term decision horizon may be detrimental to owners, leading them to focus primarily on projects that yield short-term returns and to reject projects with positive expected net present values, simply because of anticipated short-term unfavorable cash flows. This is called the "time-horizon" problem.



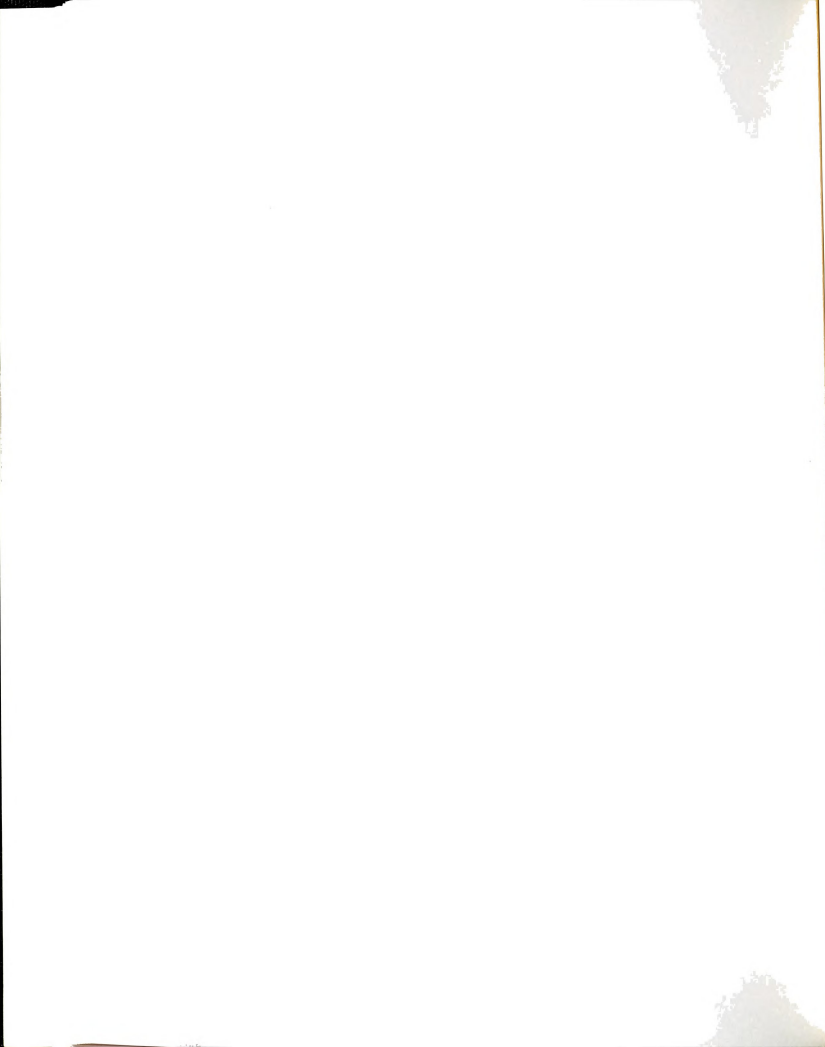
2.2 Evaluation of Compensation Plans

As Smith and Watts pointed out, BPs may not alleviate the time-horizon problem since they reward managers generally for their contributions to the company's success only during a one-year period. On the other hand, SOPs and PPs may mitigate the horizon problem and motivate managers to strive for the company's long-term health instead of short-term profits. In addition, these two plans are designed to retain top management personnel, since a manager leaving before the completion of the award period is not entitled to anything (the forfeit clause).¹³

Compared to BPs and SOPs, PPs could be more effective in reducing the horizon problem for the following reasons. First, because PPs' compensation amounts are directly connected with 3-6 year accounting numbers and not with stock market changes, the tendency of managers to adopt a short-term perspective and their concern over uncontrollable stock market factors should be reduced.¹⁴ Secondly, PPs' goal-setting processes may force managers to expend more effort toward predicting the firm's future activities in order to set goals in a more accurate manner and to communicate their forecasts to the lower level managers.

2.3 Hypotheses

In explaining why a firm adopts PPs, the "conventional" motivation hypothesis contends that PPs are, in general, better than bonus and salary at augmenting managers'



decision horizons (Tehrani, Travlos and Waagele, 1987a). In investigating the motivation hypothesis the direct measure would be to measure managers' attitude regarding decision-making time spans. However, it is hard to develop direct and reasonable proxies for the decision span. Because of this difficulty, empirical research on this hypothesis used indirect surrogates such as capital expenditures (Larcker, 1983), R & D expenditures (Sopariwala, 1985), and the ratio of fixed assets to total assets and managers' ages (Lewellen et al., 1987). This study will reanalyze Lewellen et al.'s (1987) time-horizon variable (age) as well as turnover from both the owners' and managers' perspectives and hypothesize the relationship between adoption and these variables.¹⁵

2.3.1 Executive Turnover

High executive turnover is theoretically harmful to owners because managers who are considering leaving the firm for other employment tend to have short-term decision horizons and view projects within the limits of their expected tenure periods. From the owners' perspective, the motivation hypothesis asserts that adoption of PPs should lengthen such managers' decision horizons, because if the managers leave before the award period they would forfeit the compensation expected from the PPs (Larcker, 1983; Tehrani et al., 1987a). According to this assertion, owners of firms with high turnover (short expected tenure)



are likely to adopt PPs because they would want to encourage their managers to stay longer.

Studies of stock market reactions support this motivation hypothesis from the owners' perspective. Positive market reactions to PPs adoption (Larcker, 1983; Brickley et al., 1985), and the positive abnormal returns of firms with PPs and the negative returns of firms without PPs in merger and sell-off decisions (Tehranian et al., 1987a and 1987b) imply that the adoption of PPs stems from the interests of the owner.

Objectives of PPs stated in the proxy statement also reflect this hypothesis. PPs are explicitly stated as serving to encourage executives to remain with the firm and work towards the company's long-term success. For instance, an extract from the 1982 proxy statement of Textron Inc. expresses the company's expectations for the PPs;

The board of directors believes that in order to . . . retain and motivate key employees, Textron's short-term incentive programs should be augmented by a long-term program [long-term performance plans] (p. 16, Textron Proxy Statement dated March 24, 1982)

However, this common belief about the retaining ability of PPs assumes that actual turnover is so high that it is detrimental to the firm. Thus if the turnover is not high or it is not harmful to the firm, the argument from the owner's perspective is dubious. Besides, this belief ignores managers' interests as discussed below.

Managers' Standpoint: If managers perceive that the

adoption of PPs will be contradictory to their interests they may work against their adoption. In a firm where top managers feel that it is likely that they will be leaving in the near future, they would not want to have PPs implemented at the cost of other compensation. They would not wish to lessen their flexibility to leave the firm by imposing a financial penalty on leaving. Thus, they would seek to influence owners not to adopt because the adoption would work against their interests. If managers exert a strong influence on the adoption process and the managers do not expect to stay with the firm, firms with high turnover might not be more likely to adopt PPs.

From this perspective, the positive market reactions to PPs adoption, which has been used as evidence of the owners' perspective motivation hypothesis, could be interpreted differently. For example, it might be caused by "signalling" of expected long tenure; that is, the adoption of PPs might reflect managers' expectation of long tenures and that they are signalling this to the ownership by proposing PPs adoption (Raviv, 1985).

Actual Turnover: There are two empirical findings that suggest that executive turnover is not so high as to be harmful to the firms. First, Lee and Milne (1988) conducted a study of CEOs and CFOs (Chief Financial Officers) in the 1985 Fortune 500 companies. Their tenure analysis indicates that "at nearly half of the major companies, CEOs stay



longer than 10 years. Only at a very small fraction of the Fortune 500 companies do CEOs change more than twice in a 10 year period" (p. 28). Second, Table 4.1 from Business Week (1983) shows that turnover of the top two managers of the largest firms has increased steadily from an average of 3.3 managers/year to nearly 10 managers/year. However, even the higher figure suggests that average tenure is considerable, probably more than ten years on average.¹⁶ Since PPs' award periods are, at most, 6 years, it is questionable whether PPs have an ability to lengthen the decision horizons of managers with expected tenures that are already long.¹⁷ So whether the adoption was influenced by the desire to retain managers in a firm is questionable. Nonetheless, the hypothesis is set in terms of the conventional assertion.

H1: PPs adoption is positively related to executive turnover.

2.3.2 Ages of Managers

Other things being equal, younger managers who expect to stay with their firm for many years should have no objection to the adoption of PP since in the long run there may be little difference between PPs' benefits to them and short-term plans. On the other hand, it can be supposed that older managers who will retire soon do not want to include PPs in their compensation packages. Even though they may be



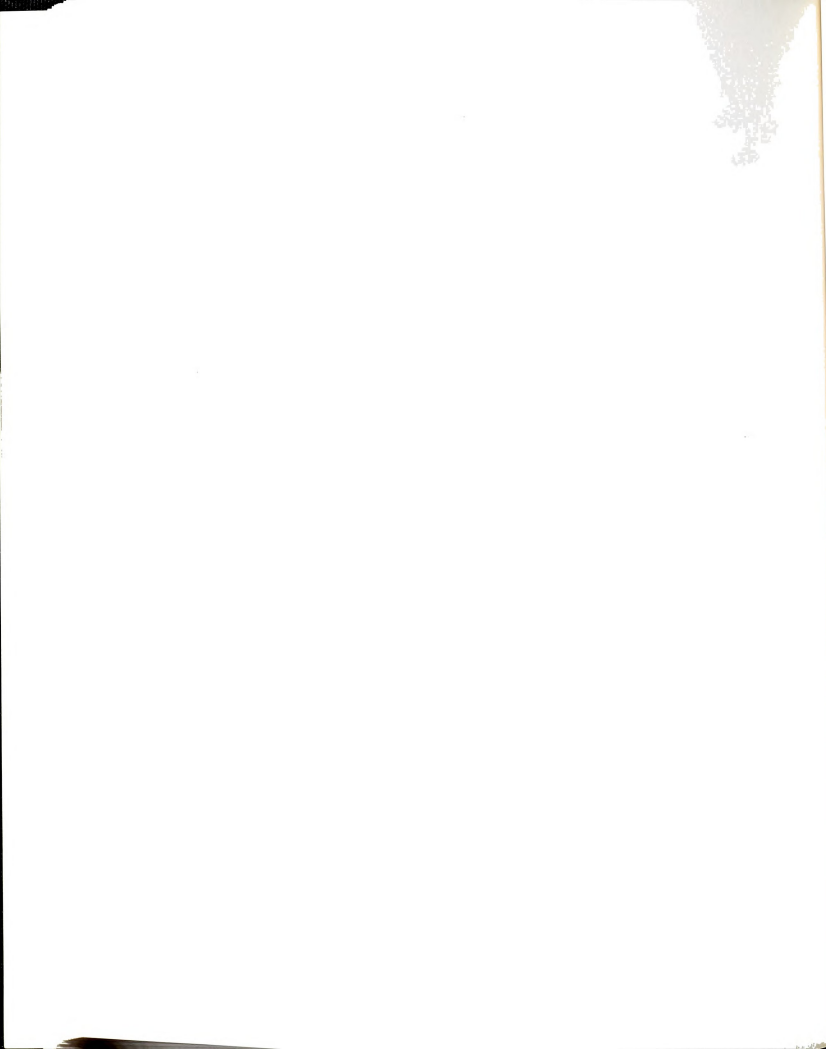
Table 4.1
Number of Executive Resignation¹

Period	Number of Annual Resignations ²
1960-64	3.3
1965-69	3.6
1970-74	4.1
1975-79	8.6
1980-83	9.8

Source: Business Week, Dec. 19, 1983

¹ Retirement cases are not included.

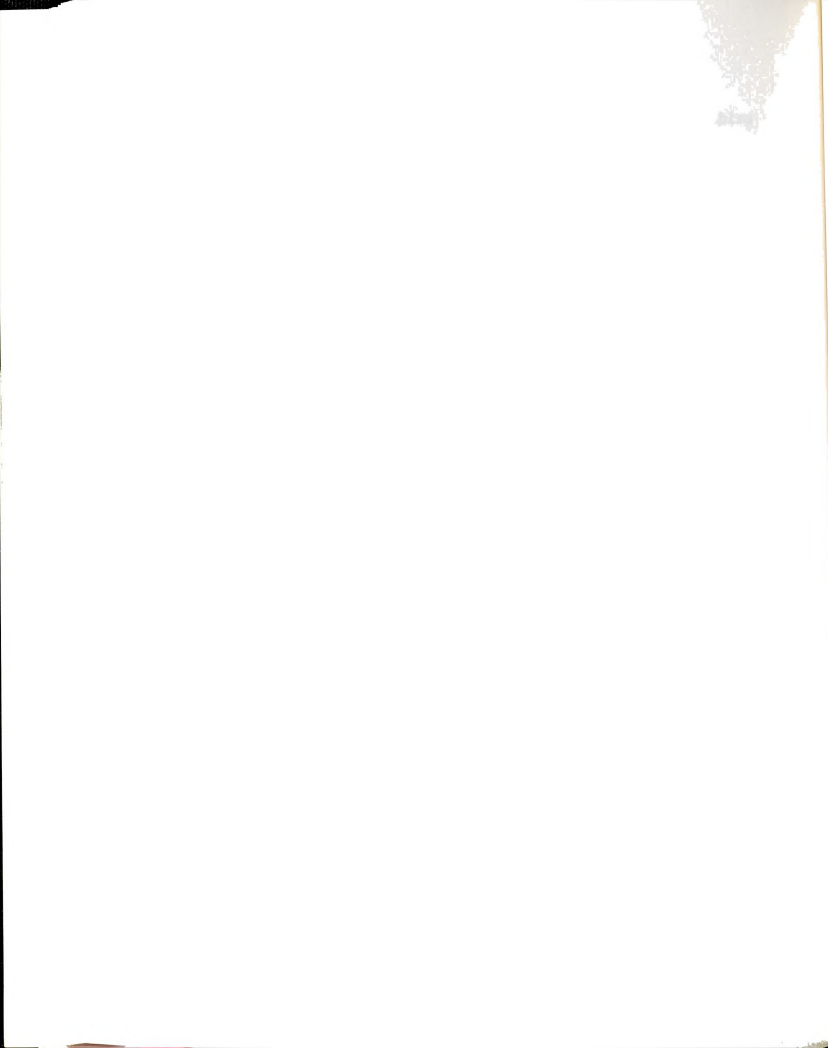
² Average annual number of departures from the top two executive jobs in a sample of 100 large corporations.



paid a pro rata amount of a plan's award in retirement, the awards may not be more than those of short-term incentives. For instance, if an executive near retirement expects an annual bonus to be based on sales, he/she can seek to attain the maximum bonus amount by various short-term strategies such as increasing advertizing expenditures or enlarging the sales force to increase sales revenue. However, if sales level under the sales-increasing strategy exceeds profit-maximizing levels in the long-run, the one-year pro rata award of PPs would become smaller than the maximum bonus. If managers significantly influence the adoption procedure, age may be negatively related to the adoption.

A major problem of the above is that it does not consider the owners' interests at all. Lewellen et al. (1987) examined the owners' preference for long-term incentive plans over the age variable. Their hypothesis is based on the effects of the executive labor market on managers' behavior.

Lewellen et al.'s Argument: They examined the association between age and stock-related long-term incentive compensation. According to their argument ages of managers are expected to have a positive association with PPs adoption for two reasons. The first arises from the executive labor market's disciplining mechanism which Fama (1980) called the "ex post settling up" process. Older managers with few years before retirement do not need to be



concerned about their future career. The older they are, therefore, the less disciplined they are by their value in the labor market. The older managers may tend to be more myopic and self-interested (e.g., using more perquisites) without suitable long-term incentives. Therefore, the owners of a firm with many old managers would want to implement PPs for their long-range disciplining powers.

Secondly, younger managers who are, in general, less wealthy than their older counterparts are likely to be more desirous of immediate compensation for their financial needs. By contrast, older managers are less likely to need immediate rewards and be "more willing to accept the additional exposure to risk" of deferred payment (Lewellen et al., 1987, p. 290). Therefore, older managers may be less likely to object to the PPs adoption.

Review of Lewellen et al.'s Argument: Even though they found a positive relationship between age and stock-related long-term incentive plans, it is difficult to apply their argument to this PP adoption study for three reasons. First, it appears that the disciplining power of the labor market is not strong enough to resolve all divergences. Only partial ex-post settling up is generally supported by analytical and behavioral research such as Lambert (1983), Demski and Feltham (1978), and DeJong, Forsythe, Lundholm and Ucker (1985).¹⁸

Second, one of Lewellen et al.'s arguments is based on

1000000
1000000

the managers' wealth and their preference for immediate payment. However, the fact that younger managers are relatively less wealthy doesn't mean that younger managers need immediate payment of all compensation amounts. The findings of Benston (1985) and Murphy (1985) showed that, in fact, annual compensation is a small portion of executives' total wealth. They found that annual changes in the value of executives' stockholdings were three to five times their total annual cash and cash-equivalent compensation. Since compensation amounts from PPs are usually a small portion of total compensation, younger managers may like PPs if PPs are beneficial to them in the long-run. Thus, managers' wealth does not seem to play an important role in PPs adoption.

Finally, Lewellen et al.'s study tested ages of managers in relation to the proportion of stock-related payments, not to the adoption of long-term plans. The positive association between ages and stock-related payment can be interpreted as the accumulation of unexercised stock option awards during their tenures. Thus it is possible that the positive relationship may have nothing to do with managers' preference for long-term plans.¹⁹ Nonetheless, the hypothesis is set in term of the labor market hypothesis.

H2: PPs are more likely to be adopted by firms with older managers than by firms with younger managers.

3 Risk-aversion Dimension

3.1 Risk-aversion Problem

Kaplan suggested that owners have less risk-averse attitudes than managers because (1) the owners' human capital is independent of the firm's success, and (2) they can diversify their portfolios in the capital market. On the other hand, managers' risk cannot easily be diversified since they are much more closely tied to the fortunes of their companies. Assuming managers are more risk-averse, a contract in which owners take all the risk, assigning no risk to managers (i.e., paying a fixed salary) is pareto-efficient. However, if owners cannot observe the managers' efforts and managers are effort-averse, such a contract fails to align owners' and managers' interests because the managers have little incentive to work (the moral hazard problem: Holmstrom, 1979; Shavell, 1979; Grossman and Hart, 1983; Demski, 1985).

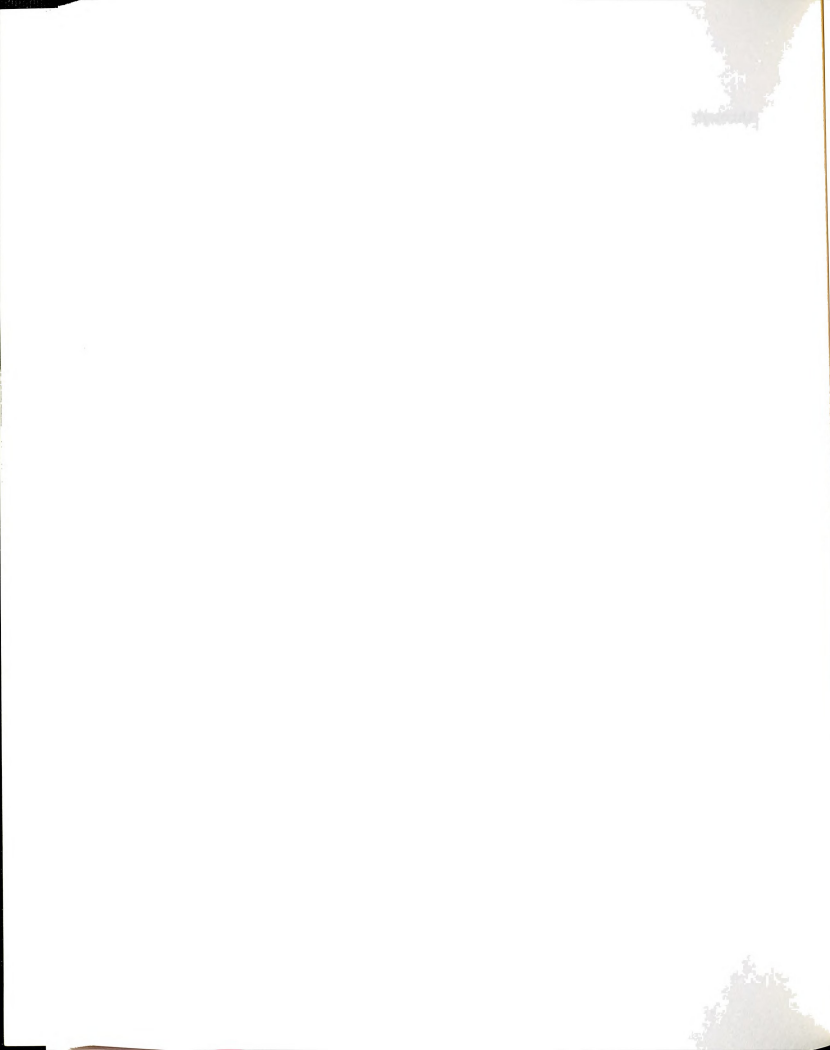
Thus, a contract should allocate some risk to managers in order to motivate them to work. This allocation can reduce their tendency to reject projects which increase the variance of their projected payoffs. However, the amount of risk allocated to them should not be exorbitant. Contracts which assign too much risk "create a problem by increasing the manager's exposure. . . . Given that managers are risk-averse, they will require additional compensation of [sic] the additional risk" (Smith and Watts, 1982, pp. 148-9). Without allocating the suitable amount of risk to managers

through incentive contracts, they might lack proper motivation and would tend to avoid potentially profitable projects which they see as too risky. This problem is called the "risk-aversion" problem.

3.2 Evaluation of Compensation Plans

Stock Option Plans: The capacity of SOPs to alleviate the risk-aversion problem is dubious. On the one hand, "the expected payoff to a stock option increases with the volatility of the stock price. Thus, options or stock appreciation rights provide the manager with incentives to invest in projects which increase the volatility of the firm's cash flows" (Smith and Watts, 1982, p. 147). Kaplan, on the other hand, suggests that stock-related plans might reinforce managers' risk avoiding behavior. Managers' financial rewards as well as their worth in the job market are so closely tied to their firm's success that own-firm stock ownership may merely reinforce their unwillingness to take risks with their firm's future. They are more likely to avoid risky investments and risky decisions in spite of high expected returns.²⁰

Bonus Plans and Performance Plans: These two budget-based plans do provide managers with incentives to undertake risky projects which can offset the manager's natural risk-aversion (Smith and Watts). However, the amount of risk allocated to managers differs since the award periods of the two plans differ. The BPs' goals are updated annually based



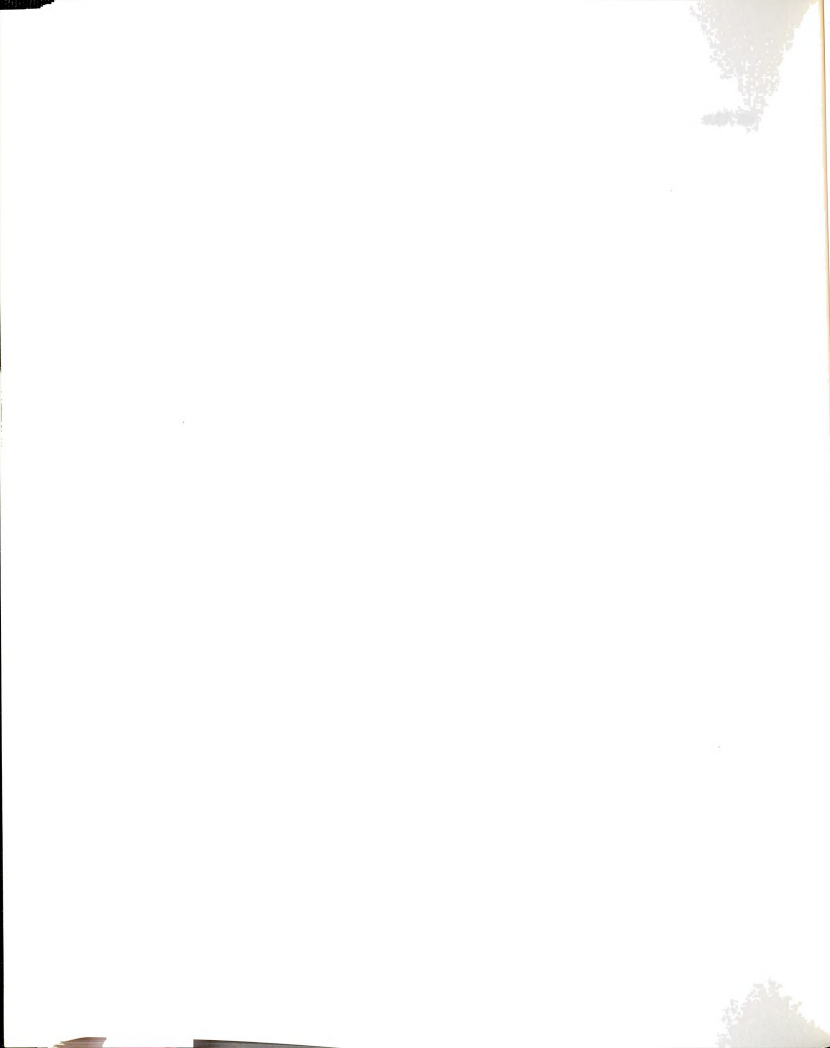
on the firm's current environment. Since PPs are not adjusted this frequently, the total risk to the managers is greatly increased. However, the less risk inherent in the firm's activities, the less this is a problem. The details will be discussed in the hypothesis section.

3.3 Hypotheses

3.3.1 Environmental Conditions

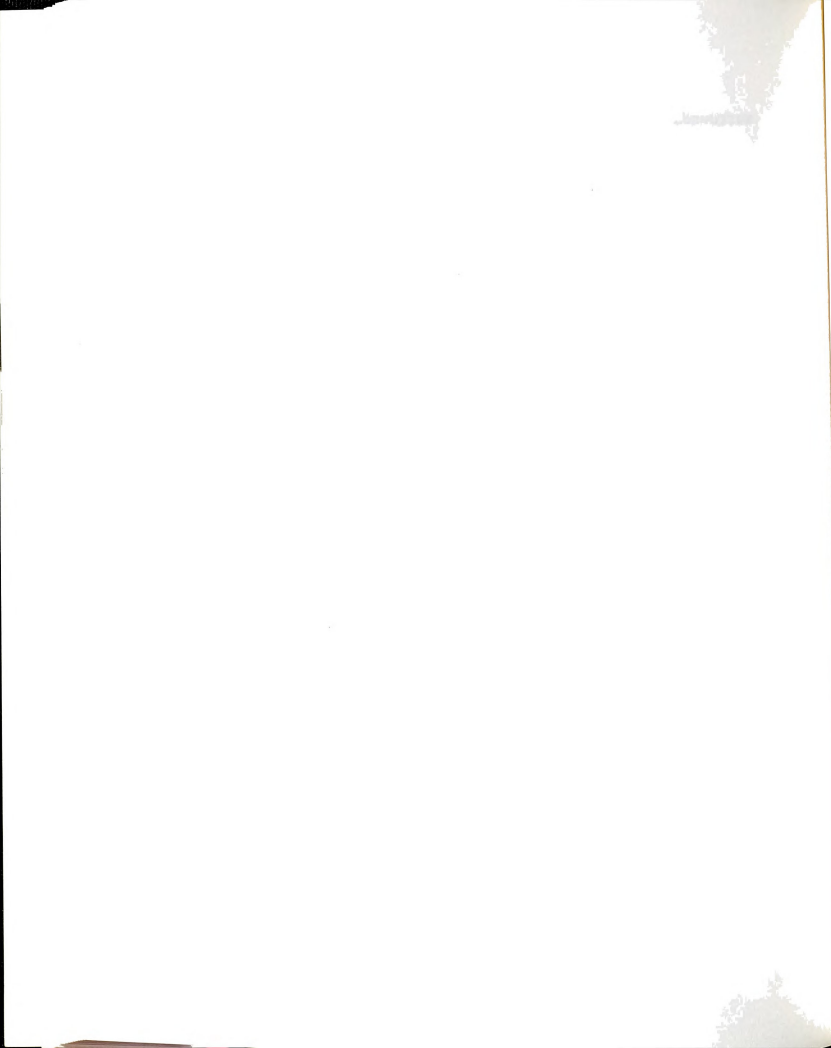
Since BPs are already pervasive in large U.S. firms and the plans are based on a firm's basic financial data (e.g., annual incomes, before or after taxes), the adoption of PPs may be regarded as an additional long-term monitoring system in order to improve on a contract which was based solely on annual income. This monitoring system sends two signals: forecasted long-term goals at the beginning of an evaluation period, and the actual long-term financial results at the end of the contract period. The signals are thought to reflect the managers' long-term performance even though they are imperfect estimators.

Lambert (1983) extended agency theory to multi-period relationships and showed that a contract which depends on the manager's current performance along with his/her performance in prior periods is the optimal form. If owners consider managers' performance over the entire history of their employment they can not only alleviate the moral hazard problem but also diversify away some of uncertainty



surrounding managers' actions and efforts. As in Lambert's result, including the PPs monitoring system in a contract improves, in principle, the welfare of both owners and managers if the signals from PPs are informative and producing the signals is costless (Holmstrom, p. 84). The signal is informative if it contains information beyond that conveyed by annual incomes. In fact, PPs' signals are informative since they contain managers' forecast about the firm's value in the future which cannot be revealed by annual incomes.

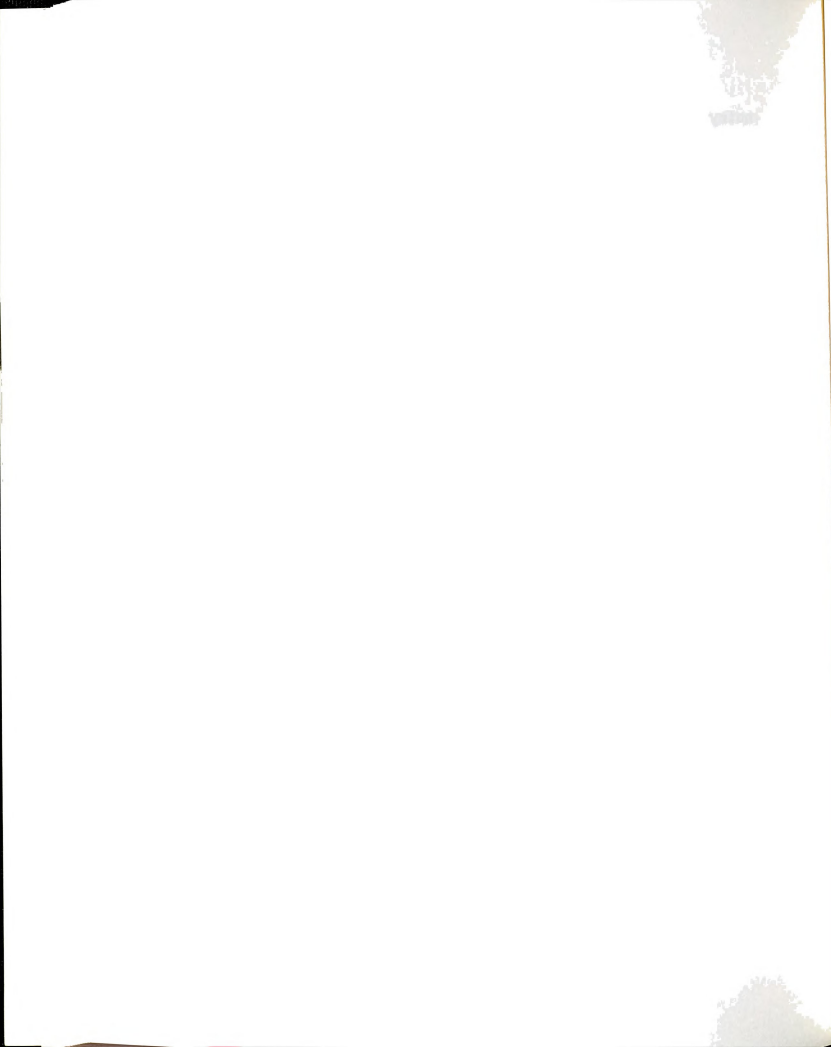
Why then are not PPs, whose signals are informative, in practice, universal? If some firms do not use them because they do not increase the welfare of both parties, under which conditions does the monitoring system fail to improve on a contract based on annual incomes alone? Even though there is no rigorous study concerning this issue, Harris and Raviv (1979) and Holmstrom (1979) suggested that noisiness in the signals might reduce the benefit of the informativeness. "One might conjecture that in some situations a sufficiently noisy, yet informative, signal could add too much randomness to the contract to be acceptable by risk-averse parties" (Holmstrom, p. 87). Such a signal which introduces imperfect information concerning managers' efforts tends to reduce the welfare of both parties (Harris and Raviv, p. 25). Lambert (1983) did not analyze these phenomena since he had ruled out extremely



noisy signals.²¹ His model is based on the separability assumption in which the production functions are separable and the states of nature are independently distributed over time. Thus, the time periods are independent and managers' actions have no multi-period effects (p. 451).²² In addition, no cost is incurred in producing a signal in his model, since the signal is composed of managers' performance in prior periods.

Environmental Uncertainty: The uncertainty of the production, investment and financial environment of the firm may be an important determinant of signal noisiness. Environmental uncertainty is defined in this study as the diffuseness of the probability distribution of events in the firm's environment which is positively related to the difficulty in predicting future events. The more uncertain the environment in this sense, the noisier the signal that PPs produce. As this uncertainty increases, three potentially dysfunctional phenomena occur in using the PPs monitoring system.

First, as information concerning managers' efforts is garbled by noise generated by unpredictable events, it becomes more difficult to distinguish managers' actions or effort from the effect of unexpected events. This reduces the benefit of the information in alleviating the moral hazard problem. Second, since the basic effect of uncertainty is to limit the ability of the organization to



pre-plan or make decisions about activities in advance of their execution, managers faced with an uncertain environment experience higher risks in setting long-term goals. Finally, the cost of producing forecast signals increases in an uncertain environment because more effort in data collection and analysis is required. These last two phenomena require more compensation for managers under the assumption that they are risk- and work-averse.

Hence, above a certain level of uncertainty the benefit of additional informativeness might be less than the additional compensation required for the extra forecast risk, effort, and the cost of signal production, at which point PPs are no longer optimal risk-sharing arrangements. It is hypothesized therefore that as the uncertainty of the environment increases, the likelihood of using PPs in the contract decreases.

This hypothesis is consistent with a study done by Govindarajan (1984) which used contingency theory to examined the relationship between environmental uncertainty and performance evaluation style. He defined environmental uncertainty as "the unpredictability in the actions of the customers, suppliers, competitors and regulatory groups that comprise the external environment of the business unit" (p. 127). Questionnaires about uncertainty, evaluation style and the effectiveness of divisions were collected from 58 division managers of eight Fortune 500 multi-division firms.

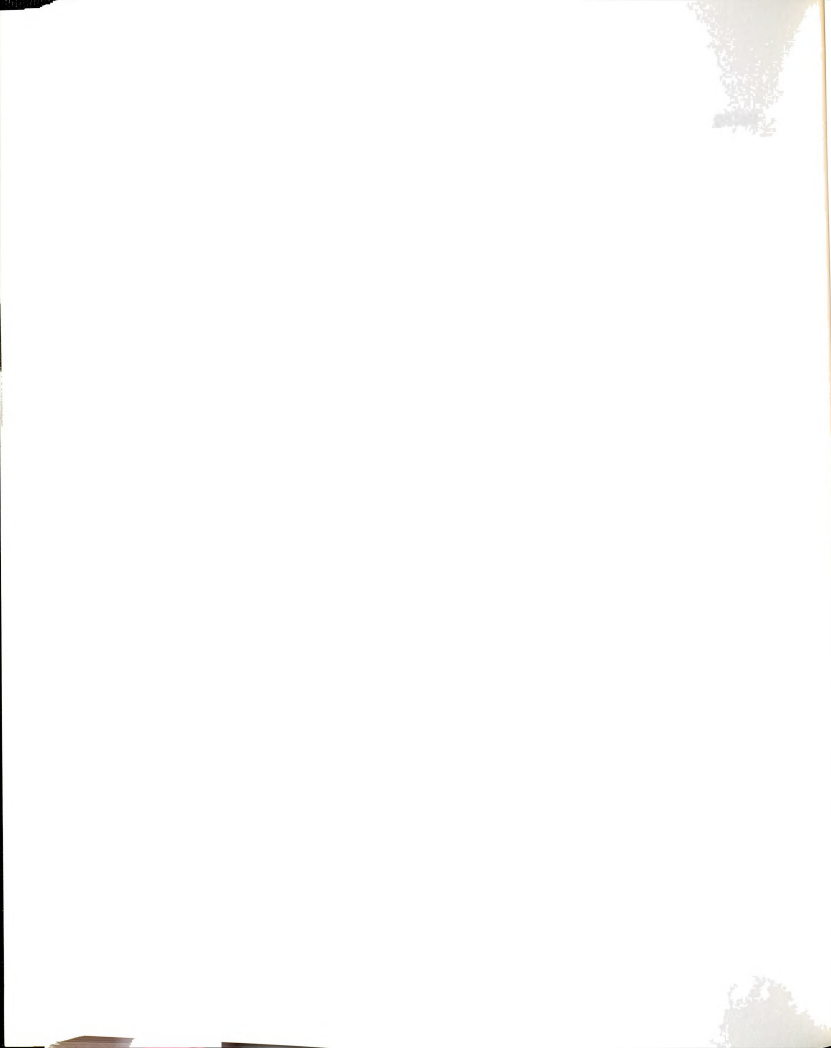
Using these data he found that: (1) superiors whose divisional managers face higher environmental uncertainty used greater subjective judgment in performance evaluation whereas superiors whose divisional managers face lower environmental uncertainty relied heavily on formula-based approaches in performance evaluation; and (2) the contingency relationship between environmental uncertainty and performance evaluation specified in (1) was stronger for more effective divisions than for less effective divisions (p. 132). His findings indicates that in a situation with high environmental uncertainty, rigid formula-based schemes would not adequately reflect managerial performance whereas such schemes would be adequate for a situation with low environmental uncertainty.

H3: PPs adoption is inversely related to the uncertainty of the environment.

4 Performance Measurement Dimension

4.1 Performance Measurement Problem

One source of divergence of interests results from the inability to precisely measure managers' performance. Theoretically, the performance should be evaluated in terms of how their effort increases the firm's value, and managers should be compensated accordingly. However, since owners cannot directly observe managers, proxies must be used to estimate their effort. This estimation is forced to rely on reported results based on accounting measures [such as net



income, EPS (earning per share) and ROI (return on investment)], or stock market measures [such as stock prices].

These proxies have well-known defects. Accounting measures are open to management manipulation (Healy, 1985; Lambert and Larcker, 1985). A strategy known as 'taking a bath' is an example which possibly alters accounting incomes by deferring revenues or accelerating write-offs. Furthermore, accounting measures do not include future-oriented information such as a firm's expected growth rate, general economic trends, etc.. If a large part of the managers' activities produce results after an incentive plan's award period, such measures would not reflect the managers' real performance (Lambert and Larcker, 1987). Stock market measures have different problems. Even though they, in principle, reflect all publicly available information in a timely and unbiased manner, in practice they can fluctuate with changes in the firm's financial surroundings which are beyond the manager's control. Thus, managers may receive different payoffs depending on the date of the performance evaluation (Lambert and Larcker, 1985). These various defects which are due to using imperfect proxies in evaluating managers' performance are called the "performance measurement" problem.

4.2 Evaluation of Compensation Plans

The problem of management manipulating the accounting

measures in order to maximize the return from BPs has long been recognized as well as investigated.²³ BPs which use accounting measures to formulate goals might encourage managers to alter financing, production and investment decision which result in increased the reporting of current earnings to the detriment of the long-term value of the firm. SOPs can reduce the likelihood of such manipulation. However, they introduce stock market performance into the compensation of managers. For instance, when an uncontrollable "market crash" (such as in October 1987) or "bear market" persists over any considerable time (such as occurred during the late 60's and early 70's), the value of SOPs as incentives becomes problematic.

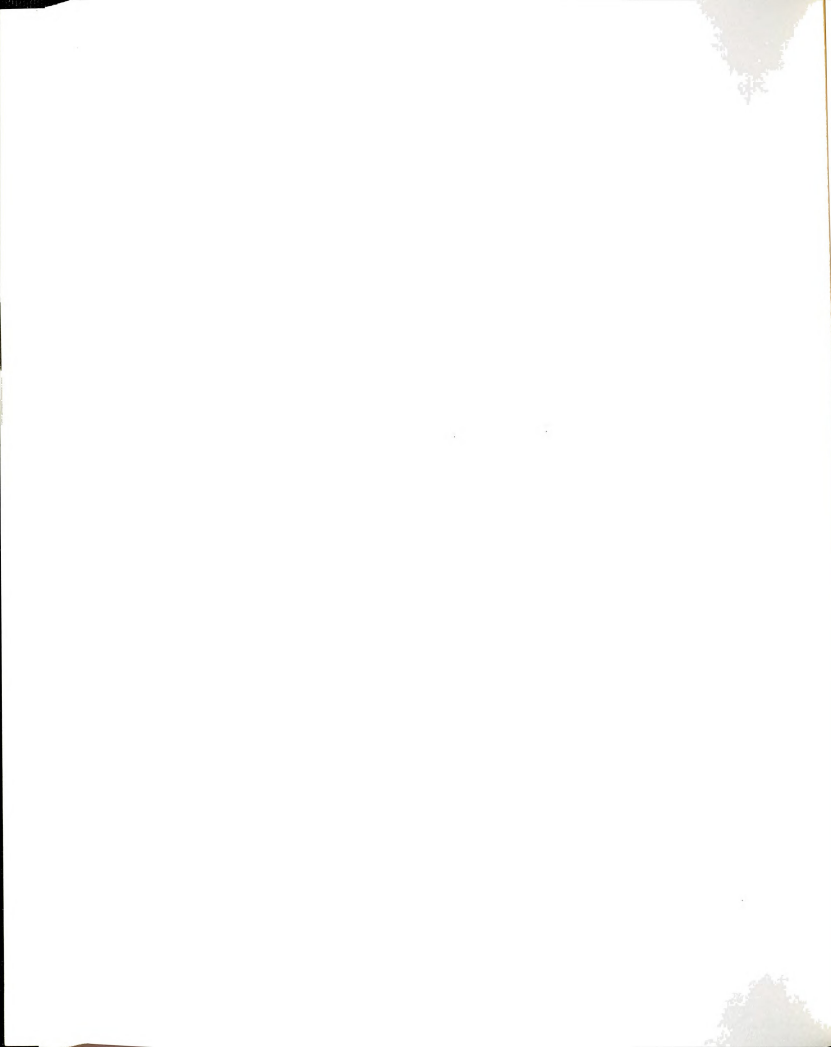
PPs seem to overcome both of these problems, since they avoid the stock market influence on compensation as well as being less affected by accounting manipulations than BPs. PPs have long award periods so that a short-term manipulation is less effective in attaining the specified goal (Smith and Watts, 1982, p. 150). In addition, the long-term period makes manipulations, especially continuous ones, more detectable. For fast growing firms, however, it may be difficult to evaluate managers' efforts correctly since accounting numbers are historical data which hardly measure future-oriented performance.

4.3 Hypotheses

4.3.1 Future Impact Consideration

If most of the actions carried out by managers have future-period consequences as in a growing firm, they could often bring about negative or negligible profit in the current period. It would not be appropriate to evaluate these managers by profitability measures. Instead, their performance evaluation should reflect the realization of future results from current actions. Lambert and Larcker's (1987) findings were consistent with this idea. They made a period classification which defines the "early" period as a period when the firm's growth potentials are large, and the "later" period as a period when the effects of investment projects are reflected in accounting numbers (p. 106).²⁴ They hypothesized that the "early" period firms would use stock price measures more than the "later" period firms. They assumed that the extent to which a firm was in the early stages was related to the growth rate, and found a positive relationship between growth rates and the usage of stock price measures.

Generally, growth rates of firms are related to the nature of investment projects. Managers of rapidly-growing firms are likely to put an emphasis on new projects whose results are to be realized in the future. Since most projects of such firms do not produce immediate increases in net incomes, profitability measures are not likely to be



good criteria with which to evaluate the managers. SOPs would tend to eliminate this time-lag problem. Therefore, managers, as well as owners, of fast growing firms, should be more likely to use SOPs rather than PPs. On the other hand, if a firm's growth rate is slow, investment projects are more likely to be those that replace past projects or maintain current facilities. In such cases, there may be less of a time-lag problem in using accounting-based incentive plans. Managers, therefore, may not dislike accounting-based incentive plans. Thus firms with low growth rates are more likely to adopt PPs than firms with high growth rates.

H4: Firms with high growth rates are less likely to adopt PPs than firms with low growth rate.

4.3.2 Managers' Own-firm Stockholding

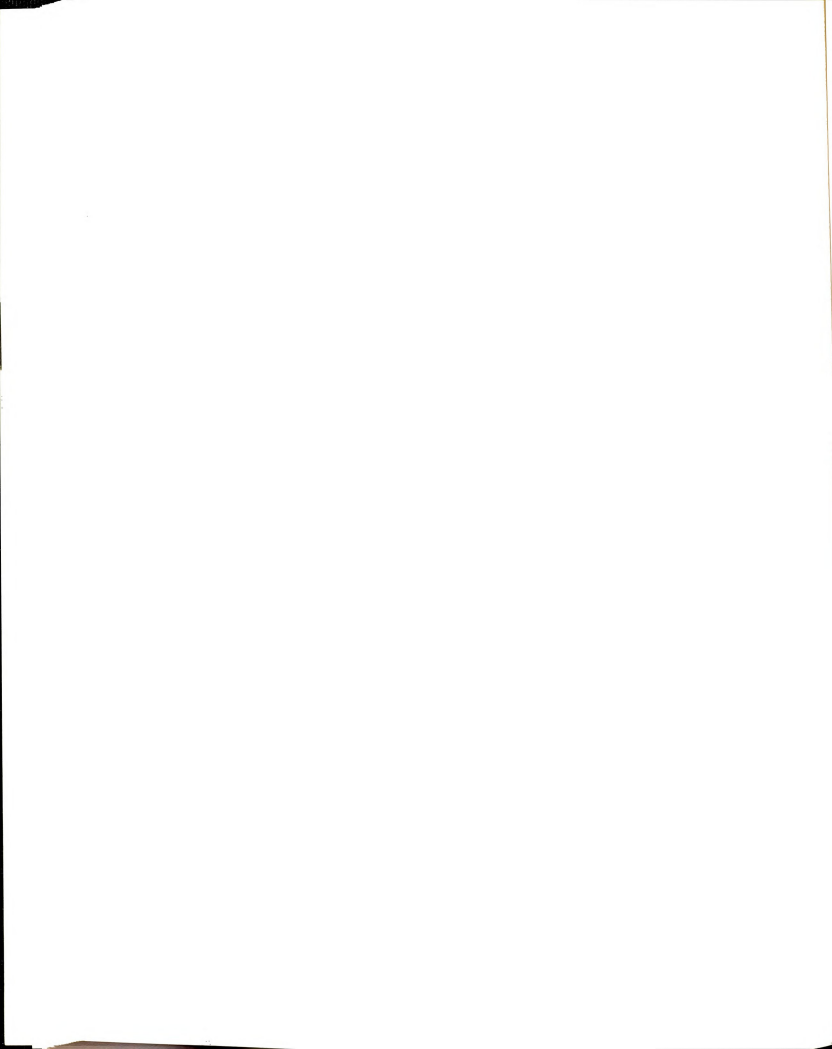
When a firm considers adopting long-term incentive plans, the magnitude of the managers' own-firm stockholdings may affect the decision.

Managers' Interests: Managers with large stockholdings might welcome the diversification provided by the adoption of PPs, since the future compensation from PPs are not tied to the company's stock.²⁵ However, this diversification argument does not find support in the existing empirical studies. Benston (1985) reported that annual compensation is, in general, not an important determinant of their wealth

and, instead, "changes in the market values of the shares the executives owned in their companies overwhelmed their remuneration" (p. 77). Thus, it is doubtful that managers would work for the adoption of PPs solely for the purpose of diversification since such diversification would amount to so small a part of their total compensation.

Furthermore, since managers hold large amounts of their firm's stock, it is likely that they expect their firm to yield higher returns than the stock market average. Such managers are likely to be interested in increasing their stockholdings and to want increases in SOPs. In this case, PPs adoption would be negatively related to managers' own-firm stockholdings.

Owners' Consideration: There are two contradicting arguments regarding owners' interest in managers' stockholding and additional usage of stock-related plans. The first argument suggested by Kaplan (1982) is related to risk-aversion dimension: if managers have large stockholdings, their total wealth is largely dependent on the firm's stock market performance and this could lead to risk-avoiding behavior. They may be reluctant to choose high variance investment projects in spite of possible high expected returns since they would be exposed to too much risk. Thus, owners of the firm with such managers would be more likely to seek the adoption of PPs than SOPs in order to provide an incentive for longer-term risk taking.



To the contrary, the theoretical arguments of Jensen and Meckling (1976) suggest that managers' stockholdings can assist in aligning managers' and shareholders' interests. These stockholdings increase the cost to managers of any investment by their firm that decreases share prices. Managers will not avoid variance increasing investments as long as the investments increase the payoff expected from their stockholdings. However, "as the manager's ownership claim falls, his incentive to devote significant effort to creative activities such as searching out new profitable ventures falls" (Jensen and Meckling, 1976, p. 313).

Empirical Findings: Empirical studies concerning the managers' motivation for mergers and acquisitions (Amihud and Lev, 1981; Walking and Long, 1984; Benston, 1985; Agrawal and Mandelker, 1987) are consistent with Jensen and Meckling's argument. Managers' stockholdings seem to have a role in reducing agency problems. Lewellen et al. (1987) found similar results in their study of the composition of incentive plans; namely, the usage of stock-related plans were positively related to variance-increasing investment even when the average value of the managers' own-firm stockholdings is substantially larger than their total remunerations.²⁶ It seems that owners may want, or at least they might not dislike, their managers having SOPs.

In fact, Tehranian et al. (1987a) shows that both the mean and median of current stockholdings are larger for

firms without PPs than firms with PPs "but not reliably so at conventional significance levels" (p. 58). Based on theoretical arguments and Tehranian et al.'s findings, the hypothesis is set as follows:

H5: PPs adoption is negatively related to managers' own firm stockholdings.

The firm characteristics which have been discussed in this chapter and their associations with the adoption of PPs are summarized in Table 4.2. The table also includes the arguments and empirical evidence from previous research for respective hypotheses.

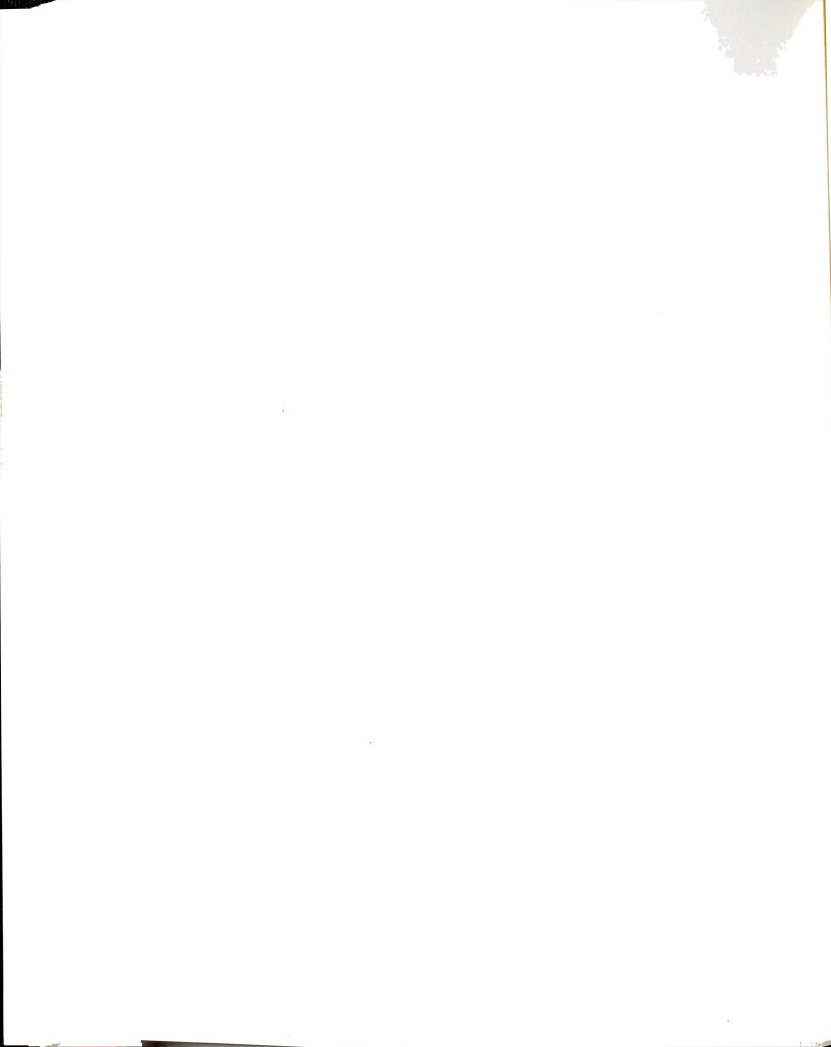


Table 4.2
Firm Characteristics and Their Associations with PPS Adoption

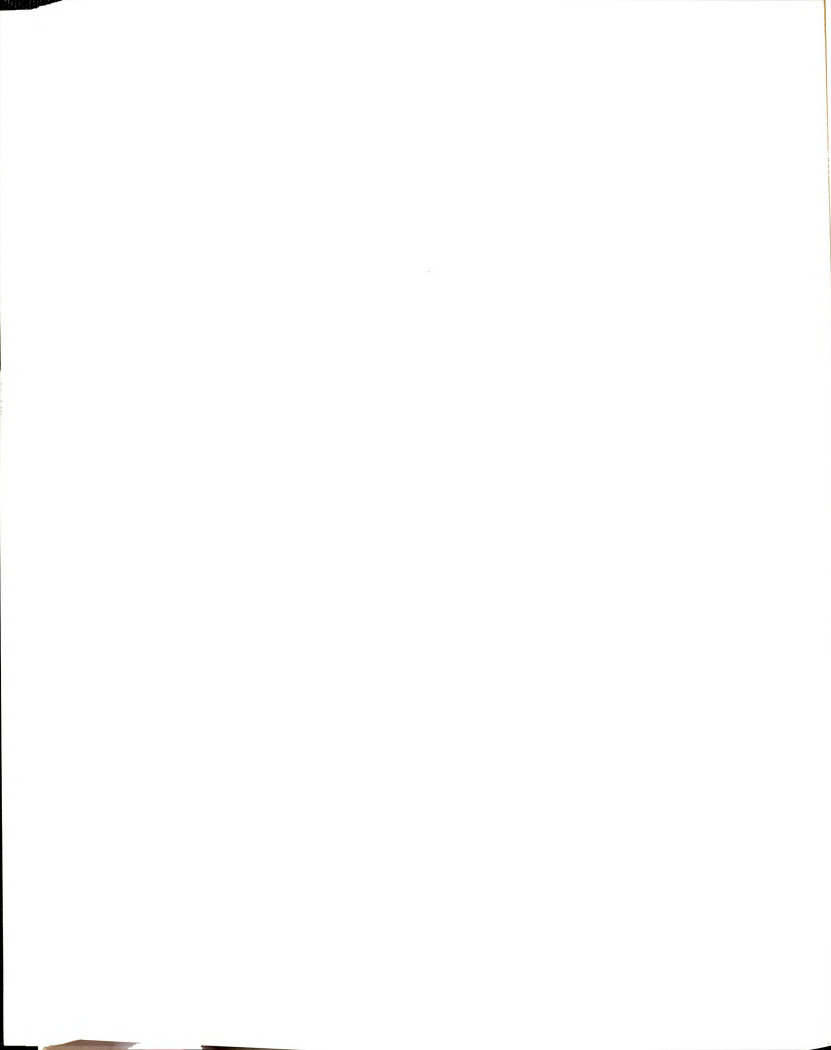
Variables	Arguments	Association with Adoption	Empirical Evidence
TIME-HORIZON TURNOVER			
	Motivation hypothesis (Larcker, 83; Tehranian et al., 87a)	+	Larcker (83); Bickley et al. (85)
	Argument for managers' interests	-	<u>Business Week</u> (12/19/83); Lee and Milne (88)
AGE			
	Labor market hypothesis (Lewellen et al., 87)	+	Lewellen et al. (87)
	Conventional wisdom	-	
RISK-AVERSION UNCERTAINTY			
	Argument for informativeness vs. noisiness (Lambert, 83; Holmstrom, 79; Harris and Raviv, 79)	-	Govindarajan (84)
MEASUREMENT GROWTH RATE			
	Argument for "early" period firms (Lambert and Larcker, 87)	-	Lambert and Larcker (87)
STOCKHOLDING			
	Argument for diversification (Kaplan, 82)	+	
	Agency cost hypothesis (Jensen and Meckling, 76)	-	Agrawal and Mandelker (87) Tehranian et al. (87)

V DATA

1 Sample Firms

1.1 Fortune 200 Firms

The firms used in this study are taken from Long-term Incentive Compensation Plans Among the Top 200 (Annual Report) issued by Frederic W. Cook & Co. Inc.. This report has been issued since 1975 and contains 200 firms and their usages of various long-term compensation plans. These 200 firms (Top 200) are selected from the Fortune 500 list by their revenue rankings each year.²⁷ Since this report contains a different list of the Top 200 every year, the total number of firms is 274. Out of these 274 firms, 199 firms were chosen based on two criteria. First, the information about the initial adoption year must be available from the Top 200 report or from the proxy statements. Forty seven firms were dropped because the adoption year was not identified. Second, accounting and stock market information should be available through Standard and Poor's Compustat annual tape, the Value Line tape, or the University of Chicago's Center for Research in Security Prices (CRSP) data tapes. Those that were not listed at least in two of the three tapes were dropped. This assures that the sample firms do not have too much missing data.²⁸ Twenty-eight firms were not considered because they failed the second criterion, 199 firms becoming



available for the study. These firms (**available sample**) are listed in Appendix B. This list was sorted by company names and reported usage of PPs, adoption year, types of PPs, industry groups, and sales ranks.

1.2 Test Periods

1.2.1 Control for Differences in Adoption Years

As shown in Table 2.3, while only 15% (29 firms) of the Fortune 200 had PPs in 1975, almost 60% had PPs in 1986. The characteristics of firms adopting in 1975 might be different from those of the firms adopting in 1986, since, in later years, the characteristics of PPs were better-known and firms could predict the effects of adoption on managers' performance more precisely. Thus, firms adopting PPs in the early 70's might be among the more innovative in testing a new compensation system. One way to control for the difference in adoption years is to divide the sample into subperiods. In this study two subperiods, 1978-81 and 1982-86, were chosen. Also, this divisions was chosen to coincide with changes in tax laws so as to provide a control for changes in tax treatment of capital gains as well as changes in general economic conditions.

Tax Reform Acts: When a firm considers the adoption of PP it should evaluate the PP's relative advantage or disadvantage over other incentive plans. Hence, favorable tax status (or the lack of it) for certain types of SOPs



would be a consideration in the PPs adoption decision.

Since 1972 when PPs were introduced to public corporations, there have been three major tax reforms regarding SOPs and their capital gains treatment. Before 1976, there were qualified SOPs which had a capital gain tax advantage. Managers received this benefit if the stocks obtained from exercising the qualified SOPs were held more than three years. The Tax Reform Act (TRA) of 1976 repealed the qualified SOP, only nonqualified SOPs remained and SOPs no longer held a tax advantage over other types of compensation plans.

In 1981, the Economic Recovery Tax Act (ERTA) created a statutory stock option which was called an Incentive Stock Option (ISOP). The ISOP was taxed in a manner similar to the qualified SOP. This 1981 version was at least as favorable for managers as the old qualified stock option. One purpose of ERTA was stated as follows: "the provision was designed to encourage the use of stock options for key employees" (U.S. Congress, JCT, 1981, p. 159). In fact the number of companies having an ISOP has increased since 1981, "reversing a four-year trend of net decreases between 1977 and 1980" (Frederic W. Cook & Co., Inc., 1982), and it seems clear that this increase was due to ERTA. Recently, new tax reform has leveled the advantage. The Tax Reform Act of 1986 reduced the benefit of an ISOP when it increased the maximum tax rate applicable to net capital gains from 20% to

28%.

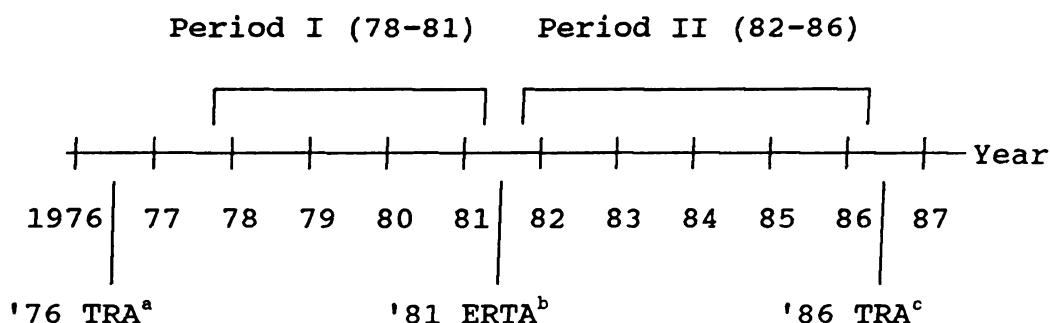
The division of the test period into two subperiods coincides with the existence (or absence) of the benefit related to SOPs as shown in Figure 5.1. Figure 5.1 depicts the effective dates of three tax reform acts and the two subperiods. During the first period of 1978-81 (**Period I**), there was no tax advantage derived from capital gains of SOPs while there was during **Period II**, 1982-86.^{29 30} Thus, this sub-grouping could control for the relative tax benefit difference over adoption years and enable us to investigate the effects of the taxation difference on other firm characteristics.

1.2.2 Test Firms and Subperiods

The sample firms and their status with respect to PPs is given in Table 5.1. The "Non-adoption" column shows the number of firms which did not have PPs. In 1971 when there was no PPs at all, all 199 available firms were non-adoption firms. Before Period I, 159 had no forms of PPs, while in 1981, the last year of Period I and the year prior to the beginning of Period II, the number had dropped to 125. By 1987, the year after Period II of the study this number was 79. The "Adoption" columns report the number of firms which originally adopted one type or both types of PPs and the "Drop" columns show the numbers of firms which dropped PPs completely.

This study investigates characteristics of firms which

Figure 5.1
Revision of Tax Acts and Sample Periods



^a Tax Reform Act (TRA) of 1976 repealed the qualified stock option treatment for options granted after May 20, 1976.

^b The Economic Recovery Tax Act (ERTA) of 1981 provided for the incentive stock options, which were taxed in a manner similar to tax treatment previously applied to the qualified stock options. The provision was effective from August 13, 1981.

^c The Tax Reform Act (TRA) of 1986 repealed the net capital gain deduction for individuals. The provision which applied to taxable years beginning after December 31, 1986 increased the maximum tax rate on long-term capital gain from 20% to 28%.

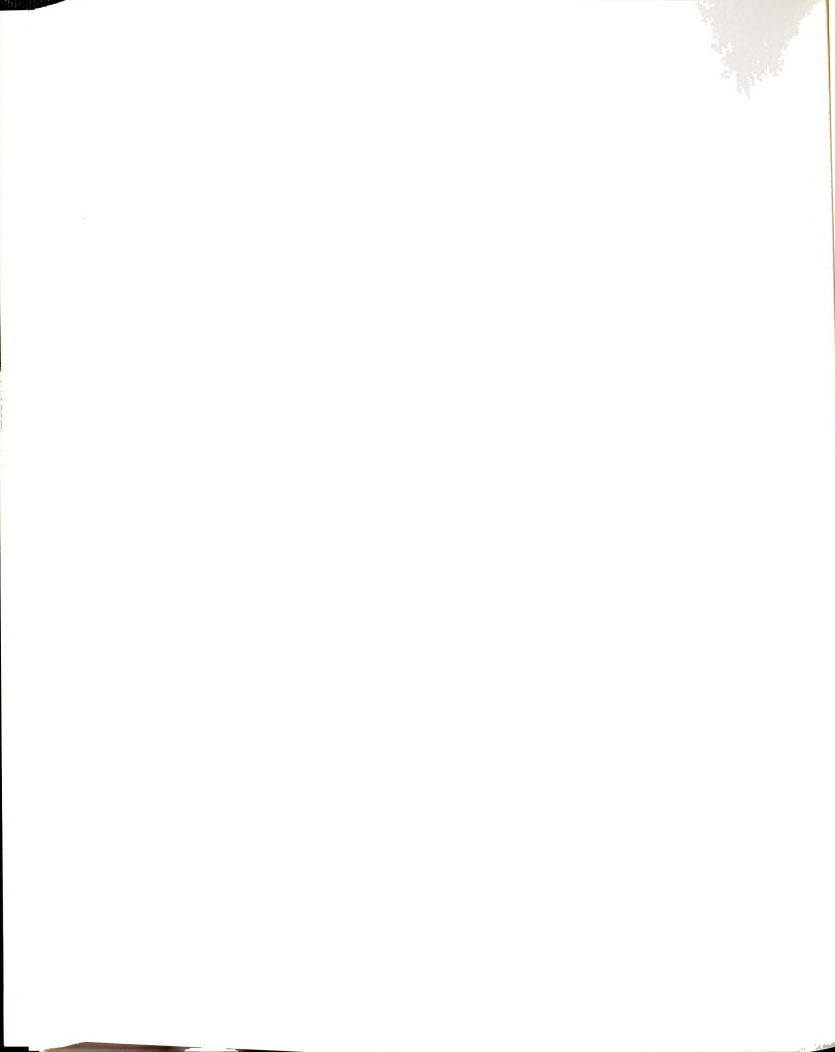


Table 5.1
Number of Firms Adopting or Dropping Performance Plans¹

Non-adoption		Adoption ²			Drop	
		Unit	Share	Both	Unit	Share
1971	199	-	-	-	-	-
1972-77	159	22	13	5	0	1
Period I						
1978	150	6	2	1	0	0
1979	141	5	4	0	1	0
1980	132	6	2	1	0	0
1981	125	5	2	0	0	0
Period II						
1982	111	13	1	0	1	1
1983	109	1	1	0	0	0
1984	97	10	0	2	1	0
1985	93	3	0	1	3	2
1986	86	4	2	1	1	0
1987	79	4	2	1	3	1
Total		79	29	12	10	5

¹ The number of adoptions and drops were counted from the available sample.

² Unit, Share and Both are designated 1) performance unit plans only, 2) performance share plans only, and 3) both unit plans and share plans.

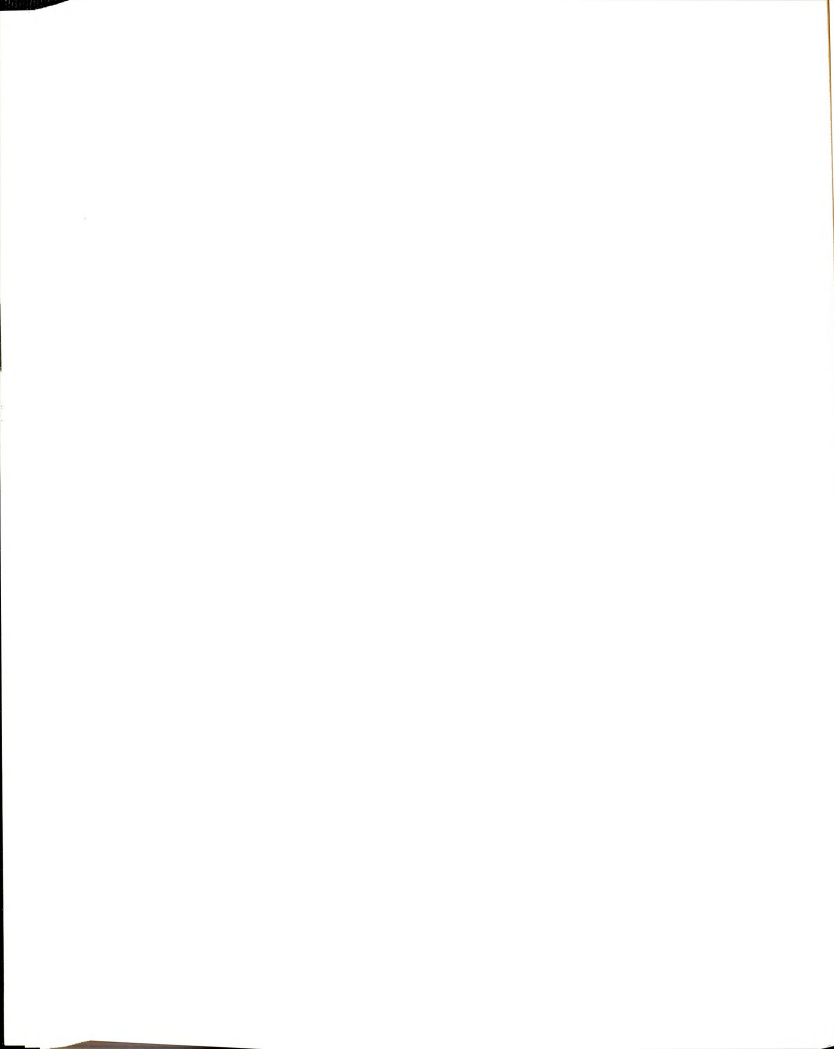


adopted PPs during a certain period, compared to those which did not. Thus test samples of each period consist of firms which did not have PPs at the beginning of the period. Among these, firms which did not adopt during the test periods but adopted immediately after the periods (i.e., 1982 and 1987) were deleted from the test sample. This deletion helps to minimize a possible error of identifying adoption timing at the boundary of the periods. In addition, since the exact time of the tax reform acts influence on firms' decision making is unknown, the deletion also helps to avoid period-division error resulting from the unknown, precise time at which the reforms effected the decision process. After fourteen firms in 1982 and seven firms in 1987 were deleted, the numbers of test firms in Period I and in Period II are 145 and 118, respectively. Among these, thirty four firms during Period I and thirty nine during Period II adopted PPs.

2 Measures of Firm Characteristics

2.1 Data Collection Consideration

Base-year: Adoption years are spread out over a 4-5 year period. This does not create a problem for the PPs adopters because data for adoption years can be collected and used for analysis. However, which year should be used for non-adopters? In the initial analysis, 1980 and 1984 were chosen as the "base-year" for Period I and Period II,



respectively, for data collecting purposes. Since the choice of the base-years is arbitrary, a different base-year was used in an additional analysis but similar results were found. This will be explained in the sensitivity analysis section.

Measurement of Personnel Variables: This study used three types of information about the sample firms' managers: own-firm stockholdings, ages and turnover. Since personnel data must be collected manually from the proxy statement or from business reference books, such data collection is very time consuming. Because of data collection difficulties, only one-year of data was collected to measure firms' personnel characteristics.³¹ Adoption year data were collected for adoption firms and the base-year data were collected for non-adoption firms.

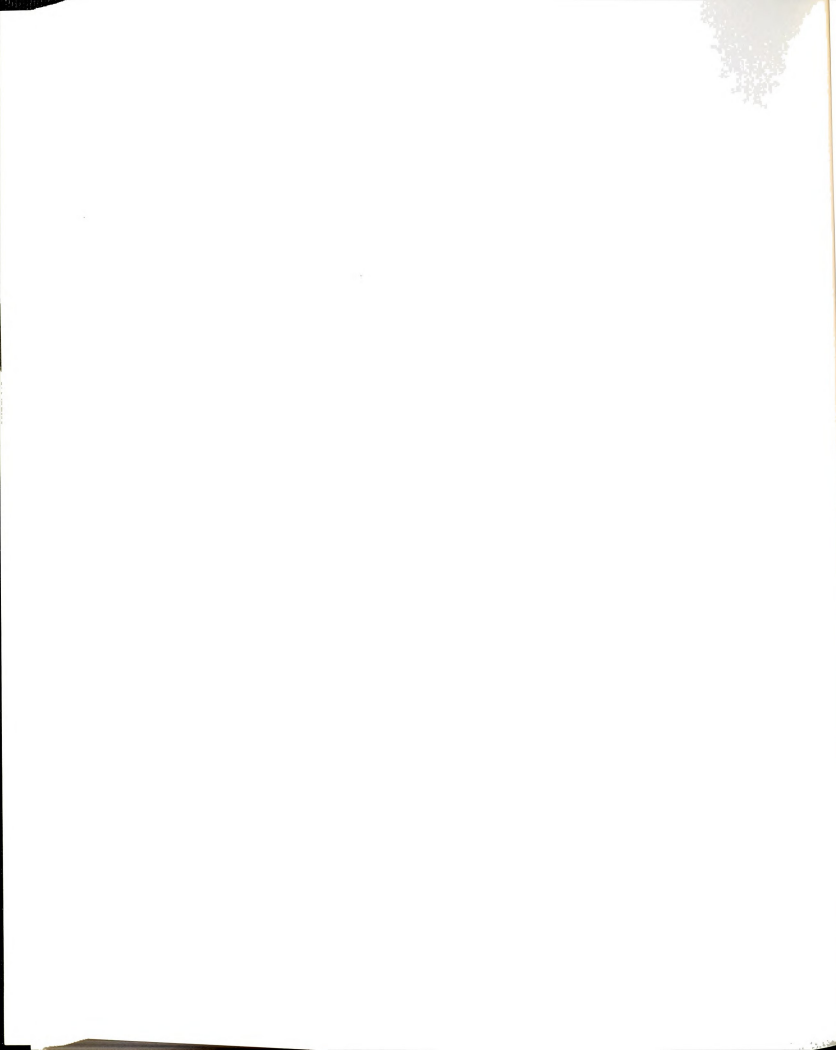
Measurement of Accounting and Stock Market Variables: Since data for non-personnel variables can be collected from various tapes, multi-period data collection is not difficult. To moderate the effect that the choice of any one particular year may have on the results, averages for three years were used in measuring non-personnel variables. The averages were calculated from three-years of data, the base-year and the two proceeding years for both adoption and non-adoption firms. Thus, for example, the R & D ratio was measured by the average of three-year R & D ratios for 1978-1980 for Period I and the average for 1982-1984 for Period

II. Sensitivity analyses were done over different base-years and different collection periods but the results were similar to the initial analysis.

Measurement of Growth Rates: Among the non-personnel variables, the growth rate variable alone was not measured by the average of three years. Instead, the growth rates in the base-years, 1980 and 1984, were collected from the Value Line tape. The reason that the average was not used is that the calculation of the growth rates was already based on average amounts. The detailed calculation method will be explained at Section 2.4.2 of this chapter.

2.2 Time-horizon Variables

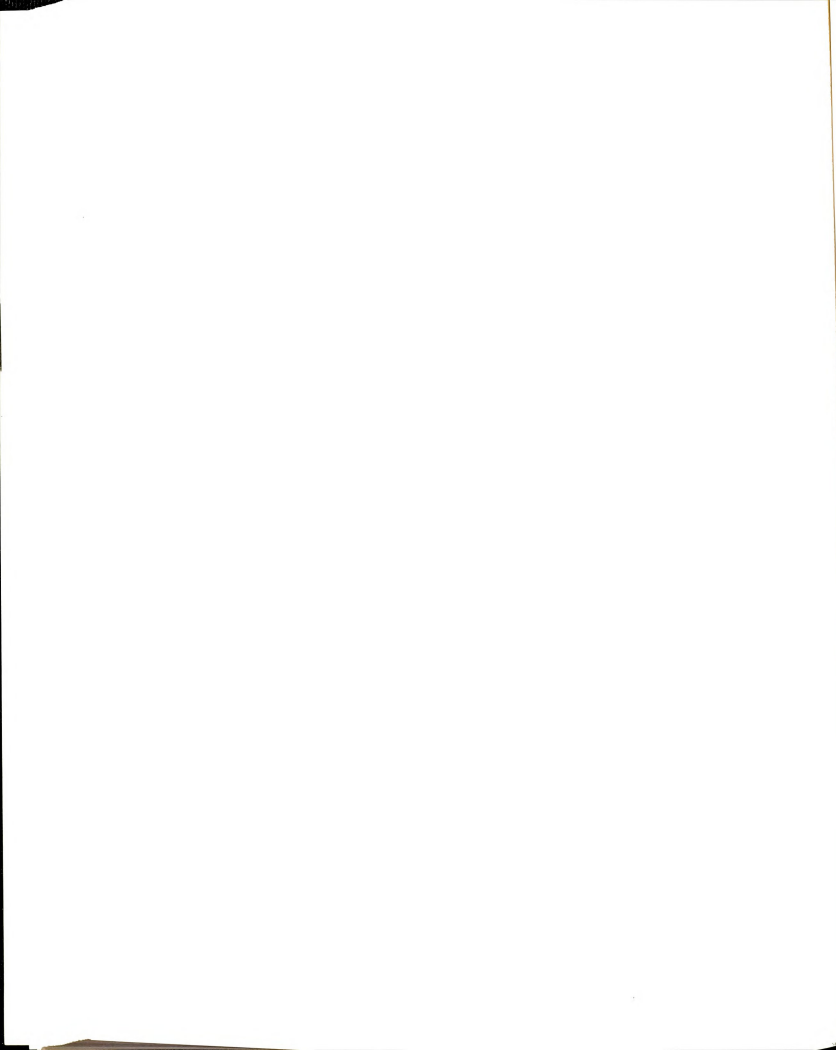
It was hypothesized that executives turnover and age were positively related to the adoption of PPs. The five highest paid managers in each firm were studied as a group in measuring executive turnover and age. The list of these five managers (normally, a CEO, a president and group vice presidents) was identified from the Reference Book of Corporate Management (1974-86) or from the proxy statements if not available from the reference book. In addition to five managers, the CEO's turnover and age were studied to measure firm characteristics. Lewellen et al. (1987) used data for the top manager and the top five managers in each firm, and Agrawal and Mandelker (1987) collected data for the top manager, the two top managers, and the group defined



in the proxy statements as "all officers and directors" of each sample firm. Since they found consistent results over the different groupings, it is expected that the two sets of personnel data should produce similar results.

Executive Turnover: No compensation research except Coughlan and Schmidt (1985) has measured executive turnover, and they measured only the turnover in CEOs. This study measured the turnover of the CEO and the five highest managers for a three-year period. The turnover ratio of the five managers (**Turnover**) was measured as the number of managers who were in the list at the year (t-2) but have left by the year t, where t is the adoption year for adoption firms and the base-year for non-adoption firms.³² Thus this ratio can range from 0 (lowest turnover) to 5 (highest turnover). Change in the CEO (**CEOchng**) was measured between t-2 and t in the similar manner and thus the **CEOchng** takes 0 (no change) and 1 (change).

Since firms usually have provisions for mandatory retirement at age 65 (Coughlan and Schmidt, 1985), officers who left firms at or above 65 are regarded as retiring and were deleted from the turnover count. This method used to calculate turnover might produce two measurement biases: a positive bias in measuring turnover of managers below 65 and a negative bias in measuring turnover of managers at or above 65. First, the positive bias can occur since **Turnover** and **CEOchng** might include death, dismissal from employment



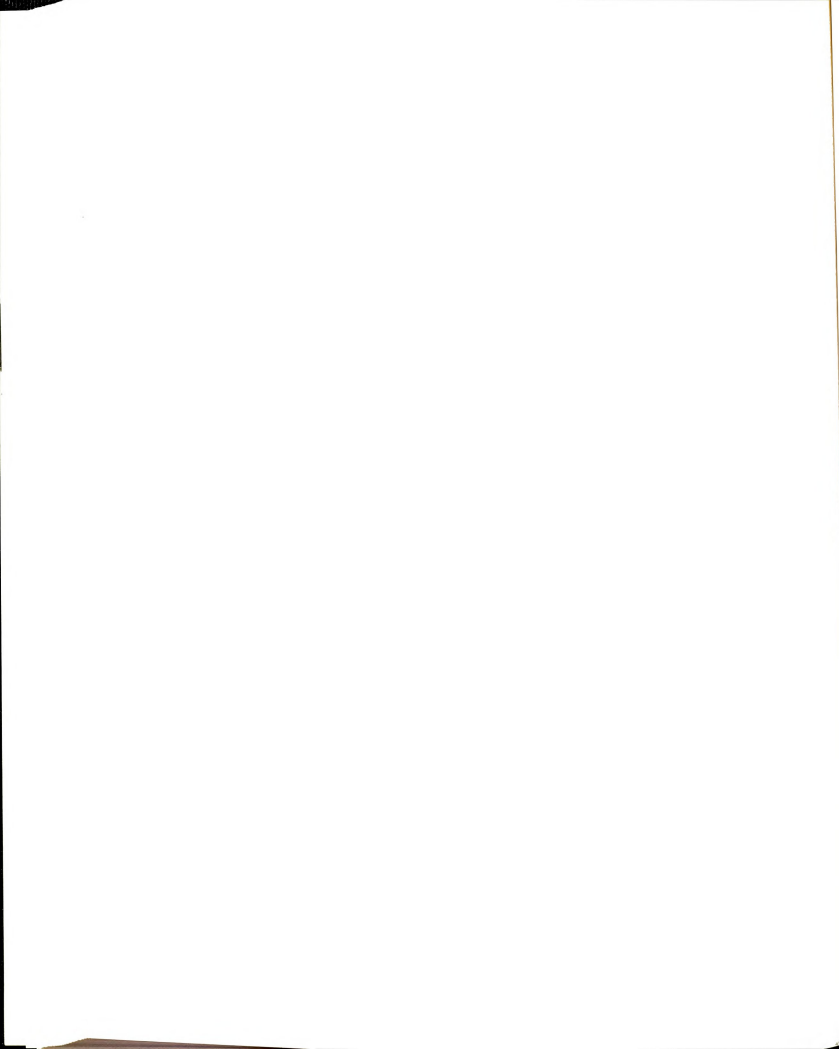
or early retirement as turnover counts. Second, since leaving a firm after 64 was regarded as retirement without further investigating actual reasons, turnovers of managers whose ages are more than 64 are not counted and thus the negative bias can occur.

Ages: Ages of the top manager (Age1) and the five highest managers (AveAge) in the adoption years for the adoption firms and the base-year for the non-adoption firms were collected from the Reference Book of Corporate Management (1975-86) or from the proxy statements for firms not listed in the first source.

2.3 Risk-aversion Variables

In this dimension, it was hypothesized that the environmental uncertainty was inversely related to the adoption of PPs. For this study, which considers the managers' interests, an ideal measure would be the manager's perception regarding the degree of change in the firm's surroundings, the competitiveness of the industry and the speed of technological development. However, since such measures are hard to collect and may be of questionable reliability and validity, this study cannot but rely on other more objective measures. Three accounting measures and three stock market measures were computed for this purpose.

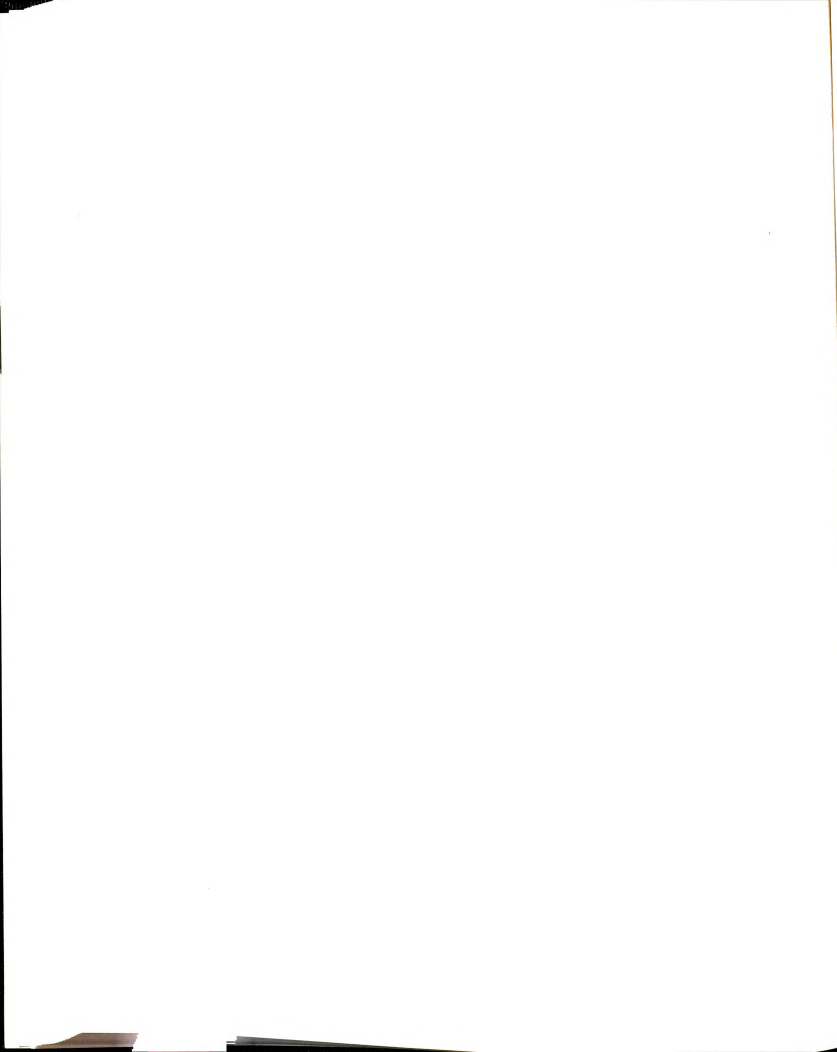
Accounting Measures: The volatility of net sales amounts (VolaSale), the ratio of R & D expenditures to total



assets (**R&Dratio**) and the ratio of long-term debt to stockholder's equity (**Leverage**) were chosen as proxies of the environmental uncertainty.³³ These accounting data were collected from the 1987 annual Compustat Tape.³⁴ **VolaSale** were measured by the coefficients of variation of three-years of data and **R&Dratio** and **Leverage** were measured by means of three-years of data as explained in the previous section. The coefficient of variation (CV), which is defined as the standard deviation divided by the mean expressed as a percentage, was used to measure volatility. This volatility measure is better than the standard deviation or variance because it adjusts for mean differences among firms.

The reason for using the R & D ratio instead of the volatility of R & D is based on the argument of Blandin, Brown and Koch (1974). They suggested that a more appropriate measure of uncertainty might be the absolute level of the ratio of R & D to assets, not the volatility of the level. Their rationale is summarized by Downey and Slocum (1975) as follows:

The firm which allocates a greater proportion of its resources to R & D is the firm which probably introduced new products and new technologies, enters new markets, and diversifies product lines. This is the firm that continually faces the new, the unexpected, and the unplanned uncertainty. This same firm could allocate consistently a large proportion of its resources to R & D and exhibit zero volatility. (pp. 565-6)

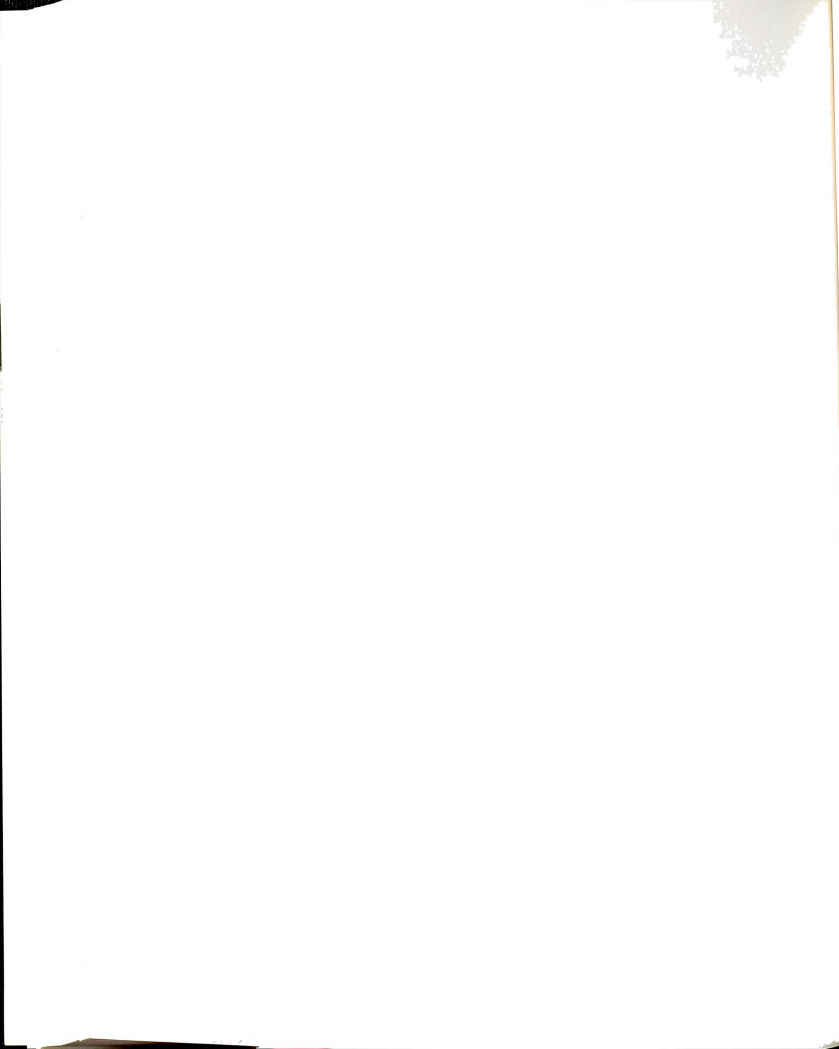


Stock Market Measures: The volatility of stock market returns (**VolaRetu**), stock market betas (**Beta**) and the standard error of the residuals from the market model (**Ser**) were used as proxies of environmental instability. Thirty six monthly stock market rates of return (78/1 to 80/12 for Period I and 82/1 to 84/12 for Period II) were collected from the CRSP tape. **VolaRetu** was measured by the standard deviation of the 36 monthly returns.³⁵ **Beta** was estimated by the slope coefficients of the market model regressions, based on these 36 monthly returns and the CRSP value-weighted index. **Ser** was calculated from the same model used for computing **Beta**.

2.4 Performance Measurement Variables

2.4.1 Growth Rates

It was hypothesized that the growth rate was inversely related to the adoption of PPs. This study used the average growth rate of sales (**Gr5Sale**) and accounting book values (**Gr5Bv**), and the average ratio of the market value of the firm's equity to book value (**Mv/Bv**) in order to measure the growth rate or the relative importance of options on future profitable investment opportunities. The five-year growth rates of the accounting measures were collected from the Value Line tape. The Value Line growth rates are defined as "compounded annual rates of changes of the accounting measures over the past 5-year period" (Value Line Data Base,



page 5, Chapter 19). In order to temper cyclicity, Value Line compares three-year average amounts in a five-year interval in calculating five-year growth rates. For example, in calculating sales growth rate in 1984, the average sales of 1982-1984 are compared with the average sales of 1977-1979.³⁶

These growth rates use past accounting data to estimate future potential and thus it is assumed that the trend of the growth rate can be projected in the future. For Mv/Bv , three-year market values of common and preferred stocks and book values of stockholders' equities were collected from the Compustat Tape. This measure, used by Lewellen et al. (1987), reflects the market's expectation about future performance as well as the relative value of SOPs as compared to PPs.

2.4.2 Own-firm Stockholdings

It was hypothesized that the own-firm stockholdings were inversely related to the adoption of PPs. The number of shares held by the highest paid manager of each firm is identified from the proxy statements of the adoption years for adoption firms and of the base-years for non-adoption firms.³⁷ Following Agrawal and Mandelker (1987), two measures were constructed. The first measure ($HOLD1$) is the ratio of the dollar value of common stock beneficially owned by the top manager to his/her cash and cash-equivalent compensation. The second measure ($HOLD2$) is the proportion

of total stock outstanding that is beneficially owned by the top manager. Beneficial ownership is defined by SEC regulations as shares over which he/she has sole or shared investment discretion plus shares which are receivable by him/her upon exercise of employee stock options exercisable within 60 days. The cash and cash-equivalent compensation basically consists of annual salary plus bonus. The security holding and cash and cash-equivalent compensation were collected from the proxy statement.³⁸

These measures are designed to overcome both the problems of comparing security holdings of managers with differing levels of total wealth and the difficulty involved in comparing undeflated dollar amounts at different points over sample periods (Agrawal and Mandelker, 1987, p. 828). Agrawal and Mandelker and Lewellen et al. used the data for the group defined in the proxy statements as "all officers and directors". However, since this study requires that the data relate only to the officers, this measure cannot be used in this study.³⁹

3 Descriptive Statistics of Sample Firms

3.1 Distributional Properties of the Variables

Table 5.2 shows summarized definitions of the firm characteristics constructed in the previous section. In the time-horizon dimension, two additional measures are shown to compare the results with other studies: **Fix**, used by

Table 5.2
Description of Independent Variables (1)

TIME-HORIZON DIMENSION

Turnover	Turnover rates of the five top managers between year t and t-2. For non-adopters, year t (base-year) is 1980 for Period I and 1984 for Period II, and for adopters, year t is an adoption year. The officers whose age are over 63 in year t-2 were excluded in turnover count in order to reflect mandatory retirement.
CEOchnng	Categorical measure of CEO changes between year t-2 and t; 0 for no change and 1 for change.
AveAge	Average age of the five top managers.
Age1	Age of the top manager.
Cat_Ave	Categorical measure of AveAge which has 0 (youngest group) to 3 (oldest group); Total sample firms are equally divided into 4 groups.
Cat_Age1	Categorical measure of Age1 ; the division method is the same as Cat_Ave .
Fix	Average ratio of long-term assets [c6-c4]* to total assets [c6] for the three years t to t-2. Year t (base-year) is 1980 for Period I and 1984 for Period II, and this is applied to the other variables unless otherwise mentioned. [Source: <u>Compustat</u>]
Capital	Average ratio of capital expenditures [c23] to total assets [c6] for the three years t to t-2. [Source: <u>Compustat</u>]

RISK-AVERSION DIMENSION

VolaSale	Coefficient of variation of three-year sales [c12] amounts from t to t-2. The coefficient of variation is defined as the ratio of the standard deviation to the mean expressed as a percentage. [Source: <u>Compustat</u>]
-----------------	---

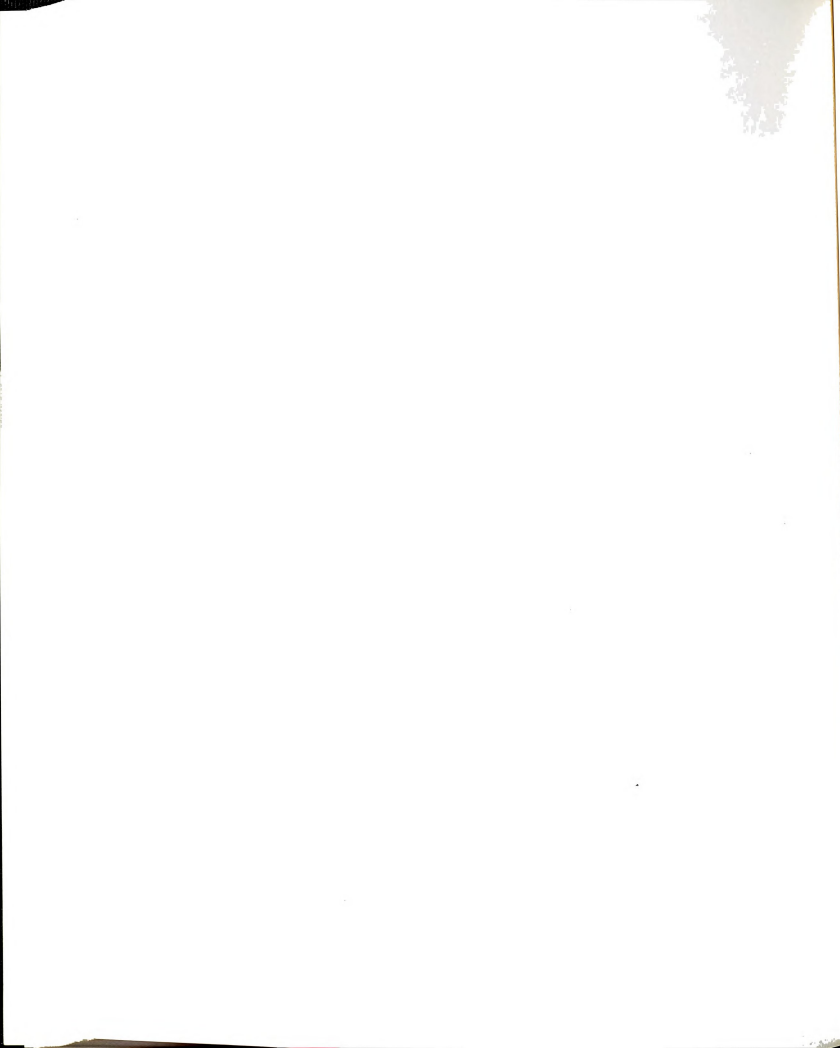
Table 5.2 (cont'd)

R&Dratio	Average ratio of R & D expenditures [c20] to total assets [c6] for the three years t to t-2. [Source: <u>Compustat</u>]
Leverage	Average ratio of long-term debt [c9] to total book value of equities [c6-c4-c9] for the three years t to t-2. [Source: <u>Compustat</u>]
VolaRetu	Standard deviation of monthly stock market rates of return for the 36 months from 78/1 to 80/12 for Period I, and from 82/1 to 84/12 for Period II. [Source: CRSP]
Beta	Slope coefficient of the market model regression, based on value-weighted market index, using the same 36 monthly stock returns as in VolaRetu . [Source: CRSP]
Ser	Standard error of the residuals from the market model regression based on value-weighted market index, using the same 36 monthly stock returns as in VolaRetu . [Source: CRSP]

PERFORMANCE MEASUREMENT DIMENSION

Gr5Sale (Gr5Bv)	Annual growth rates of sales [v362]* (book values of equities [v365]) for five years of t-4 to t. [Source: <u>Value Line</u>]
Mv/Bv	Average ratio of market value to book value of equities [v150] for the three years t-2 to t. [Source: <u>Value Line</u>]
Hold1	Ratio of the top manager's own-firm stockholding to cash and cash-equivalent compensation in adoption years for adoption firms and in year t for non-adoption firms. [Source: Proxy statement]
Hold2	Ratio of the top manager's own-firm stockholding to the common stock outstanding. The measurement time of Hold2 is the same as that of Hold1 . [Source: Proxy statement]

* The numbers after c and v are the Compustat and the Value Line item numbers.



Lewellen et al. (1987) as a time-horizon measure; and **Capital**, used by Larcker (1983) in the managers' behavior change study (for detail, see Chapter 3). Since it is possible that time-horizon effects of the age variable may not take on a linear relationship with managers' ages, the average age of the group (**AveAge**) and the CEO's age (**Age1**) has been converted into categorical measures. For the categorical variables (**Cat_Ave** and **Cat_Age1**), **AveAge** and **Age1** of sample firms were divided into 4 groups equally so that each group has the same number of firms.⁴⁰ Values from 0 to 3 were assigned, 0 to the youngest group and 3 to the oldest group. The conversion from **AveAge** to **Cat_Ave** are similar between Period I and Period II, and **Cat_Ave** takes 0 below 55, 1 between 55 and 57, 2 between 58 and 59, and 3 above 60.

Table 5.3 reports the distributional properties of the characteristics used as the independent variables.⁴¹ In the time-horizon dimension means of the age variables between the two periods are not much different. The average ages of the five top managers ranged from 46.4 to 67.3 with a mean of 57.8 during Period I, and from 42.2 to 67.6 with mean of 57.8 during Period II. The distributions of **AveAge** in both periods seem to follow a bell curve and average ages are far below retirement ages. Executive turnover (**Turnover**) increased slightly: roughly 11% (.55 out of five managers) left their firms during Period I and 14% (.73

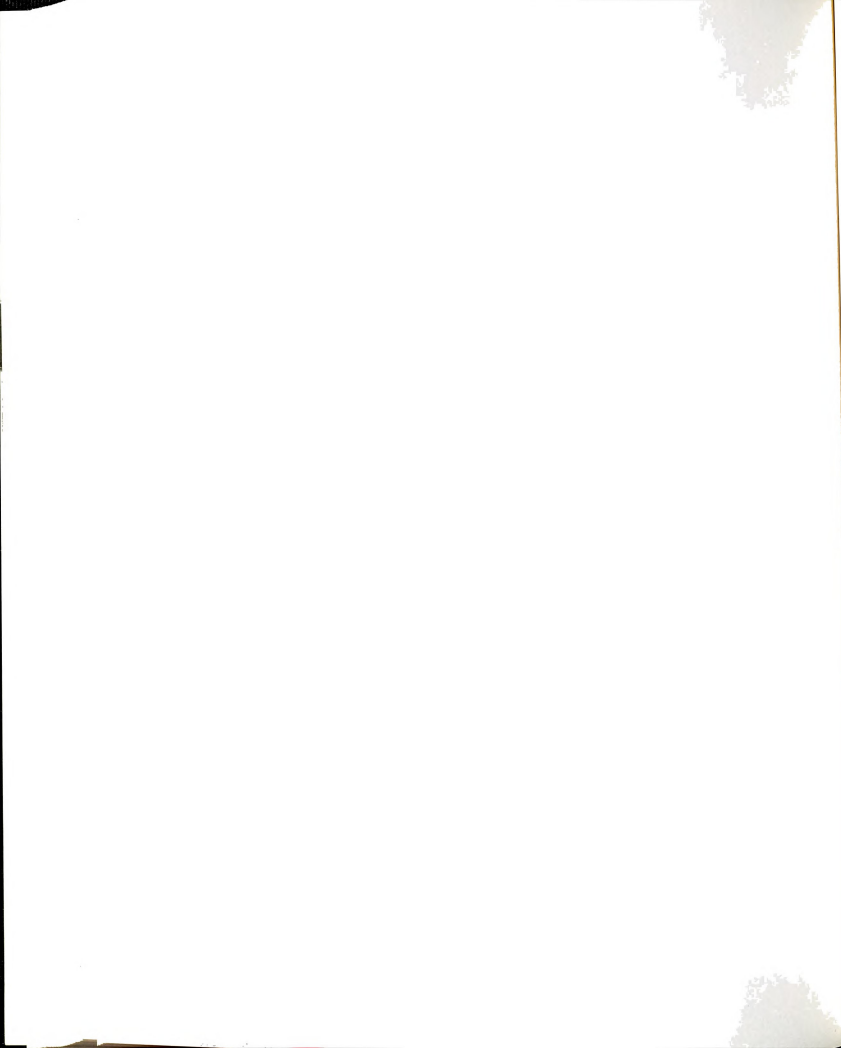
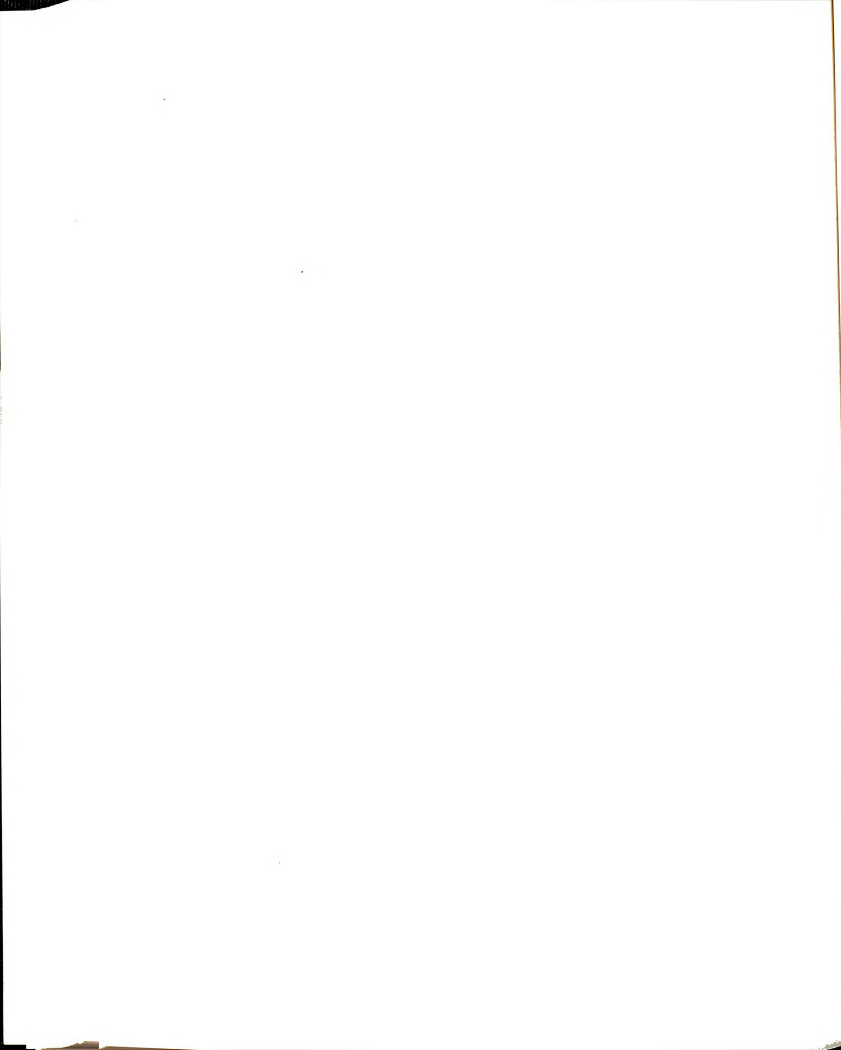


Table 5.3
Summary Statistics of Variables for Period I and II¹

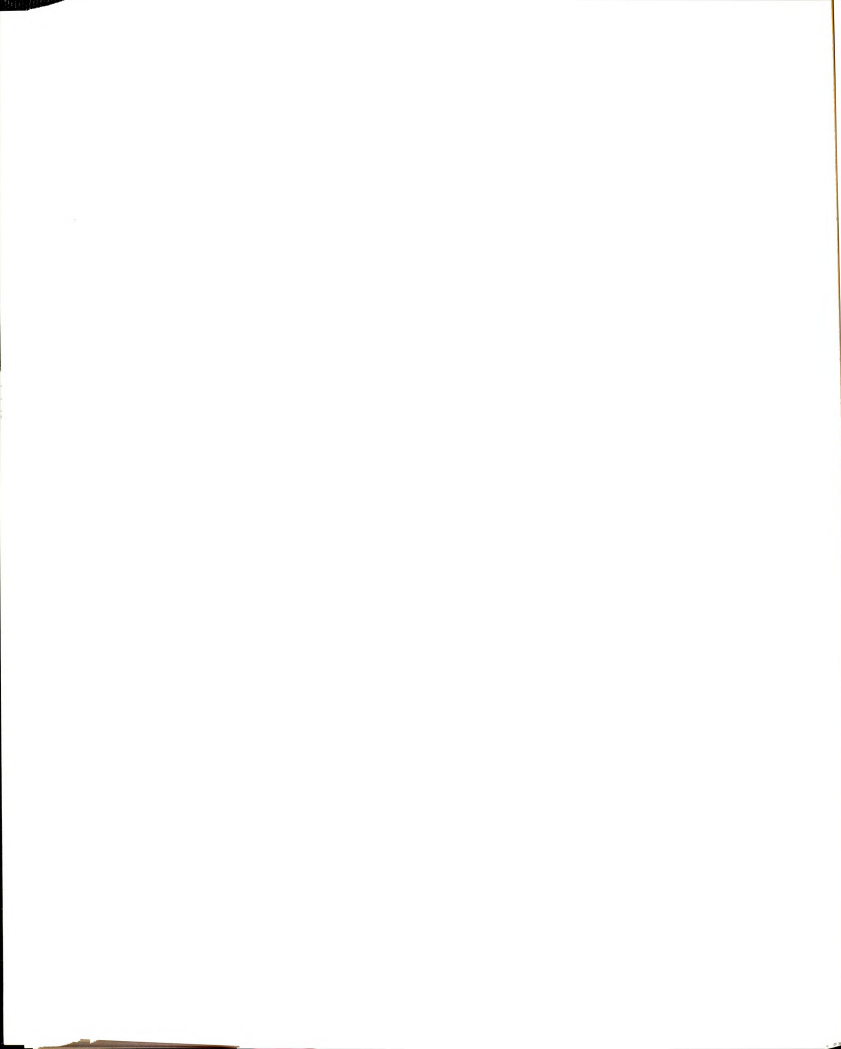
	Period I					Period II				
	N	Mean (SD)	Skewness	Min	Max	N	Mean (SD)	Skewness	Min	Max
TIME-HORIZON										
Turnover	135	.55 (.84)	2.0	0	4	113	.73 (.83)	.9	0	3
CEOchnng	135	.14 (.35)	2.1	0	1	113	.26 (.44)	1.1	0	1
AveAge	139	57.8 (3.6)	-.2	46.4	67.3	117	57.8 (4.4)	-.7	42.2	67.6
Age1	139	61.1 (6.2)	.1	43	80	117	61.2 (7.2)	-.4	30	84
Fix	142	.50 (.16)	.2	.17	.93	118	.56 (.16)	-.2	.13	.83
Capital	142	.10 (.04)	.9	.03	.23	118	.08 (.03)	1.0	.02	.22
RISK-AVERSION										
VolaSale	141	16.6 (8.9)	1.4	2.3	58.7	118	11.6 (9.8)	1.7	.46	46
R&Dratio	125	.03 (.03)	1.5	.00	.15	92	.04 (.03)	1.0	.00	.14
Leverage	137	.62 (.88)	7.5	.01	9.37	117	.52 (.44)	2.5	.02	3.05
VolaRetu	135	.09 (.03)	2.0	.03	.25	114	.09 (.02)	1.0	.05	.17
Beta	130	1.07 (.46)	.5	-.02	2.72	112	1.14 (.36)	.3	.28	2.09
Ser	130	.07 (.02)	1.6	.03	.16	112	.07 (.02)	1.3	.04	.16
MEASUREMENT										
Gr5Sale	138	13.1 (6.8)	1.1	-4.0	38	116	8.1 (12.1)	4.9	-13	107
Gr5Bv	138	11.9 (6.9)	1.1	-24	42	115	9.2 (14.5)	5.6	-22	132
Mv/Bv	139	1.30 (.65)	1.3	.21	4.12	117	1.4 (.77)	1.9	.48	4.65
Hold1	140	30.3 (83.4)	3.7	.17	409	118	17.4 (66.8)	6.0	.04	484
Hold2	140	10.8 (25.2)	3.6	.02	151	118	5.2 (16.6)	6.1	.01	137

¹ For definitions of variables, refer to Table 5.2.



manager) during Period II. The CEO turnover (**CEOchnng**) increases sharply from .14 to .26. If these values of **CEOchnng** are converted into tenure periods, they are 14 years in Period I and 7.7 years in Period II.^{42,43}

In the risk-aversion and measurement dimensions, three conspicuous features must be mentioned. First, all variables except **Beta** have large positive skewnesses which indicates that there are some extreme values. In order to reduce the effect of these outliers, all variables in these two dimensions were transformed by natural logarithm. Because certain variables include zero, one is added to each for all the log-transformations. In addition, since **Gr5Sale** and **Gr5Bv** have negative values, before the log-transformation, the minimum values are also added to these variables. Second, the means of Period I and Period II are very different. In the measurement dimension, all of the variables except **Mv/Bv** have much larger means in Period I than in Period II. It seems that without the period division, the results would be contaminated by economic condition differences over time. Finally, **R&Dratio** has many more missing values in both periods than any other variables. If missing values of R & D result from immaterial amounts and the proportions of missing R & D in the adoption group and the non-adoption group are different, the results would be biased. This missing R & D problem will be discussed in the next chapter.



3.2 Adoption Variable

3.2.1 Differences in Adoption Rates

Table 5.4 shows the number of adoptions versus sales-rank groups and test periods. The total available sample of 199 firms was sorted into descending order of sales amounts and grouped by intervals of 20 firms. Sales were measured by the average of 1982-84 sales amounts. Four time divisions were reported: prior to Period I (1972-77), Period I (1978-81), Period II (1982-86) and 1987. Table 5.4 indicates that firm size may a factor in the adoption decision. By 1987, seventy of the top 100 firms had adopted PPs compared with 49 firms of the bottom 99 firms. During Period I, especially, adoption rates were highly related to firm size. However, size was not an important factor prior to Period I and during Period II where there was little association of adoption rates with size. The relationship between adoption rates and size differences will be examined statistically in the next section.

In addition to size, industry type seems to be a factor in the adoption of PPs. Table 5.5 shows adoption rates of various industry groups. Industry grouping follows Fortune's classification which is similar to the SIC 2-digit code classification.⁴⁴ Adoption rates of industry groups are widely spread from 0% to 100%. For instance, by 1987

Table 5.4
Number of Adoption by Sales Rank Groups and Periods

Sales Rank (Range of Sales) ¹	Adoption Periods				Adoption by 87	
	72-77	78-81	82-86	87	Yes	No
1-20 (92,195-14,271)	3	7	5	0	15	5
21-40 (12,464-7,115)	5	5	3	1	14	6
41-60 (7,046-4,887)	3	2	5	2	12	8
61-80 (4,885-3,902)	6	4	4	0	14	6
81-100 (3,788-3,146)	5	5	5	0	15	5
Subtotal	22	23	22	3	70	30
101-120 (3,140-2,619)	3	2	7	0	12	8
121-140 (2,584-2,088)	4	0	3	0	7	13
141-160 (2,029-1,661)	5	3	3	1	12	8
161-180 (1,655-1,395)	1	4	1	0	6	14
181-199 (1,399-775)	5	2	4	1	12	7
Subtotal	18	11	18	2	49	50

¹ Sales ranks are based on average sales amounts for 1982-84. Sales are expressed in million dollars.

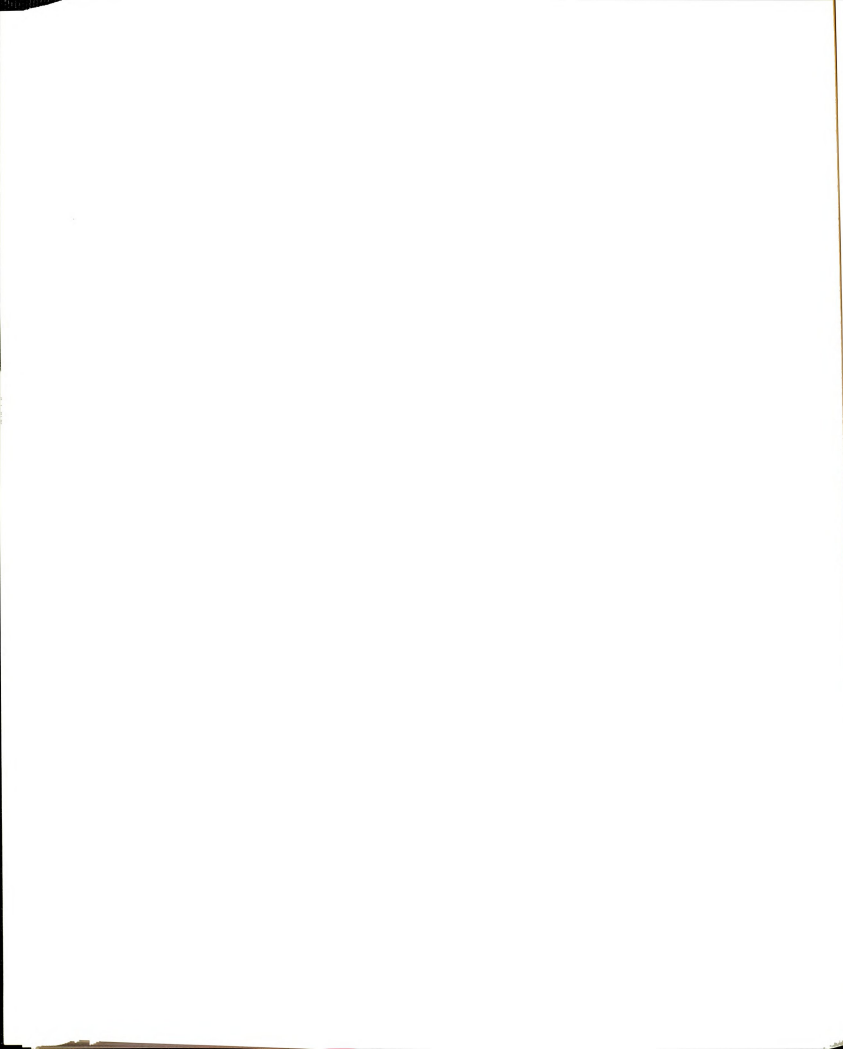
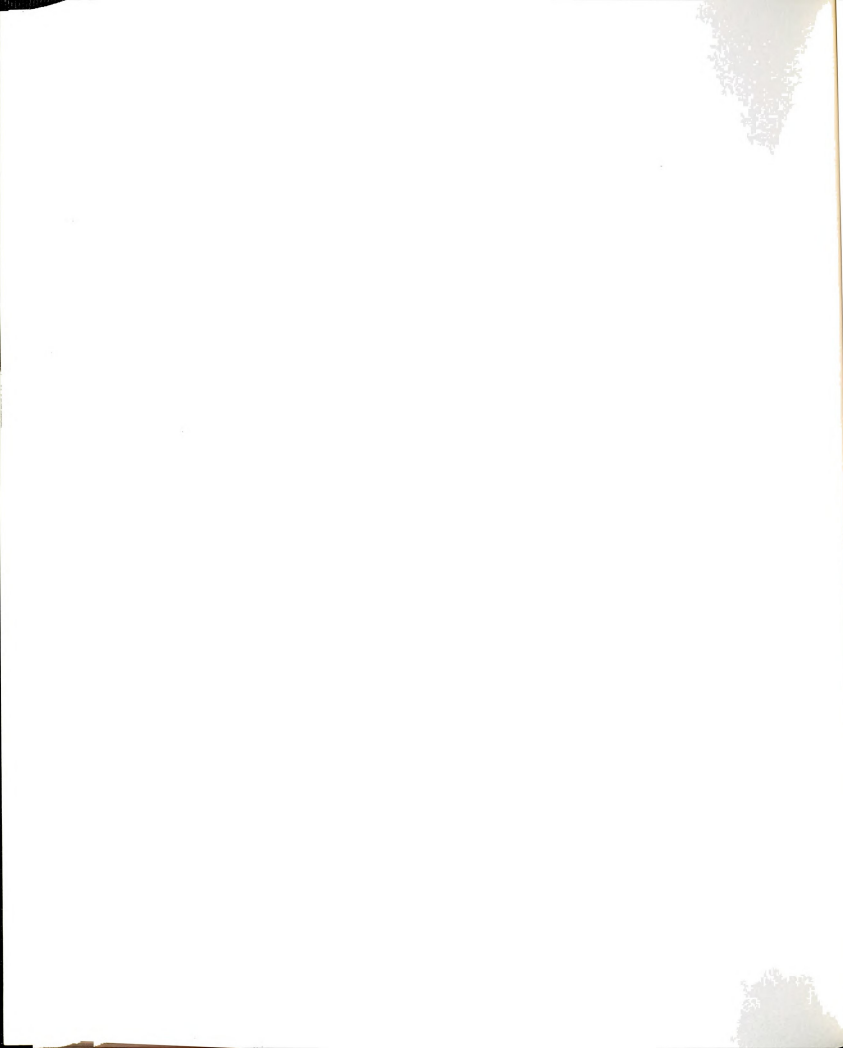


Table 5.5
Number of Adoption by Industry Groups and Periods

Industry Groups ¹	Total	Number of Adoption				Adoption Rates by 1987
		72-77	78-81	82-86	87	
Aerospace (41)	10	2	1	2	1	.60
Apparel (23)	2	0	0	1	0	.50
Beverage (49)	3	1	0	1	0	.67
Build Material (32)	4	3	1	0	0	1.00
Chemical (28)	17	5	2	2	0	.53
Computer (44)	9	0	3	2	0	.55
Electronics (36)	23	4	5	3	0	.52
Food (20)	18	7	4	3	0	.78
Forest Products (26)	16	2	2	2	1	.44
Industrial Equip (45)	12	2	3	3	1	.75
Metal Products (34)	5	1	1	1	0	.60
Metals (33)	7	2	0	2	0	.57
Mining (10)	3	0	0	0	0	.00
Motor Vehicles (40)	6	0	1	5	0	1.00
Petro Refining (29)	23	3	5	3	1	.52
Pharmaceuticals (42)	12	2	2	3	0	.58
Publishing (27)	8	2	1	2	0	.63
Rubber Products (30)	3	0	0	1	0	.33
Scientific Equip (38)	5	1	1	1	2	1.00
Soaps & Cosmetic (43)	3	0	0	1	0	.33
Textile (22)	3	1	0	1	0	.67
Tobacco (21)	3	0	1	0	1	.67
Transport Equip (37)	4	2	1	0	0	.75
Total	199	40	34	39	7	.603

¹ Industry grouping follows Fortune classification in 1984 and the classification numbers are in the parentheses.



all firms in the building material, motor vehicle and scientific equipment industries have PPs in their compensation packages, whereas no firm in the mining industry had PPs by 1987. Even between industries with 100% adoption rates, there is a big difference in adoption periods. All companies in the building material industry had adopted by 1980, whereas at that time no company in the motor vehicle industry had adopted PPs.⁴⁵ The different adoption rates and different adoption periods among industries suggests that industry-specific factors might influence compensation package design.

3.2.2 Statistical Analysis of Size Covariate

Univariate tests of the size difference were conducted between the adoption and non-adoption firms in Table 5.6. Two panels of the table report the results of the t-test and the Wilcoxon Rank-sum test over Period I and II. Panel A used the 1978-81 adoption information and Panel B used the 1982-86 adoption information.

The variable **Sale** is measured by the 3-year average of 1978-80 net sales for Panel A and 1982-84 net sales for Panel B. Since **Sale** shows large skewness (5.12 for Panel A and 4.97 for Panel B) the log form is taken and **LogSale** is calculated by a logarithm-transformation of **Sale**. However, the **LogSale** still has relatively large positive skewness (.55 for Panel A and 1.28 for Panel B) and thus, the Wilcoxon test was used as a complement. The average

1871
1872
1873

Table 5.6
Univariate Tests of Size Difference¹

Panel A: Adoption Period of 1978-81

	Non-adopt		Adopt		t-statistic	Z Score of
					Difference	Wilcoxon
	N	Mean	N	Mean	in Means ²	Test
Sale	108	4484	34	7300	-	-
LogSale	108	7.82	34	8.22	-2.03**	-1.93**
RelaSale	108	-.13	34	.26	-1.49*	-2.32**

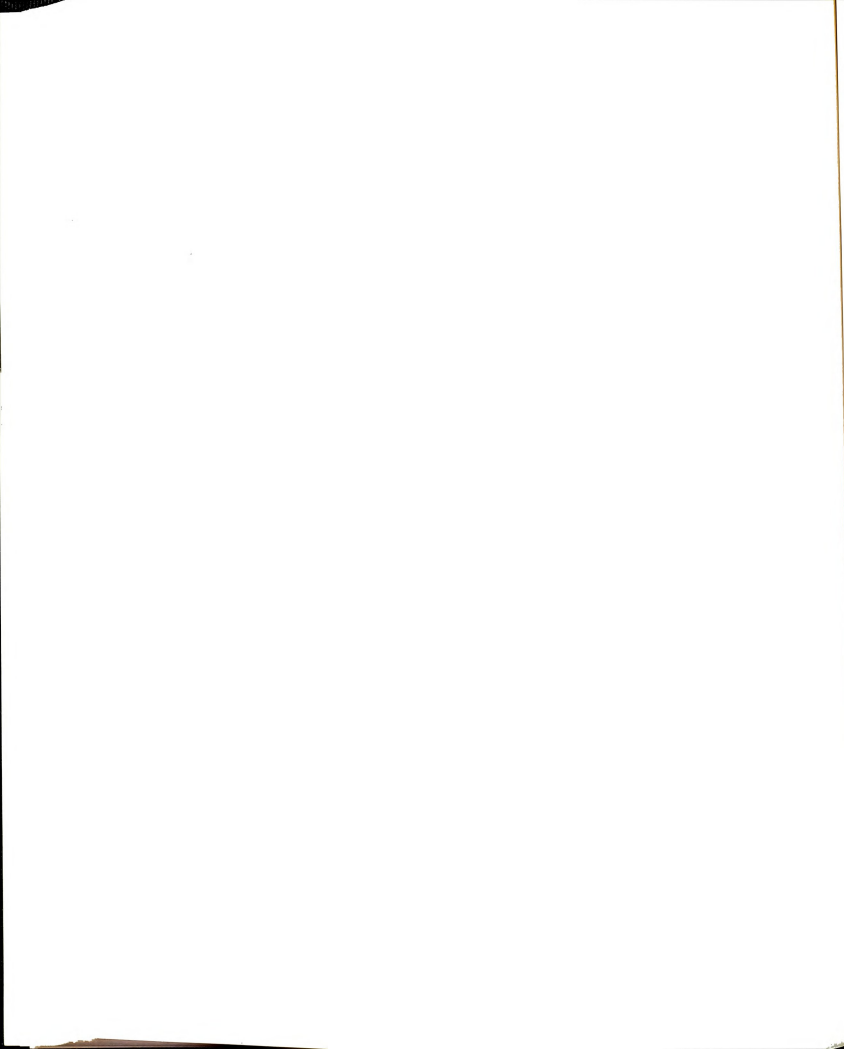
Panel B: Adoption Period of 1982-86

	Non-adopt		Adopt		t-statistic	Z Score of
					Difference	Wilcoxon
	N	Mean	N	Mean	in Means ²	Test
Sale	79	5621	39	7906	-	-
LogSale	79	8.05	39	8.38	-1.92**	-2.31***
RelaSale	79	-.08	39	-.02	-0.37	-2.11**

¹ The measurement of the size variables are as follows:
SALE(in millions) is measured by 3-year average of net sales of 1978-80 for Panel A and 1982-84 for Panel B.
RELASALE is calculated by (**SALE** of individual firm - industry average) / industry average. The industry average is computed from the 199 available sample firms. It reflects the relative size of the firm in the industry.
LOGSALE is calculated by logarithm-transformation of the **SALE**.

² The t-statistic is adjusted for differences in variances if an F-test indicates that the hypothesis of equal variances between the two groups on a specific attribute can be rejected at the .05 level.

- * Significant at the .10 level (one-tailed test).
- ** Significant at the .05 level (one-tailed test).
- *** Significant at the .01 level (one-tailed test).

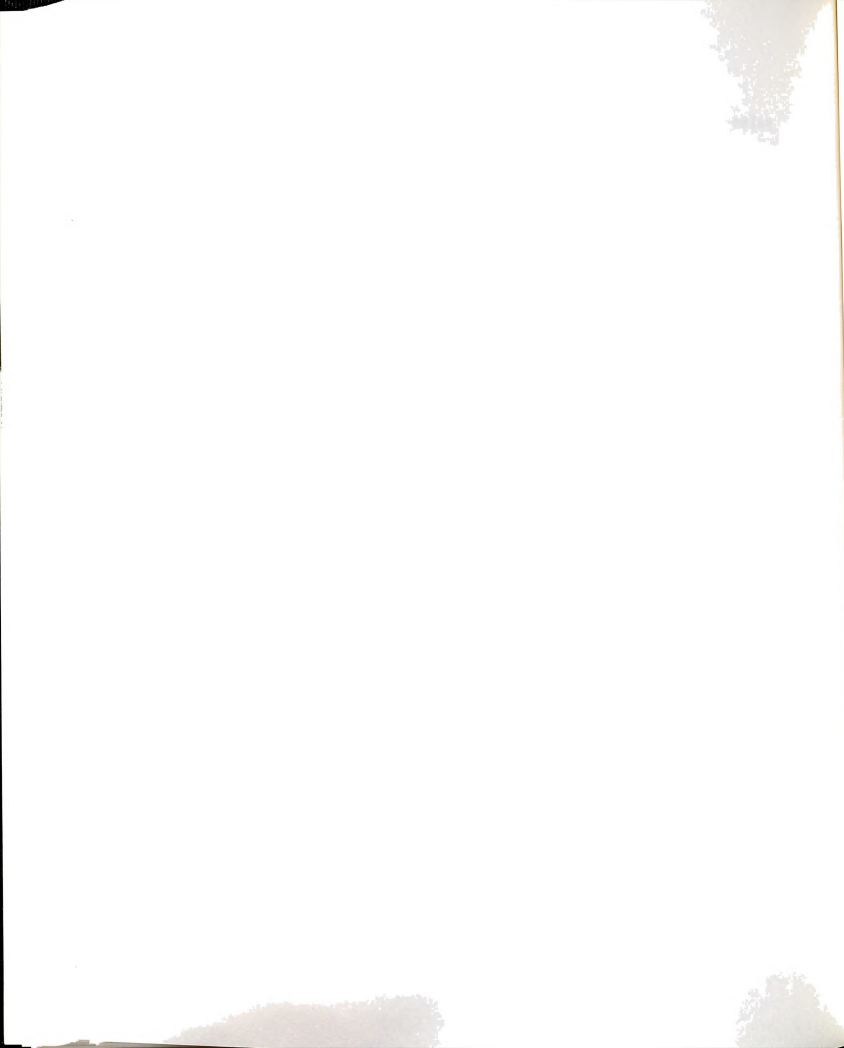


sales of the adoption group in both panels is much larger than those of the non-adoption group and the **LogSale** reflects this difference over the two periods in both the parametric and nonparametric tests.

To examine how much the relative size of a firm within an industry affects the adoption decision, **RelaSale** was constructed. For calculation of **RelaSale** the difference of a firm's net sales from the industry average is divided by the industry average. Positive values of the **RelaSale** show above-average size and negative values show below-average size regardless of absolute size. This variable controls for the differences in average size among industries.⁴⁶ Since the absolute size was found to be significant, if the test result of **RelaSale** were not significant, it could be interpreted that only the absolute size plays a role in the adoption decision regardless of the size status of the firm within the industry. However, the tables show that the **RelaSale** is significant over both periods except for the t-test of Panel B.⁴⁷ This suggests that the size status within the industry could be a factor in the adoption decision.

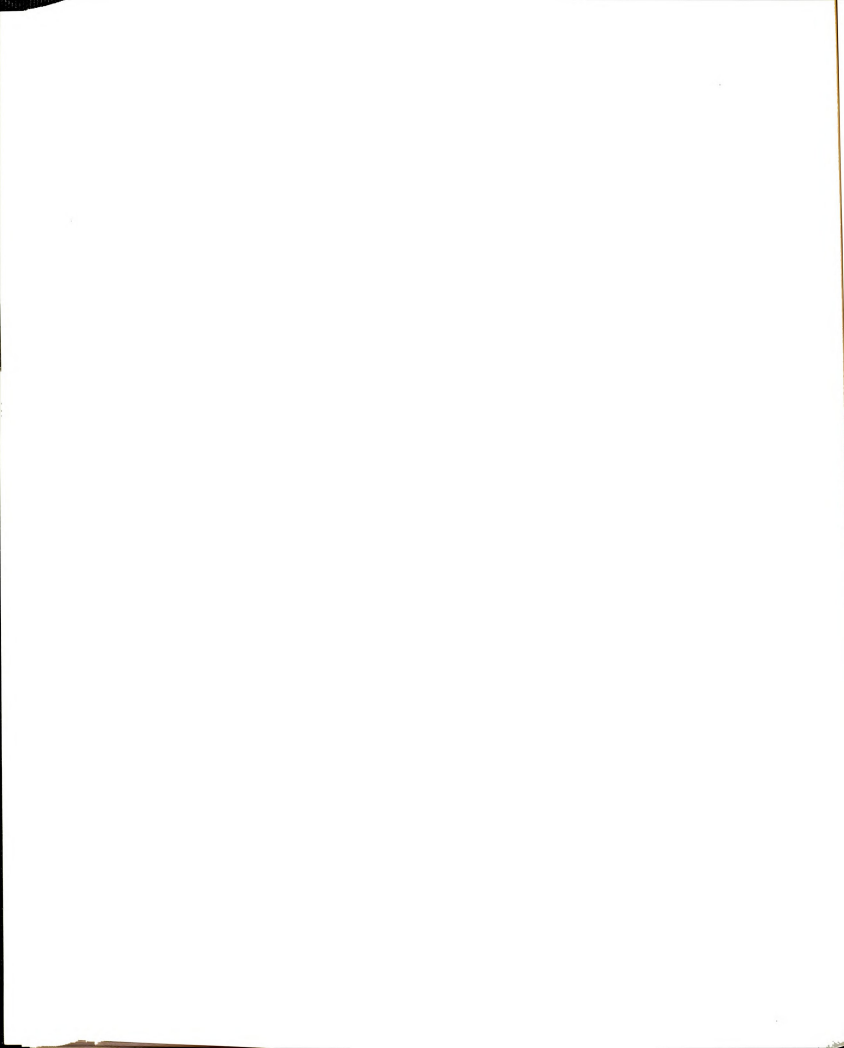
3.2.3 Control for Size and Industry Differences

In order to control for the size difference between the adoption firms and non-adoption firms, multivariate analyses were conducted in addition to univariate tests. **LogSale** was included in the model as a covariate. As for industry



effects, one way to control for industry differences is to include industry-specific factors in the model with firm characteristics. Specifically, a firm characteristic variable will be divided into the industry average part and a residual part (a firm characteristic minus the industry average). In this way the regression coefficients of the residual parts provide partial correlations of firm characteristics with the adoption variable after removing the influence from industry-wide factors.

However, inclusion of industry covariates in the multivariate analyses did not occur in this study for two reasons. First, the multivariate analyses cannot include the industry differences effectively since there are too many industries that consist of a small number of firms. For instance, among 23 industries in the sample, twelve industries have less than four firms in Period II. Second, because of the exploratory nature of this study, it is difficult to predict the directions and magnitudes of the industry effects and to interpret the multivariate results. Fortunately, the adoption firms show different characteristics from the non-adoption firms without controlling for industry factors, as explained in the next chapter.



VI RESULTS AND DISCUSSION

1 Univariate Analyses

The univariate t -test and nonparametric Wilcoxon Rank-sum test were used to test the hypotheses. Results of these tests are reported under each dimension. If necessary, modified tests were conducted. Since the division of the sample periods and the selection of base-years were arbitrary, sensitivity analyses of different period-divisions and measurements were done. Results of these sensitivity analyses were compared with the results of the original design. Additionally, the original results were compared with the results derived from the same sample after deleting the largest and smallest fifteen companies. Finally, the homogeneity of the different types of PPs were examined by separating unit-plan adopters and share-plan adopters and comparing these groups with non-adopters.

1.1 Time-horizon Dimension

1.1.1 Correlation Analyses

Panel A in Table 6.1 shows the correlations between variables in the time-horizon dimension. The numbers in the upper right triangle are the correlation coefficients for Period I and those in the lower left triangle are for Period II. The high correlations between **Turnover** and **CEOchng**, between **AveAge** and **Age1**, and between **LFix** and **LCapital**

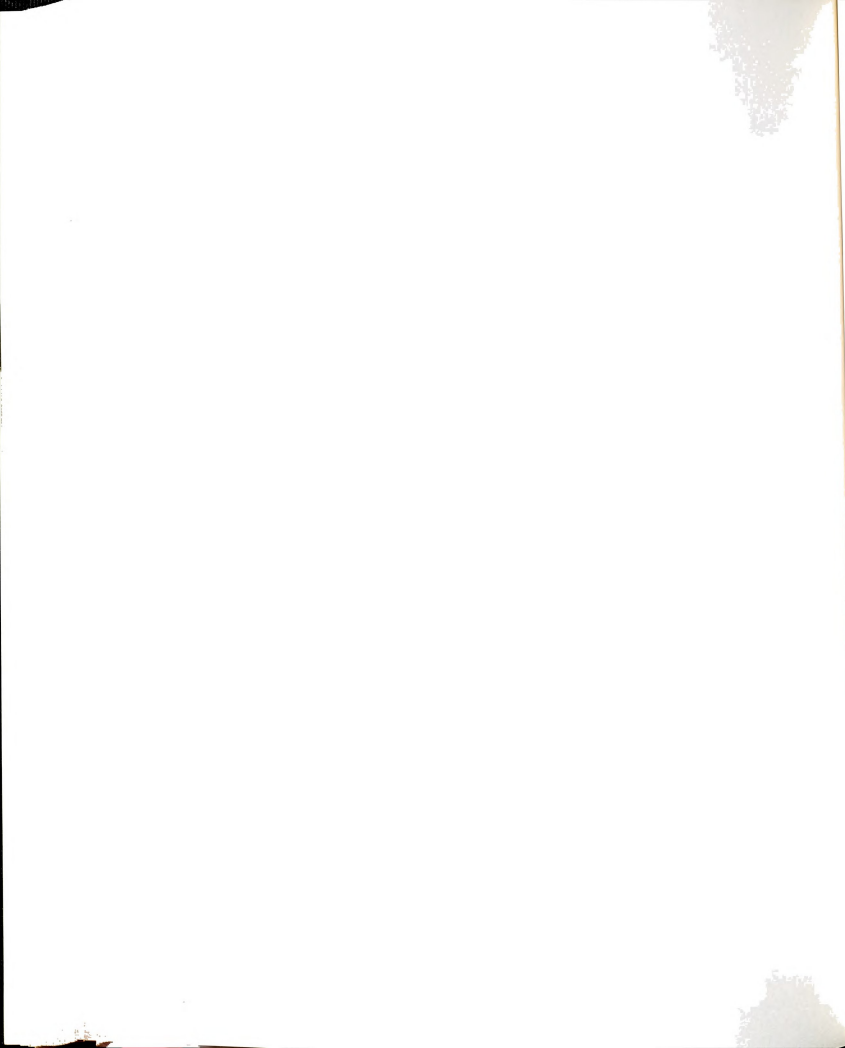


Table 6.1
Correlation Coefficients for Period I and II^{1,2}

Panel A: Time-horizon Dimension

	Turnover	CEOchng	AveAge	Age1	LFix	LCapital
Turnover		.27**	.00	.01	.00	-.03
CEOchng	.22*		-.03	-.23*	.21*	.03
AveAge	-.20*	.14		.54**	.10	-.03
Age1	-.07	.00	.57**		.09	.04
LFix	.00	-.07	.07	.11		.48**
LCapital	-.19*	-.12	.00	.01	.28**	

Panel B: Risk-aversion Dimension

	LVolaSale	LR&Dratio	LLever	LVolaRetu	LBeta	LSer
LVolaSale		.08	-.05	.19*	.26**	.00
LR&Dratio	.17		-.10	.01	.20*	.07
LLeverage	-.05	-.22*		.18*	.05	.15
LVolaRetu	.31**	.05	.36**		.57**	.75**
LBeta	.26**	.12	.16	.52**		.38**
LSer	.27**	-.04	.37**	.89**	.21*	

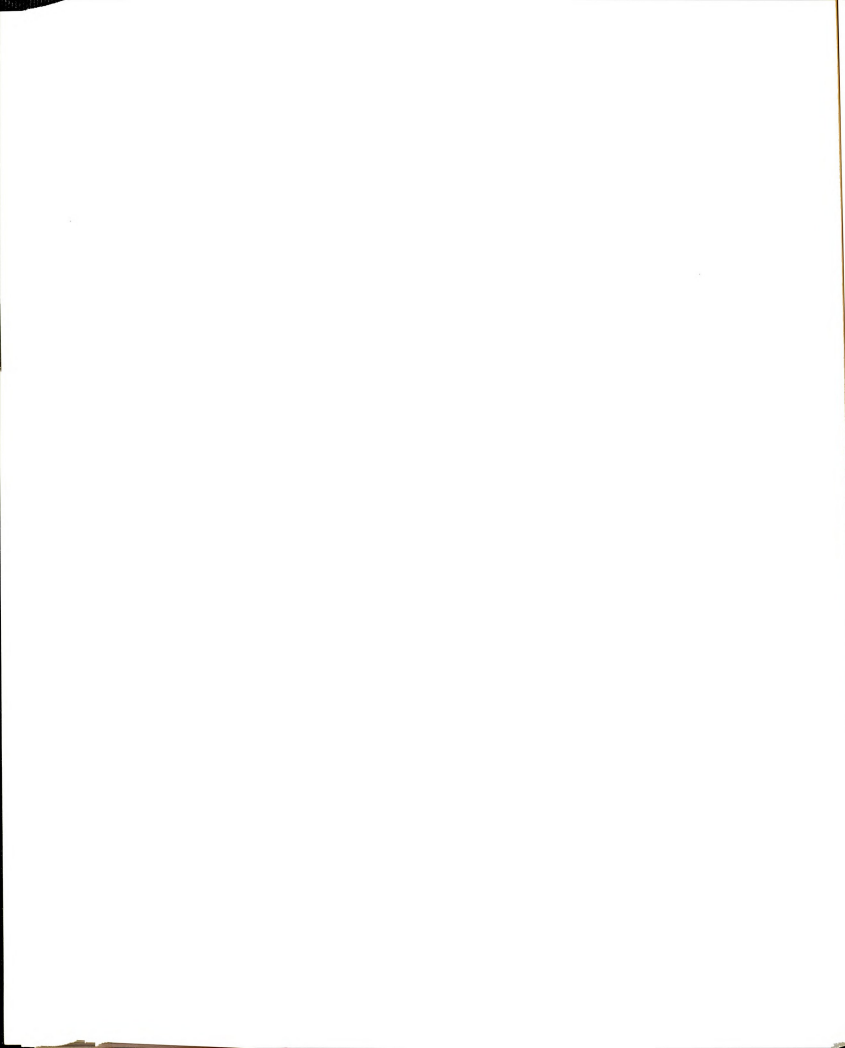


Table 6.1 (con't)

Panel C: Performance Measurement Dimension

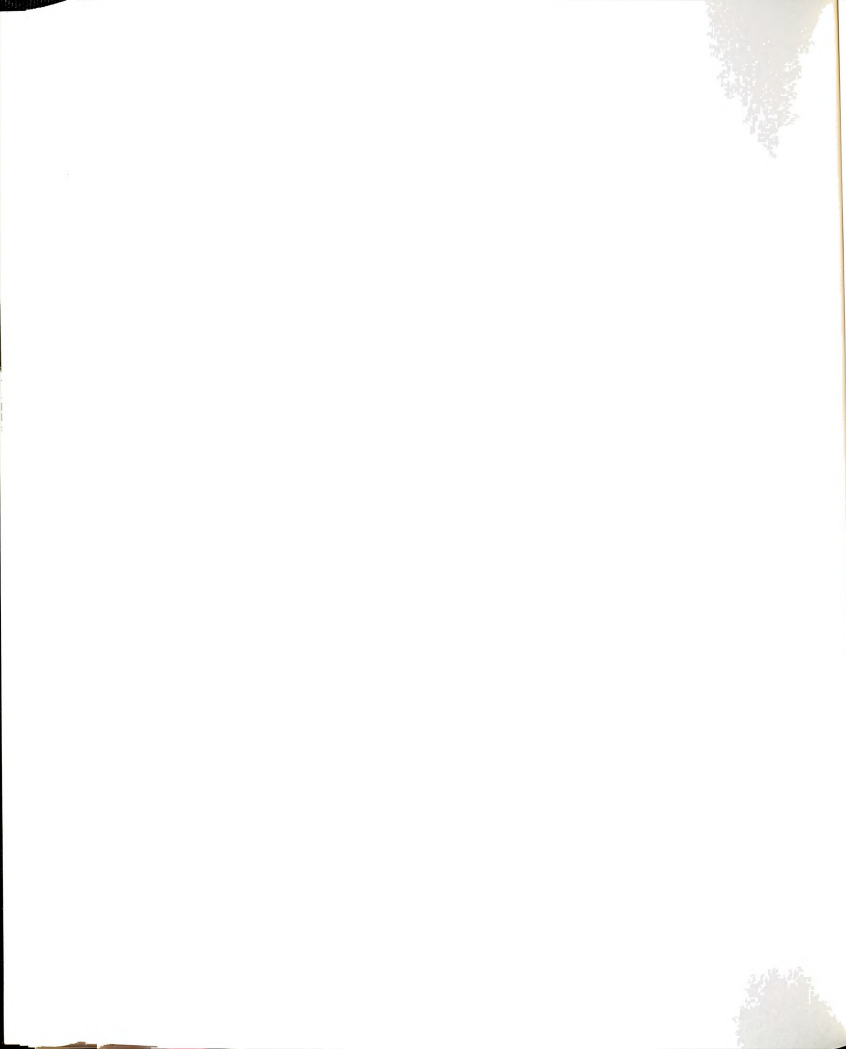
	LGr5Sale	LGr5Bv	LMv/Bv	LHold1	LHold2
LGr5Sale		.57**	.45**	.30**	.21*
LGr5Bv	.70**		.46**	.21*	.12
LMv/Bv	.46**	.32**		.12	-.08
LHold1	.25**	.23*	.11		.88**
LHold2	.17	.18	-.03	.91**	

¹ The correlation coefficients for Period I are reported at the upper right triangle and those for Period II are reported at the lower left triangle.

² For the definitions of variables, see Table 5.2.

* Significant at the .05 level (two-tailed test).

** Significant at the .01 level (two-tailed test).



reflect the fact that these pairs are proxies of the same variables. The turnover and average age of the top five managers show no correlation in Period I and a negative correlation in Period II. As explained in section 2.2 of Chapter V, since there could be a positive bias in measuring turnover of younger managers and a negative bias in measuring turnover of older managers, true correlations are likely to be higher than those in Panel A. However, it is impossible to evaluate the degrees of the biases under the measurement method of this study because reasons for individual turnover were not investigated. Accounting variables, **LFix** and **Lcapital** are not correlated with any of the personnel variables.

1.1.2 Turnover

Since no previous research tested the association between the adoption of PPs and executive turnover and theoretical arguments do not definitely direct the direction of the association, two-tailed tests were conducted in this area. As shown in Table 5.6, the average turnover in Period I and Period II is approximately .55 and .70. If these ratios are converted into tenure years, the average tenure in the available sample is between 14 and 18 years.⁴⁸ Since the award periods of PPs are at most 6 years, the hypothesis that PPs were adopted in order to decrease high turnover ratios seems to be unrealistic. The results in Table 6.2 support this conjecture. Turnover in the adopter and non-

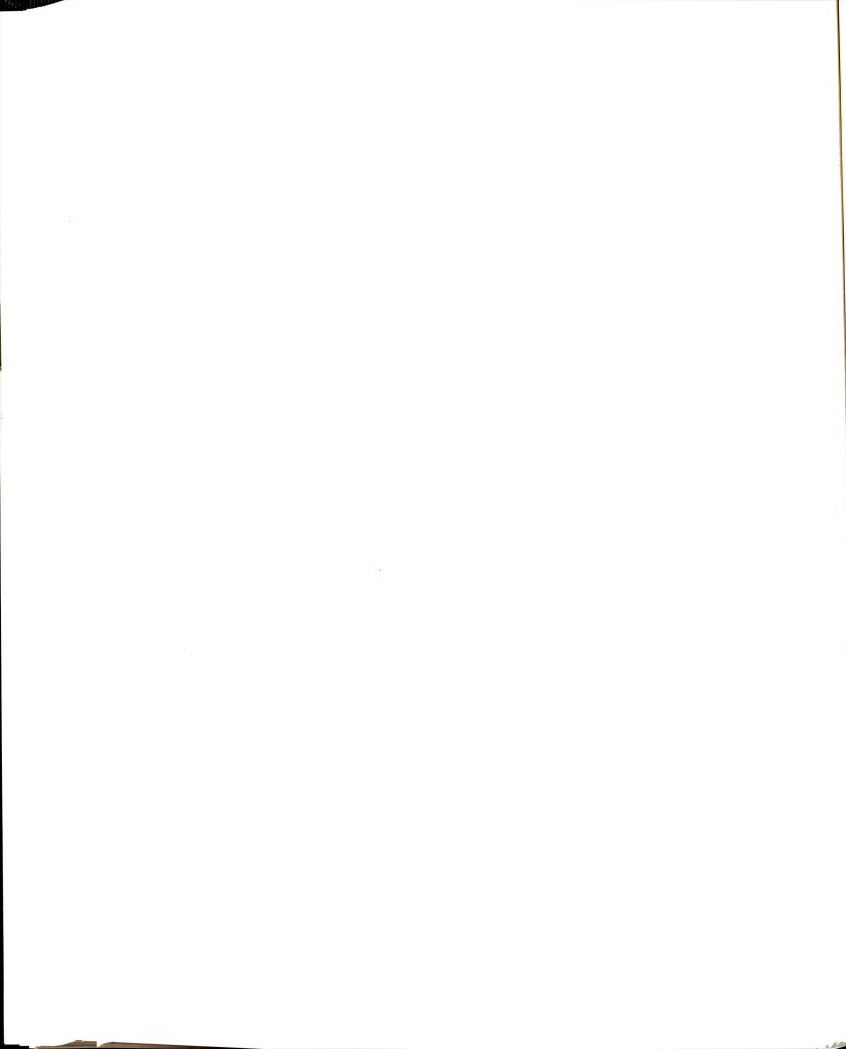


Table 6.2
Univariate Tests for Time-horizon Dimension

Panel A: Period I (1978-81)¹

	Predicted Sign ²	Non-adoption N ³ Mean	Adoption N ³ Mean	t-statistic for Difference in Means ⁴	Z score of Wilcoxon Rank-Sum test
Turnover ⁵	+/-	101 .544	34 .558	- .09	.52
CEOchng ⁵	+/-	101 .108	34 .235	-1.57	-1.82 *
AveAge ⁵	+/-	105 58.1	34 56.8	1.89 *	2.25 **
Cat_Ave ⁵	+/-	105 1.63	34 1.08	2.47 **	2.42 **
Agel ⁵	+/-	105 61.7	34 59.2	2.02 **	1.57
Cat_Agel ⁵	+/-	105 1.60	34 1.29	1.38	1.37
LFix	-	108 .397	34 .408	-.52	-.29
LCapital	-	108 .091	34 .094	-.37	-.38

90

Panel B: Period II (1982-86)¹

	Predicted Sign ²	Non-adoption N ³ Mean	Adoption N ³ Mean	t-statistic for Difference in Means ⁴	Z score of Wilcoxon Rank-Sum test
Turnover ⁵	+/-	76 .697	37 .784	-.52	-.65
CEOchng ⁵	+/-	76 .224	37 .324	-1.15	-1.14
AveAge ⁵	+/-	78 57.6	39 58.2	-.73	-.07
Cat_Ave ⁵	+/-	78 1.53	39 1.59	-.29	-.26
Agel ⁵	+/-	78 61.7	39 60.0	1.21	1.30
Cat_Agel ⁵	+/-	78 1.64	39 1.33	1.38	1.37
LFix	-	79 .442	39 .427	.74	.94
LCapital	-	79 .082	39 .075	1.10	1.15

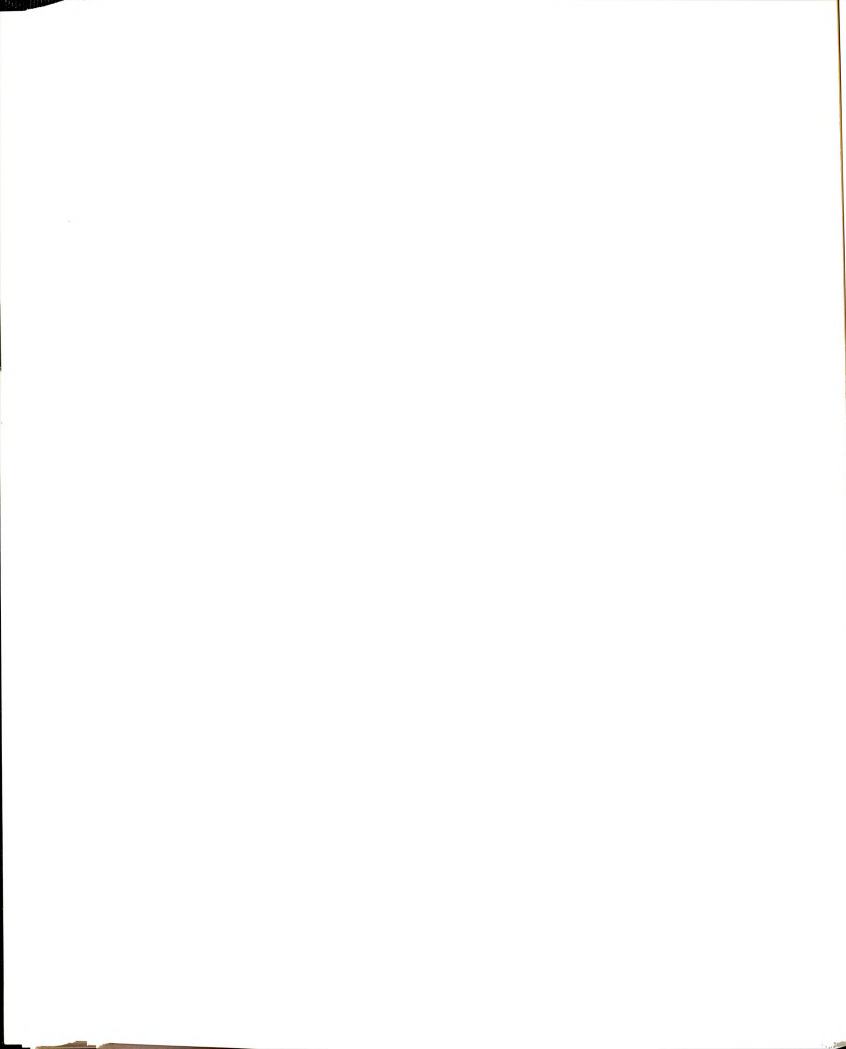


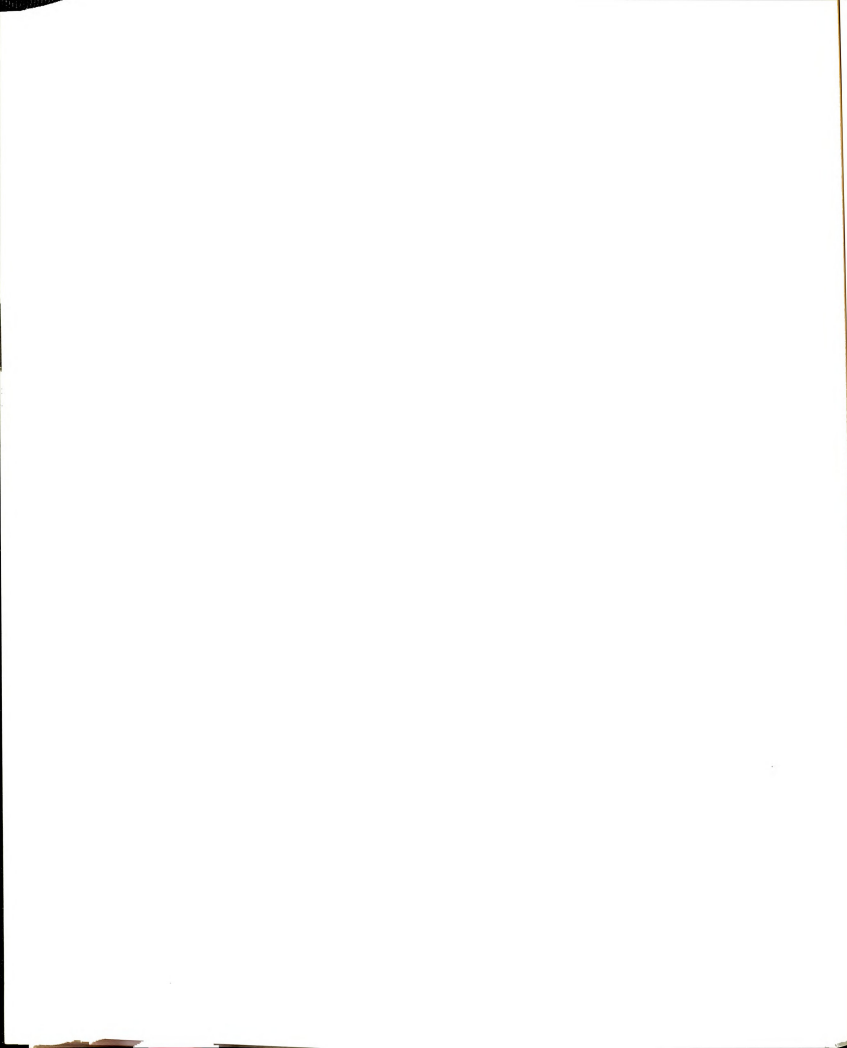
Table 6.2 (cont'd)

- ¹ The definitions of proxies of firm characteristic variables are the same for Table 5.2 except that L is prefixed to designate the logarithm-transformation.
- ² The expected sign is based on the result of (Non-adoption) - (Adoption). Thus, the sign "+" means that non-adopters' characteristics are larger than adopters'.
- ³ In Period I there were 111 non-adoption firms and 34 adoption firms. In Period II these numbers were 79 and 39, respectively.
- ⁴ The t -statistic is adjusted for differences in variances if an F -test indicates that the hypothesis of equal variances between the two groups on a specific attribute can be rejected at the .05 level.
- ⁵ The age and turnover proxies are tested by two-tailed tests.
 - * Significant at the .10 level.
 - ** Significant at the .05 level.
 - *** Significant at the .01 level.

adopter groups are not much different in both periods. Thus, high executive turnover does not appear to be a characteristic of the adoption firms. Only **CEOchng** in Period I shows a significant difference at the .10 level for the Wilcoxon test in the direction that would indicate that adoption firms have more changes in CEOs than non-adoption firms. The implication of the significant **CEOchng** and its effects on the other variables will be discussed in section 1.1.4.

1.1.3 Ages

The age variable was also tested by a two-tailed test for the same reasons as given under the discussion of turnover. Within each period all proxies of the age variable, **AveAge**, **Cat_Ave**, **Age1**, and **Cat_Age1**, show similar test statistics within a period, but between periods they are very different. In Period I, the average age of the adopters' managers is significantly lower than that of the non-adopters. However, in Period II the average age shows no statistically significant difference between adopters and non-adopters. In both periods, adoption firms have younger CEOs than non-adoption firms but the difference is statistically marginal. In summary, in both Period I and II, the ages of the CEOs in the adoption firms are lower than in the non-adoption firms. This is also true for the other top executives in Period I but not so in Period II. Accounting variables, **LFix** and **LCapital** show no differences



between the two groups in both periods.

1.1.4 Discussion

Labor Market Hypothesis: The results of both periods fail to confirm the **motivational hypothesis** that firms with high turnover are more likely to adopt PPs. Further they fail to confirm the **labor market hypothesis** that firms with older managers are more likely to adopt PPs. However, this does not preclude these hypotheses from being correct, because this study's design is incomplete on two counts. First, in order to test the hypotheses, compensation amounts from PPs should be large enough to motivate or influence managers' behavior. If the award amounts of the PPs are not sufficient to have a substantial effect on the older managers' wealth then the theoretical effects of the PPs adoption will be swamped by the much greater incentives provided by other compensation. Even though no data regarding the exact amounts of PPs or their proportion to total compensation amounts were collected, observations of the remuneration tables in the proxy statements suggest that PPs are usually only a small portion of total compensation.⁴⁹ Thus it seems that PPs would not likely be large enough to replace the disciplining force of the labor market.

Second, PPs are not the only long-term incentive plans. If a company already provides motivation to older managers through other long-term plans or special personnel policies,

the purpose of PPs adoption might be other than to provide motivation for older managers or to decrease high turnover. Even though this possibility was not examined, SOPs, which are incumbent, long-term incentive plans, seem to provide the long-term motivation. Thus, it is possible that studies like Lewellen et al., which looked at SOPs, confirmed the hypotheses but this study did not.

Difference between Periods: The next question is why the adopters' managers are younger than those of the non-adopters in Period I only. One possible scenario is that the difference may result from CEO turnover. Since **CEOchng** and **Age1** have a negative correlation in Period I ($-.24$), managers who become CEOs in Period I are likely to be younger than the outgoing CEOs. Since ages of CEOs and the average ages of the top five executives have a highly positive correlation ($.54$), a firm with a young CEO is likely to have young executives. In Period II, in which **CEOchng** is not correlated with **Age1** ($.00$), the above relation does not hold and the ages of the adopters' managers are not younger than those of non-adopters'.

In order to test this scenario, the age variable was examined after deleting the CEO-change firms in both periods. Table 6.3 reports the original results and the results of the univariate tests without the CEO-change firms. Eleven non-adoption firms and eight adoption firms in Period I, and sixteen non-adoption firms and twelve

2000-0000
1000-0000

Table 6.3
Univariate Tests of Age Variables without CEO-change Firms¹

Panel A: Period I (1978-81)²

	<u>t</u> -statistics		<u>Z</u> Scores	
	Original	Deletion ³	Original	Deletion ³
AveAge	1.89*	1.00	2.25**	1.25
Cat_Ave	2.47**	1.62	2.42**	1.61
Age1	2.02**	1.20	1.57	.62
Cat_Age1	1.38	.55	1.37	.56

Panel B: Period II (1982-86)²

	<u>t</u> -statistics		<u>Z</u> Scores	
	Original	Deletion ³	Original	Deletion ³
AveAge	- .73	- .33	- .07	- .07
Cat_Ave	- .29	.03	- .26	.01
Age1	1.21	.69	1.30	.49
Cat_Age1	1.38	.53	1.37	.52

¹ Firms whose CEOs changed between 1978-80 for Period I's samples and between 1982-84 for Period II's samples are classified as CEO change firms.

² The definitions of proxies of firm characteristic variables are the same as Table 5.2.

³ The number of deletions in Period I and Period II is 19 and 28, respectively.

* Significant at the .10 level (two-tailed test).

** Significant at the .05 level (two-tailed test).

adoption firms in Period II, were deleted. After the deletion, no proxies of the age variable in both periods are significant at the .10 level. Compared with the original t-statistics and Z scores, all proxies have proportionally lower statistics. Thus the results are consistent with the scenario that CEO changes are a reason for the significant difference in ages between the groups in Period I and II.

1.2 Risk-aversion Dimension

Correlation coefficients between different proxies of the risk-aversion dimension are reported in Panel B of Table 6.1. The presentation format of Panel B is the same as for Panel A. In both periods the stock market proxies of riskiness, **LVolaRetu**, **LBeta** and **LSer**, are highly correlated with each other whereas the proxies computed from accounting numbers, **LVolaSale**, **LR&Dratio** and **LLeverage**, are not. Thus it is doubtful that the latter three represent the same aspects of riskiness.

1.2.1 General Results

Table 6.4 shows the results of two univariate tests. Except for **LVolasale** in Period I and **LR&Dratio** in Period II, all the proxies have positive t-statistics and Z scores. This is consistent with the hypothesis that non-adoption firms face more riskier environments than adoption firms. In Period I, **LLeverage** and **LSer** are positive and significant under both tests and **LVoraRetu** is significant (generally at

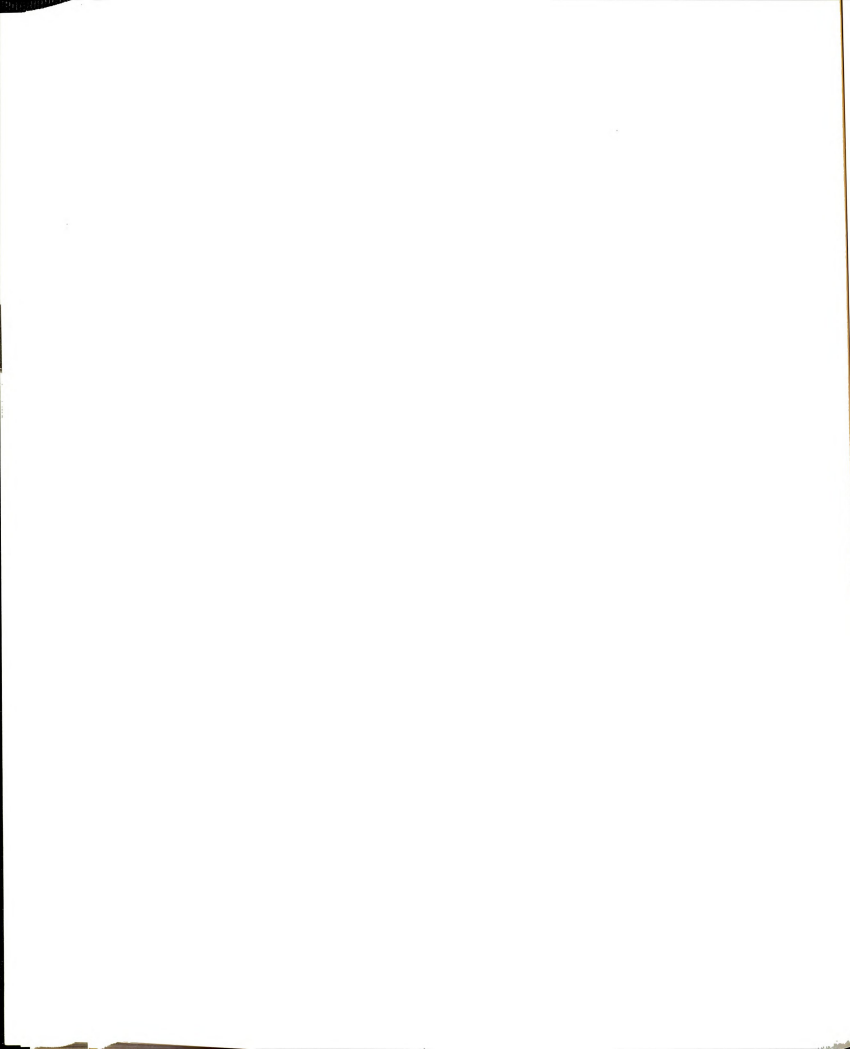


Table 6.4
Univariate Tests for Risk-aversion Dimension

Panel A: Period I (1978-81)¹

Predicted Sign ²	Non-adoption		Adoption		t-statistic for Difference in Means ⁴	Z score of Wilcoxon Rank-Sum test
	N ³	Mean	N ³	Mean		
LVolaSale	107	2.71	34	2.85	-1.44 *	-1.57 *
LR&Dratio	92	.030	33	.025	.97	.74
LLeverage	103	.446	34	.350	2.22 **	1.35 *
LVolaRetu	104	.085	31	.078	1.13	1.40 *
LBeta	99	.715	31	.665	1.07	.34
LSer	99	.064	31	.059	1.57 *	1.60 *

Panel B: Period II (1982-86)¹

Predicted Sign ²	Non-adoption		Adoption		t-statistic for Difference in Means ⁴	Z score of Wilcoxon Rank-Sum test
	N ³	Mean	N ³	Mean		
LVolaSale	79	2.29	39	2.23	.41	.56
LR&Dratio	65	.034	27	.047	-1.98 **	-2.33 ***
LLeverage	78	.400	39	.355	1.02	.60
LVolaRetu	75	.085	39	.081	.97	.63
LBeta	75	.750	37	.737	.40	.25
LSer	75	.072	37	.065	1.81 **	1.18

^{1, 2, 3, 4} The same as Table 6.2.

the .10 level) under only the nonparametric test. In Period II, only **LSer** shows a positive, significant difference. **LBeta** estimated from the 36 monthly stock returns is not significant in either period. It is possible that the 36-month estimation period may be too short to measure the riskiness of firms. In the sensitivity analyses, a 60-month estimation period was used to examine this possibility. The results are reported in section 1.4.

The volatility of sales (**LVolaSale**) and the R & D ratio (**LR&Dratio**) show strange patterns. Both have one period where they are not significant at all, and both have another period where they are significant in the direction opposite to that predicted. This **LVolaSale** anomaly will be discussed in a subsequent section in connection with **LGr5Sale**. The **LR&Dratio** irregularity is discussed in the next section.

1.2.2 Discussion of R & D Ratio

The **LR&Dratio** anomaly seems to be associated with the number of missing values in each group. Table 6.5 shows that in Period I the non-adoption group has 16 missing values and the adoption group has only 1, whereas in Period II the non-adoption group has 14 and the adoption group has 12. Thus the adoption group of the second period has many more missing values in both absolute and relative terms than the adoption group of the first period.

As explained in section 3.1 of the previous chapter, if a materiality consideration is the main reason for not

Table 6.5
Number of Firms with Missing R & D Data¹

	Non-adoption		Adoption		Total	
	N	Missing (%of N)	N	Missing (%of N)	N	Missing (%of N)
Period I	111	16 (14.4)	34	1 (2.9)	145	17 (11.7)
Period II	79	14 (17.7)	39	12 (30.8)	118	26 (22.0)
Total	190	30 (15.8)	73	13 (17.8)	263	44 (16.7)

¹ Firms whose 3-year R & D expenses are missing are classified as firms with missing R & D. The 3-year periods are the base year and two preceding years, 1978-80 for Period I sample and 1983-84 for Period II sample.

reporting R & D expenses, missing data should be replaced with a small amount to provide an R & D expense close to the true value. After replacing missing R & D expenses with .01 (\$10,000), the t -statistics are .303 in Period I and -.851 in Period II and $LR\&Dratio$ is not significant at even the .20 level in both periods. Since the adoption group of the second period, which has many firms with missing values, has a smaller mean after replacement, the difference between the adoption group and non-adoption group is not big enough to show a significant result. However, since the reason for the missing values is not certain, the question of whether $LR\&Dratio$ after the replacement is a better representation of the R & D ratios, has not been conclusively resolved.

1.3 Performance Measurement Dimension

Panel C in Table 6.1 shows the correlation coefficients between different proxies of the stockholding variable and the growth rate variable. All correlations, except between LMv/Bv and $LHold2$ in both periods, are highly positive. The high correlations between the growth rate and stockholding variable can be interpreted as follows: because stocks of rapidly growing firms yield high returns, managers of these firms hold more own-firm stocks than managers of slowly growing firms.

1.3.1 Growth Rates and Stockholdings

It was hypothesized that the growth rates of firm value

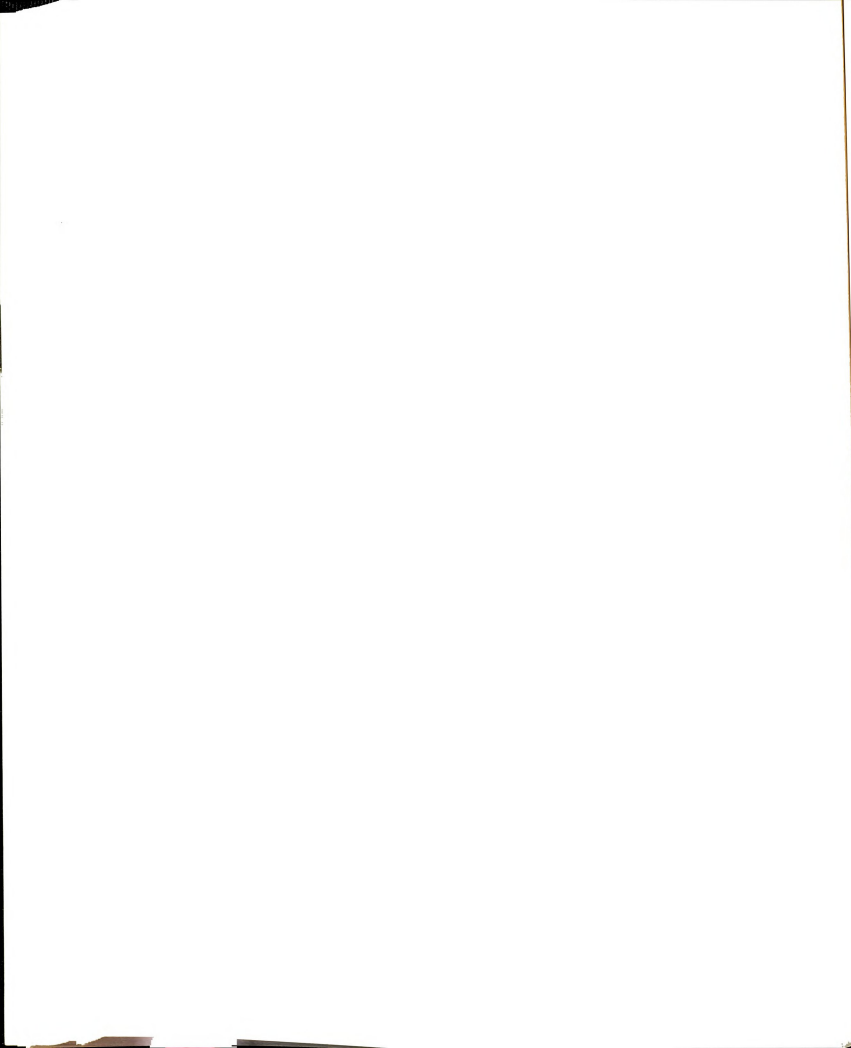


Table 6.6
Univariate Tests for Performance Measurement Dimension

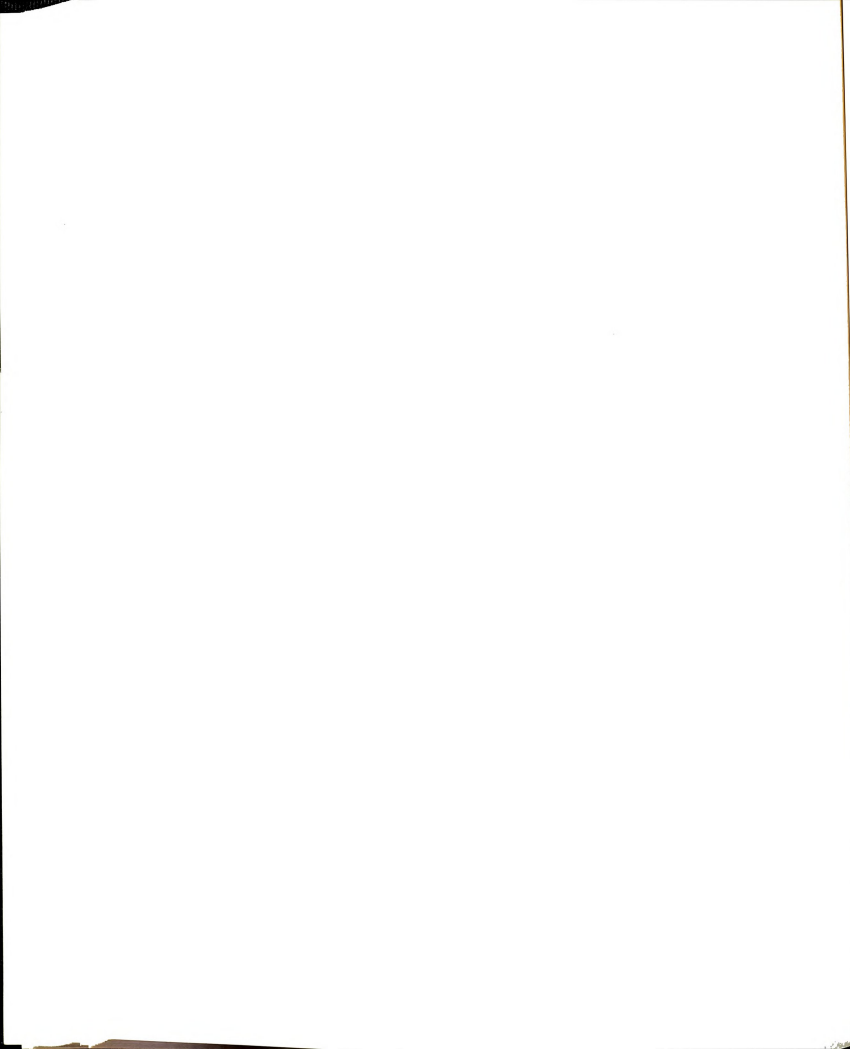
Panel A: Period I (1978-81)¹

Predicted Sign ²	Non-adoption		Adoption		t-statistic for Difference in Means ⁴	Z score of Wilcoxon Rank-Sum test
	N ³	Mean	N ³	Mean		
LGr5Sale	105	3.18	33	3.22	- .68	-1.75 *
LGr5Bv	105	3.25	33	3.26	- .29	- .05
LMv/Bv	106	.797	33	.802	- .12	- .22
LHold1	107	2.07	33	1.46	2.85 ***	1.61 **
LHold2	107	1.51	33	.94	2.79 ***	2.50 **

Panel B: Period II (1982-86)¹

Predicted Sign ²	Non-adoption		Adoption		t-statistic for Difference in Means ⁴	Z score of Wilcoxon Rank-Sum test
	N ³	Mean	N ³	Mean		
LGr5Sale	78	3.39	38	3.27	1.89 **	1.87 **
LGr5Bv	77	3.46	38	3.26	1.86 **	2.44 ***
LMv/Bv	78	.872	39	.823	.91	.59
LHold1	79	1.66	39	1.20	2.34 **	1.49 *
LHold2	79	1.11	39	.655	2.95 ***	1.49 *

^{1, 2, 3, 4} The same as Table 6.2.

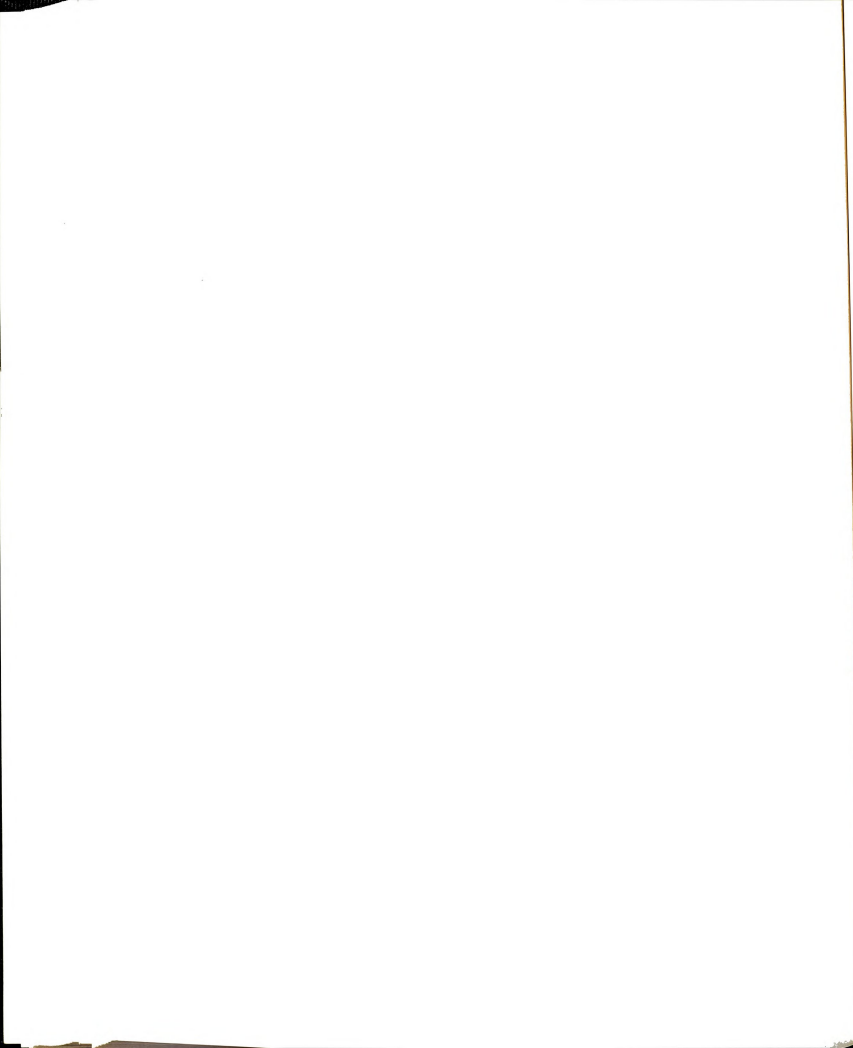


and managers' own-firm stockholdings are negatively related to PPs adoption. Table 6.6 reports the results of the measurement variables. Among the three proxies of the growth rate variable, **LMv/Bv** (used by Lewellen et al., 1987) was not significant in any periods under both the parametric and the nonparametric tests. **LGr5Sale** and **LGr5Bv** show significant results in Period II. This result is consistent with Lambert and Larcker's (1987) argument that fast growing firms prefer incentive plans using stock-price measures to incentive plans using accounting-number measures. **LGr5Sale** is significant at the .05 level in the direction opposite to that predicted. This anomaly will be discussed in the next section.

Managers' stockholding variables (**LHold1** and **LHold2**) are consistent with the hypothesis that the more stockholdings they have, the less likely it is that their firms will adopt PPs. These results show the strongest results among all variables in both periods.

1.3.2 Discussion

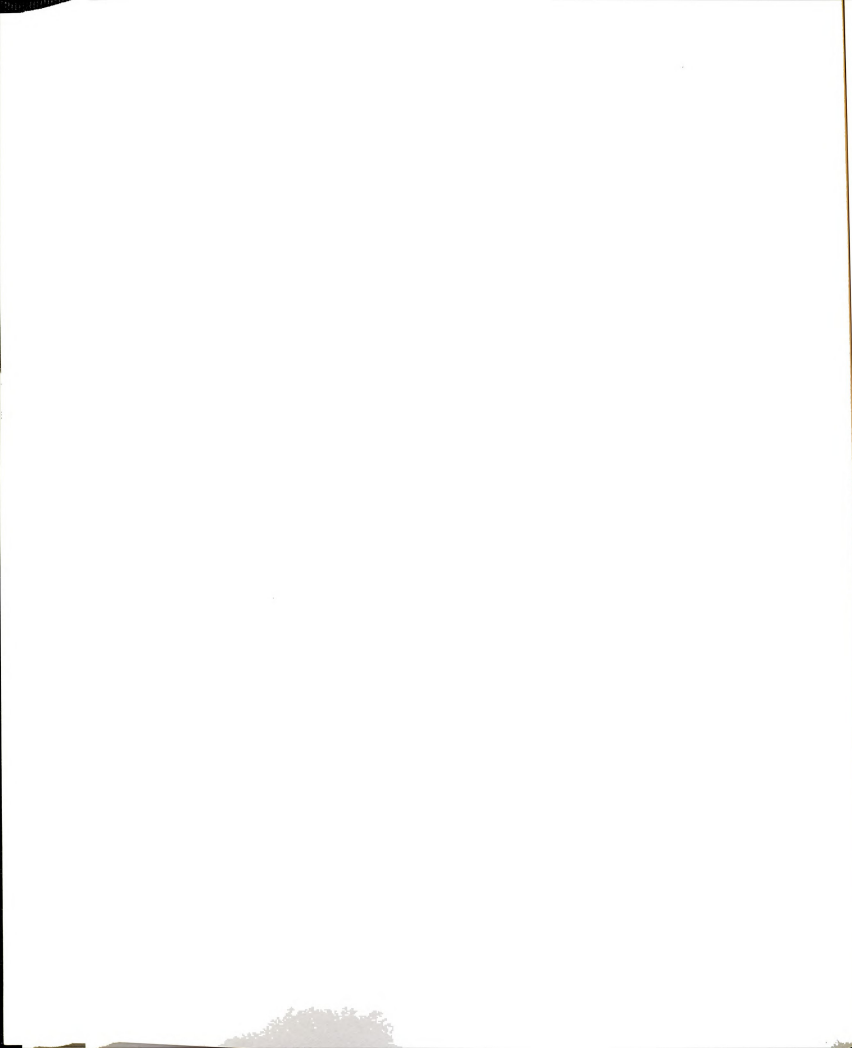
Difference between Periods: As the Lambert and Larcker (1987) results suggested, in general, firms whose growth potentials are large are likely to use stock-related plans. However, Period II shows stronger results than Period I. In particular, the growth rate variable is strongly significant in Period II but not at all in Period I. The phenomena could result from the taxation difference between the two



periods. The SOPs' tax benefits provide firms having high growth potentials with stronger incentive to use SOPs in Period II. Perhaps, under the assumption that PPs and SOPs are used in a partially substitutive manner, this stronger incentive to use SOPs in Period II leads to the significant negative correlation between growth rate and PPs adoption in Period I.

The lack of correlation in Period I may be associated with the removal of tax benefit from SOPs during this period. Since in Period I there was no tax advantage for capital gains from SOPs, the relative benefit of SOPs over the other compensation plans was less than in Period II. The disadvantage of SOPs in Period I might have discouraged firms from using SOPs. However, since no research has been done concerning how large the disadvantage was in Period I or how substitutive SOPs and PPs are, it is difficult to assess how the taxation differences contribute to the differing results in the two periods.

Anomalies of LVolaSale and LGr5Sale: Two anomalies in Period I are LVolaSale and LGr5Sale. LVolaSale and LGr5Sale were significant at the .05 level in the direction opposite to that predicted. Since both variables were computed from sales data, it is expected that sales in this period might be a source of the anomalies. In order to examine whether the anomalies are unique to sales data, total asset which is another accounting number representative of firm size was

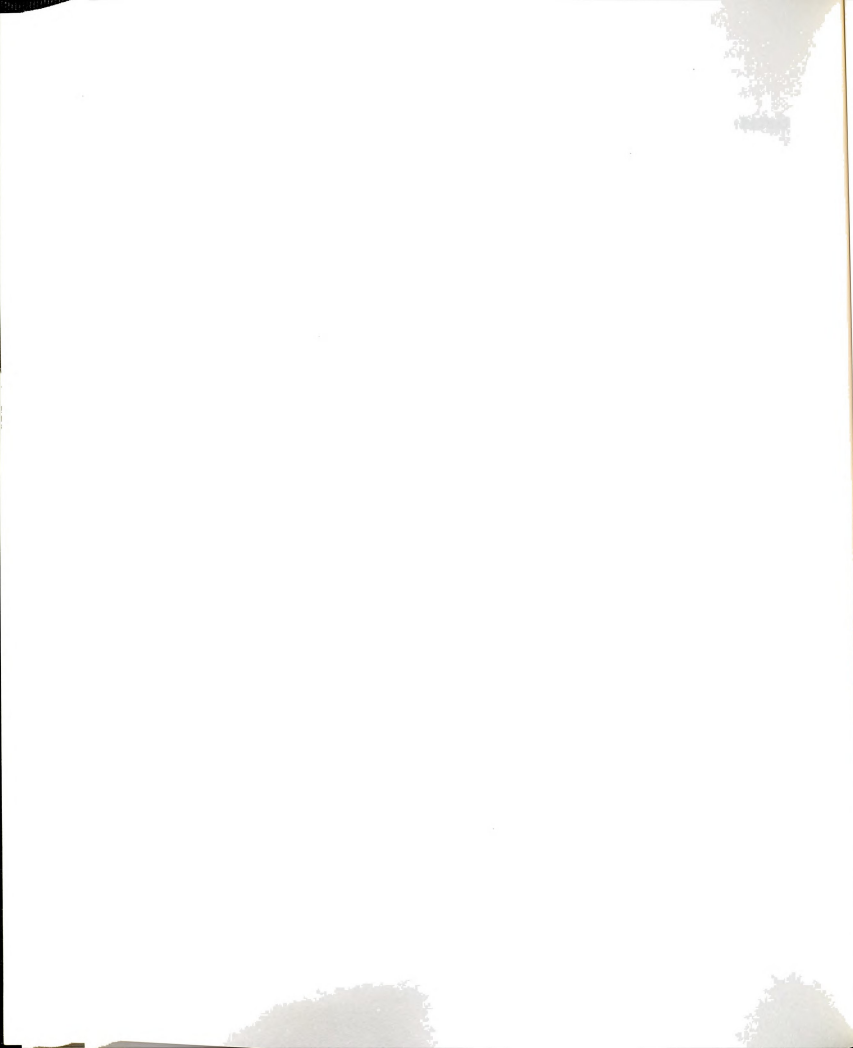


tested. The volatility of three-year assets for 1978-80 was compared between the adopter group and the non-adopter group. The asset volatility also showed the same pattern as the sales variables, i.e., the t -statistic is significant at the .10 level (-1.36) in the opposite direction in Period I and it is not significant in Period II.

A possible reason for this result might be found in the companies' activities in other than normal operations, e.g., mergers and acquisitions or sell-offs of assets. If this high volatility comes from ordinary operations, a high volatility of accounting numbers may reflect a lack of stability in the firm. However, if there are business entity changes such as mergers and acquisitions, or a change in major business lines, then the volatility measure may reflect something other than business riskiness. Thus, the tests were repeated after removing firms which had large merger and acquisition activities.

1.3.3 Deletion of Mergers and Acquisitions Active Firms

The quarterly journal Mergers & Acquisitions reports the 25 largest merger and acquisition (M & A) activities every quarter. This 25 M & A report was used to identify the firms involved in major M & A activities. The M & A data were collected from the issues of the first quarter of 1977 to the fourth quarter of 1981 for Period I sample firms, and from the issues of the first quarter of 1981 to the fourth quarter of 1985 for Period II sample firms. This 5-year



period contains one year prior to and subsequent to the measurement periods of 1978-80 and 1982-84. If the total amount of M & A's of each firm was more than 10% of its 3-year average book value from 1978 to 1980 in Period I, and 1982 to 1984 in Period II, the firm was classified as a "M & A active firm".

Table 6.7 shows the frequencies of the M & A active firms in each group. Adoption firms have relatively many more M & A activities than non-adoption firms in both periods. Thus it is suspected that adoption firms' high volatility and high growth rates of sales measures are due to these activities. However, this suspicion is not proven by the empirical evidence shown in Table 6.8.

Table 6.8 reports the univariate tests of the riskiness variable and the growth rate variable after deleting the M & A active firms. Further it shows results excerpted from Table 6.2, 6.4 and 6.6. The sample after deletion was not substantially different from the original results. Compared to the original results, almost all of the proxies of the deletion sample have smaller absolute values for the t -statistics and Z scores. However, **LVolaSale** and **LGr5Sale** in Period I are still significant or marginally significant in the opposite direction to that expected. That is, the deletion does not answer this puzzling phenomena. This pervasive, weak result and the persistent anomalies indicate that the deletion of the M & A active firms simply reduces

Table 6.7
Number of M & A Active Firms¹

	Non-adoption		Adoption		Total	
	N	M & A (%of N)	N	M & A (%of N)	N	M & A (%of N)
Period I	111	23 (20.7)	34	11 (32.4)	145	34 (23.4)
Period II	79	22 (27.8)	39	18 (46.2)	118	40 (33.9)
Total	190	45 (23.7)	73	29 (39.7)	263	74 (28.1)

¹ Firms whose total merger and acquisition amounts from 1977 to 81 for Period I, and from 1981 to 85 for Period II, are more than 10% of their book value of stockholders' equities are classified as M & A active firms.

Table 6.8
Univariate Tests without M & A Active Firms¹

Panel A: Period I (1978-81)²

	<u>t</u> -statistics		<u>Z</u> Scores	
	Original	Deletion ³	Original	Deletion ³
LVolaSale	-1.44*	-1.38*	-1.57**	-1.15
Lleverage	2.22**	1.62**	1.35*	1.02
LVolaRetu	1.13	.71	1.40*	1.36*
LBeta	1.07	1.34*	.34	.56
LSer	1.57*	1.35*	1.60*	1.30*
LGr5Sale	- .68	-1.05	-1.75**	-1.42*
LGr5Bv	- .29	- .23	- .05	- .31

Panel B: Period II (1982-86)²

	<u>t</u> -statistics		<u>Z</u> Scores	
	Original	Deletion ³	Original	Deletion ³
LVolaSale	.41	.41	.56	.48
Lleverage	1.02	.01	.60	- .20
LVolaRetu	.97	.48	.63	- .16
LBeta	.40	.12	.25	- .30
LSer	1.81**	1.27*	1.18	1.17
LGr5Sale	1.89**	1.66**	1.87**	1.64**
LGr5Bv	1.86**	1.34*	2.44***	1.66**

¹ The same as Table 6.7.

² The definitions of proxies for firm characteristic variables are the same as Table 5.2.

³ The numbers of deletions in Period I and Period II are 34 and 40, respectively. For details, refer Table 6.7.

* Significant at the .10 level (one-tailed test).

** Significant at the .05 level (one-tailed test).

*** Significant at the .01 level (one-tailed test).



the number of firms in the samples rather than controlling for confounding factors. Thus, this study has not determined whether the anomalies stem from measurement errors in **LVolaSale** and **LGr5Sale** or other problems.

1.4 Sensitivity Analyses

In the Data chapter two selections were made, one as to sample firms and the other as to the measurement of variables. The first was to determine the period division. Out of the two decade history of PPs adoption, 1978 to 81 and 1982 to 86 were chosen in consideration of taxation differences. The second was to choose measurement years for each period. Instead of a one-year measurement used in most other studies (such as Lewellen et al., 1987) the average of three year data (1978 to 80 for Period I and of 1982 to 84 for Period II) was used. In this section, the robustness of the period-division selection were examined and then different measurement periods were tested. In addition, results of tests conducted without extremely large and small firms were compared with the original results. Further, the homogeneity of the different types of PPs were examined by separating unit-plan adopters and share-plan adopters, and comparing them with non-adopters.

1.4.1 Sensitivity of Period-division

The period-division was based on tax law changes with the second period beginning the year immediately after the

Economic Recovery Tax Act of 1981 (as shown in Figure 5.1). However, since the exact time when the reforms might have influenced compensation plan decisions was not known, an additional way of period-division was tested. Firms adopting in 1981 were included in the second period and excluded from the first period, and firms adopting in 1987 were removed from the non-adoption sample of the second period. This division is based on the assumption that changes in tax acts were preceded by public debates in the business world, which would have been likely to have influenced adoption decisions ahead of the effective dates of the acts.⁵⁰

Table 6.9 lists modified t -test results in the third column with the original t -test results. Since the t -test results were very similar to the nonparametric test results, only t -statistics were reported in this and the following tables in the sensitivity analyses. There were little changes in t -test results except the stockholding variable in Period I and the age variable in Period II. Under the new period-division, adopters' CEOs are significantly younger than non-adopters' CEOs in Period II (p value of $\text{Cat_Age1} = .03$), whereas the original produced a non-significant result (p value = .17). It seems that 1981-adoption firms, which were a part of the Period I sample in the original scheme, contributed to the significant result in CEO's ages in Period II.



Table 6.9
Comparison under Different Measurement and Period-division¹

Panel A: Period I^{2,3}

	Original	Modification	
	t-statistic	Period-division	Measurement

TIME-HORIZON			
Turnover	- .09	- .06	-
CEOchng	-1.57	- .45	-
AveAge	1.89*	1.68*	-
Cat_Ave	2.47**	2.34**	-
Age1	2.02**	1.76*	-
Cat_Age1	1.38	1.41	-
LFix	- .52	- .08	- .57
LCapital	- .37	- .39	- .44
RISK-AVERSION			
LVolaSale	-1.44*	-1.31*	-1.46*
LR&Dratio	.97	.65	.92
LLeverage	2.22**	1.63**	1.98**
LVolaRetu	1.13	1.80**	1.39*
LBeta	1.07	.66	1.38*
LSer	1.57*	1.38*	1.75**
MEASUREMENT			
LGr5Sale	- .68	.53	- .94
LGr5Bv	- .29	- .60	- .62
LMv/Bv	- .12	.18	.44
LHold1	2.85***	1.72**	-
LHold2	2.79***	1.46*	-

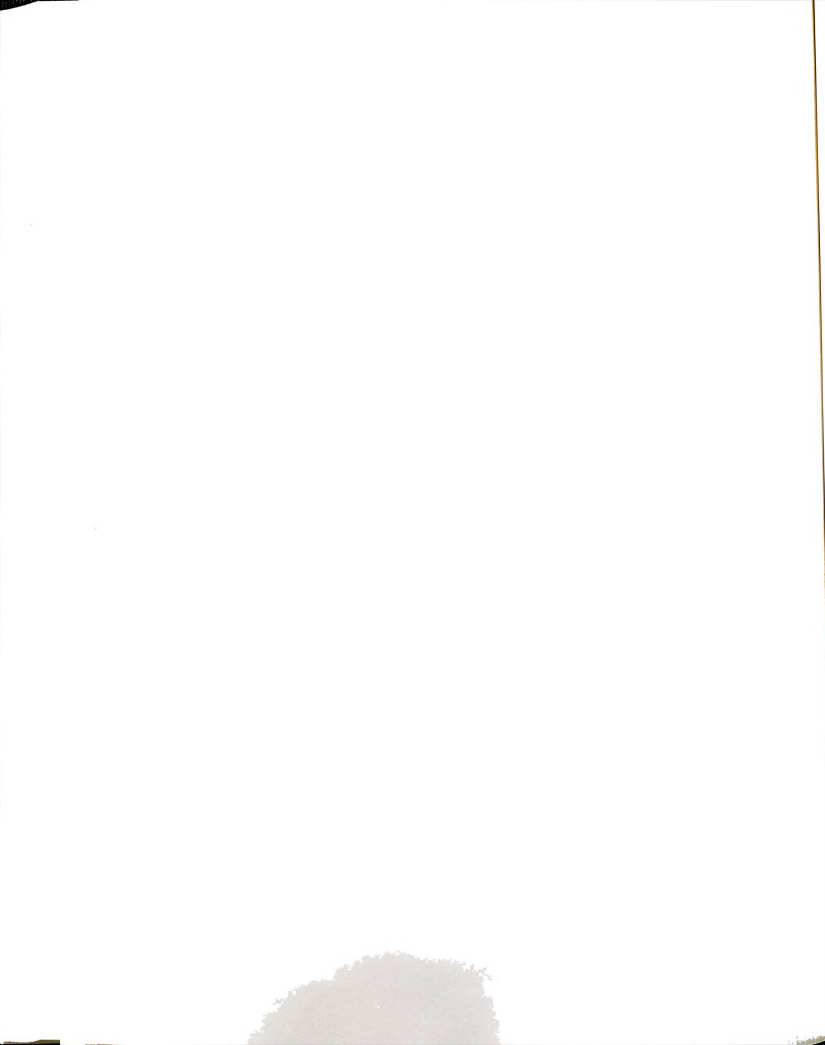


Table 6.9 (con't)

Panel B: Period II^{2,3}

	Original	Modification	
	t-statistic	Period-division	Measurement
TIME-HORIZON			
Turnover	- .52	- .32	-
CEOchng	-1.15	- .46	-
AveAge	- .73	.08	-
Cat_Ave	- .29	.48	-
Age1	1.21	1.94*	-
Cat_Age1	1.38	2.18**	-
LFix	.74	.28	.66
LCapital	1.10	1.09	1.19
RISK-AVERSION			
LVolaSale	.41	- .61	.94
LR&Dratio	-1.98**	- .55	-1.94**
LLeverage	1.02	.94	- .50
LVolaRetu	.97	1.19	1.76**
LBeta	.40	.29	.29
LSer	1.81**	1.74**	2.08**
MEASUREMENT			
LGr5Sale	1.89**	1.80**	.10
LGr5Bv	1.86**	1.76**	.02
LMv/Bv	.91	.55	.51
LHold1	2.34**	2.31***	-
LHold2	2.95***	2.22**	-

¹ Under the period-division modification scheme, the test period was altered: Period I is 1978 to 80 and Period II is 1981 to 85. Under the measurement modification scheme, the base-year and measurement period are altered. For detailed measurement modification, refer to Table 6.10.

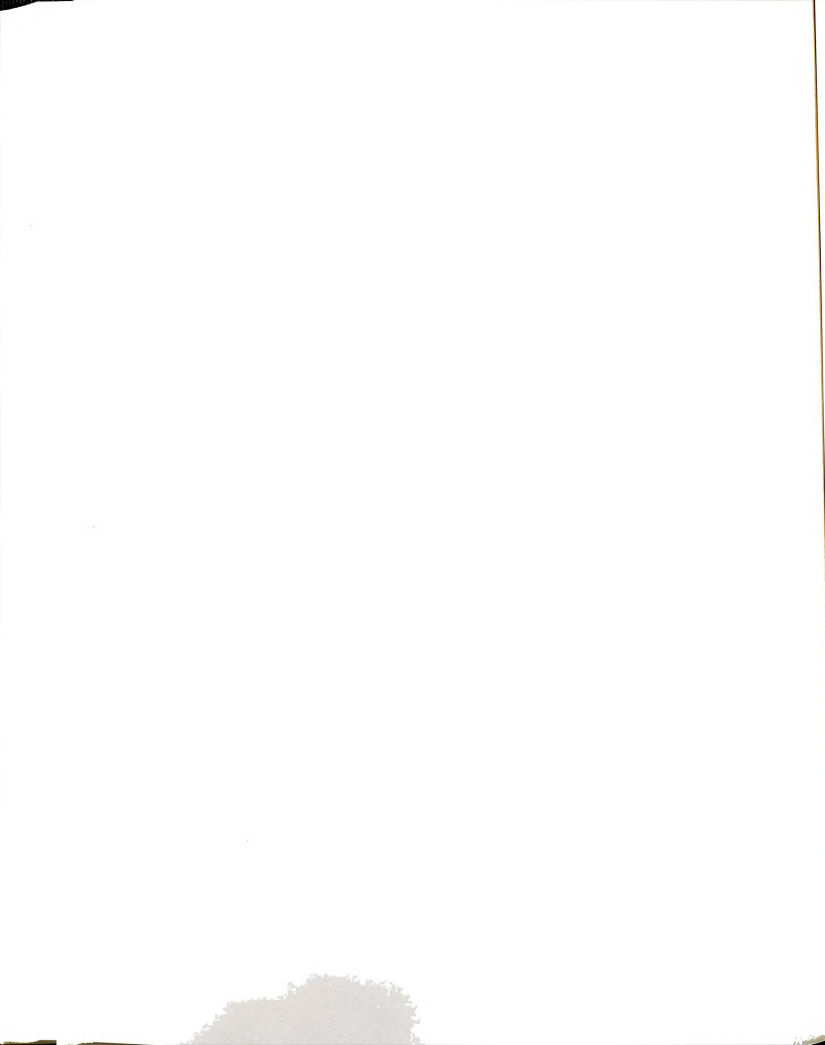
² The definitions of proxies of firm characteristic variables under the original and period-division modified tests are the same as Table 5.2 and under the measurement modified test are the same as Table 6.10.

³ The turnover and age variables are tested by two-tailed tests. The others are tested by one-tailed tests.

* Significant at the .10 level.

** Significant at the .05 level.

*** Significant at the .01 level.



1.4.2 Sensitivity of Measurement

As discussed in the Data chapter, a base-year and a 3-year measurement period (the base-year and two preceding years) were arbitrarily selected for both Period I and II. To examine the robustness of these selections, another pair of base-years and measurement periods were selected. 1981 and 1986, which are at the end of each period, were used as the new base-years for Period I and Period II, respectively. A five-year period was used to compute the averages and the volatility statistics (1977-81 and 1982-86 were used for the respective periods). Table 6.10 explains the new measurements of the proxies except for the personnel variables. The personnel variables (age, turnover and stockholding) are not included in this sensitivity analysis because of the data collection difficulty discussed in the Data chapter.

The results are listed in the last column of Table 6.9. In neither the time-horizon nor the performance measurement dimensions, are the proxies significant. Even **LGr5Sale** and **LGr5Bv** in Period II show no difference between adopters and non-adopters, which is inconsistent with the original tests. Under the modified measurements, **LGr5Sale** and **LGr5Bv** measure the growth rates in 1986, whereas the original measurements used 1984 data. Since 1986 is the last year of Period II, the 1986 growth rates are not the pre-adoption rates for all adoption firms except those that adopted in 1986. Instead,

Table 6.10
Description of Independent Variables (2)

TIME-HORIZON DIMENSION

- Fix** Average ratio of long-term assets to total assets for the five years t-4 to t. Year t (base-year) is 1981 for Period I and 1986 for Period II and this is applied to the other variables unless otherwise mentioned.
- Capital** Average ratio of capital expenditures to total assets for the five years t-4 to t.

RISK-AVERSION DIMENSION

- VolaSale** Coefficient of variation of five-year sales amounts from t-4 to t.
- R&Dratio** Average ratio of R & D expenditures to total assets for the five years t-4 to t.
- Leverage** Average ratio of long-term debts to total book value of equities for the five years t-4 to t.
- VolaRetu** Standard deviation of monthly stock market rates of return for 60 months from 77/1 to 81/12 for Period I and from 82/1 to 86/12 for Period II.
- Beta** Slope coefficient of market model regression, based on value-weighted market index, using the same 60 monthly stock returns as in **VolaRetu**.
- Ser** Standard error of residuals of market model regression based on value-weighted market index, using the same 60 monthly stock returns as in **VolaRetu**.

PERFORMANCE MEASUREMENT DIMENSION

- Gr5Sale (Gr5Bv)** Annual growth rates of sales (book values of equities) for the five years t-4 to t. These rates were obtained from the Value Line tape.
- Mv/Bv** Average ratio of market value to book value of equities for the five years t-4 to t.
-

for most of the firms, the 1986 growth rates are the growth rates experienced after the adoption. In this sense, the 1984 data seem to be better measures of pre-adoption characteristics. However, it is difficult to understand why this variable shows such a big difference between 1984 and 1986.

In the risk-aversion dimension, the anomalies of **LVolaSale** and **LR&Dratio** still persist and the stock market proxies are more significant in both periods than the original test. The modified scheme uses 60 monthly returns (77/1 to 81/12 for Period I and 82/1 to 86/12 for Period II) to calculate the stock market proxies whereas the original scheme used 36 monthly returns. If it is expected that the longer measurement-period produces more accurate results, the findings of the modified test is consistent with the hypothesis that adopters have less risky environments than non-adopters.

1.4.3 Sensitivity to Firm Size

As shown in the Data chapter, firm size is positively related with adoption rates. It is not known how size affects the adoption decision, but size is regarded as containing omitted variables, such as the political cost variable. One way to control for the size difference is to delete firms with extreme sizes. As shown Table 5.4, there is a large difference between the very largest and the very smallest firms in the sample: The average sales of the top

15 firms are \$38,820 millions, while those of the bottom 15 firms are \$1,074 millions.⁵¹ After deleting these extreme firms, the average sales of the middle 169 firms are \$3,817 millions.

Three different deletion schemes were tested: deleting the largest 15 firms, deleting the smallest 15 firms and deleting both. The results are reported with the original results in Table 6.11. Group A, Group B and Group C in the table contain the samples without the largest 15 firms, without the smallest 15 firms, and without both the largest 15 and smallest 15 firms. The results of Group A is similar to the original results in all three dimensions. On the other hand, Group B and C show somewhat stronger results than the original in the time-horizon and performance measurement dimensions. In particular, the stock market proxies in the risk-aversion dimension have higher t -statistics than the original and Group A. This can be interpreted as indicating that the firm characteristics of the top 15 firms are not different from those of the others in the 199 available sample, but the bottom 15 firms are different. **LVolaSale** as well as **LR&Dratio** still show an irregularity under all of three schemes and reasons for the **LVolaSale** anomaly have not been answered yet.

1.4.4 Different Types of PPs

Performance unit plans and share plans are the two types of PPs. The major difference between unit plans and share



Table 6.11
Univariate Tests after Deleting Firms of Extreme Size¹

Panel A: Period I^{2,3}

	Original	Without Extreme Size		
	t-statistic	Group A	Group B	Group C
TIME-HORIZON				
Turnover	- .09	- .46	- .11	- .49
CEOchn	-1.57	-1.48	-1.35	-1.24
AveAge	1.89*	1.97**	2.14**	2.23**
Cat_Ave	2.47**	2.52**	2.57**	2.63***
Age1	2.02**	1.96**	2.23**	2.18**
Cat_Age1	1.38	1.40	1.65*	1.68*
LFix	- .52	- .26	- .03	.25
LCapital	- .37	- .70	- .24	- .58
RISK-AVERSION				
LVolaSale	-1.44*	-1.27	-1.65**	-1.48*
LR&Dratio	.97	.58	.81	.40
LLeverage	2.22**	2.13**	2.12**	2.05**
LVolaRetu	1.13	.83	2.67***	2.56***
LBeta	1.07	.98	1.20	1.12
LSer	1.57*	1.21	2.39***	2.07**
MEASUREMENT				
LGr5Sale	- .68	- .54	- .86	- .73
LGr5Bv	- .29	.47	- .58	.10
LMv/Bv	- .12	- .06	- .35	- .26
LHold1	2.85***	2.37***	2.92***	2.45***
LHold2	2.79***	2.38***	3.23***	2.84***

Table 6.11 (con't)

Panel B: Period II^{2,3}

	Original	Without Extreme Size		
	t-statistic	Group A	Group B	Group C
TIME-HORIZON				
Turnover	- .52	- .85	- .42	- .77
CEOchng	-1.15	- .76	-1.12	- .71
AveAge	- .73	- .70	- .58	- .62
Cat_Ave	- .29	- .27	- .33	- .32
Age1	1.21	1.14	1.51	1.45
Cat_Age1	1.38	1.52	1.31	1.46
LFix	.74	.69	.90	.84
LCapital	1.10	1.30	1.07	1.28
RISK-AVERSION				
LVolaSale	.41	.53	- .12	- .01
LR&Dratio	-1.98**	-1.81**	-2.02**	-1.84**
LLeverage	1.02	.73	.92	.65
LVolaRetu	.97	1.10	1.31*	1.34*
LBeta	.40	.83	.40	.84
LSer	1.81**	1.67**	1.83**	1.70**
MEASUREMENT				
LGr5Sale	1.89**	1.68**	1.91**	1.67**
LGr5Bv	1.86**	1.75**	1.67**	1.56**
LMv/Bv	.91	.78	.58	.41
LHold1	2.34**	2.55***	2.05**	2.25**
LHold2	2.95***	2.92***	2.70***	2.65***

¹ The largest 15 firms and the smallest 15 firms among the 199 available sample are classified as firms of extreme size. The comparison tests were done between adoption and non-adoption firms which were collected from the sample without the largest 15 (Group A), the sample without the smallest 15 (Group B) and the sample without both (Group C).

² The definitions of proxies of firm characteristic variables are the same as Table 5.2.

³ The turnover and age variables are tested by two-tailed tests. The others are tested by one-tailed tests.

* Significant at the .10 level.

** Significant at the .05 level.

*** Significant at the .01 level.

100

100

100

100

100

100

100

100

100

100

100

100

100

100

plans is the nature of the award (unit or share) and how the awards are calculated. As explained in Chapter II, the value of a unit is set at a fixed amount before the award period begins, whereas the value of a share is determined by the firm's stock price when the award period ends. So total award amounts from the share plan are affected by the stock market's performance. In this sense, the share plans are similar to SOPs even though the degree to which the stock market affects the compensation is much smaller than with SOPs. Thus it is expected that the tests between non-adoption firms and unit-plan adoption firms should produce as strong or stronger results than the original test, but the tests for share-plan adopters should produce weaker or insignificant results.

The comparison tests between unit-plan adopters and non-adopters and between share-plan adopters and non-adopters are reported in Table 6.12 together with the original results. As expected, results of the unit-plan comparison test are similar to or stronger than the original results, but the test of share-plan adopters shows weaker results in all dimensions and in both periods.

Unit-plan Comparison Test: In Period I, the unit-plan comparison test shows similar results to the original test in all dimensions. On the other hand, this test in Period II shows much stronger results over CEO's ages and all proxies of the measurement dimension. In Period II, all the



Table 6.12
Univariate Tests of Each Type of Performance Plans¹

Panel A: Period I^{2,3}

	Original	Types of PPs	
	t-statistic	Unit Plan	Share Plan

TIME-HORIZON			
Turnover	- .09	- .00	- .16
CEOchnng	-1.57	-1.23	-1.40
AveAge	1.89*	2.06**	.50
Cat_Ave	2.47**	2.56**	.87
Age1	2.02**	1.35	1.83*
Cat_Age1	1.38	.90	1.28
LFix	- .52	.12	-1.11
LCapital	- .37	.05	- .75
RISK-AVERSION			
LVolaSale	-1.44*	-1.06	-1.11
LR&Dratio	.97	.40	1.19
LLeverage	2.22**	2.20**	1.32*
LVolaRetu	1.13	2.28**	- .01
LBeta	1.07	.82	.86
LSer	1.57*	1.34*	.97
MEASUREMENT			
LGr5Sale	- .68	- .52	- .50
LGr5Bv	- .29	- .78	.68
LMv/Bv	- .12	- .40	.40
LHold1	2.85***	2.24**	1.59*
LHold2	2.79***	2.15**	1.88**

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

1/10/1917

Table 6.12 (con't)

Panel B: Period II^{2,3}

	Original	Types of PPs	
	t-statistic	Unit Plan	Share Plan
TIME-HORIZON			
Turnover	- .52	- .76	.38
CEOchng	-1.15	- .82	-1.21
AveAge	- .73	- .31	- .96
Cat_Ave	- .29	.18	-1.12
Age1	1.21	1.83*	- .90
Cat_Age1	1.38	2.16**	-1.17
LFix	.74	.78	.15
LCapital	1.10	1.33*	- .15
RISK-AVERSION			
LVolaSale	.41	.92	-2.21**
LR&Dratio	-1.98**	- .85	-3.32***
LLeverage	1.02	.29	1.73**
LVolaRetu	.97	.98	.52
LBeta	.40	.63	- .42
LSer	1.81**	1.52*	1.71**
MEASUREMENT			
LGr5Sale	1.89**	2.24**	- .08
LGr5Bv	1.86**	1.76**	.70
LMv_Bv	.91	1.36*	- .23
LHold1	2.34**	3.13***	- .12
LHold2	2.95***	3.20***	.67

¹ Under the unit-plan comparison test, firm characteristics of unit-plan adopters are compared with those of non-adopters. Under the share-plan comparison test, firm characteristics of share-plan adopters are compared with those of non-adopters.

² The definitions of proxies of firm characteristic variables are the same as Table 5.2.

³ The turnover and age variables are tested by two-tailed tests. The others are tested by one-tailed tests.

* Significant at the .10 level.

** Significant at the .05 level.

*** Significant at the .01 level.

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

proxies of the measurement dimension show larger t -statistics than under the original test. Even LMv/Bv is significant at the .10 level, and the growth rate variable and the stockholding variable produce very large t -statistics (for instance, $LHold2 = 3.20$). These results contrast to the performance dimension of Period I, where no proxies are stronger than the original results. The considerable difference between Period I and Period II in the measurement dimension might reflect the taxation difference between Period I and Period II. It seems that separating share-plan adopters from the adoption sample might amplify the effects of the taxation differences between periods.

Share-plan Comparison Test: The comparison test between share-adopters and non-adopters does not show strong results except in the risk-aversion dimension.⁵² There are two points worth mentioning. First, the growth rate variable of the measurement dimension shows no difference between adopters and non-adopters in either period. This might be due to the share plan's award amount decision mechanism. The total amounts of the share plan are determined by multiplication of the number of shares earned during the award period and the stock price at the end of award period. So the plan's awards are affected by the stock prices. Hence fast growing firms might be more likely to use share plans than unit plans, whose awards are decided by

100

100

100

100

100

100

100

100

accounting numbers alone. This might result in the strong difference between the unit-plan comparison test and the share-plan comparison test.⁵³ Second, **LR&Dratio** shows a very striking contrast between unit-plan and share-plan tests in Period II. Since there is no anomaly in the unit-plan test, it can be concluded that the anomaly of the original test stems from the share-plan adopters' large R & D ratios, but it is hard to understand the reason for this.

1.5 Summary of Major Findings

The turnover variable was not related to PPs adoptions in the original tests and the sensitivity analyses. This is consistent with the empirical findings of Lee and Milne (1988). The results of the age variable were not consistent over periods. Managers of adoption firms were younger than those of non-adoption firms in Period I, but no difference was found in Period II. The age variable did not produce consistent results in the sensitivity analyses, either. In the tests without firms of extreme size, the original results hold. On the other hand, in the test under the period-division modification scheme and the unit-plan comparison test, this age difference was found in Period II as well as Period I.⁵⁴

Among the three riskiness proxies measured by accounting numbers, **LVolaSale** and **LR&Dratio** produced significant results in a direction opposite to that predicted. In a further analysis it was found that missing values might have

contributed the **LR&Dratio** anomaly. To examine the anomaly of **LVolaSale**, the comparison test was redone after the M & A active firms were deleted, but this did not provide an answer for the anomaly. This unanswered anomaly was present throughout the sensitivity analyses. Among three stock market proxies, **LBeta** did not show any difference in any of the tests but **LVolaRetu** and **LSer** were generally consistent with the hypothesis that adoption firms face less risky environments. The results of **LVolaRetu** and **LSer** were more significant in Period I than in Period II in both the original and sensitivity analyses. Also, in both periods, the results became stronger when the measurement period was extended from three years to five years.

The results of the growth rate variable showed striking differences between periods: In Period I, the two proxies of the growth rate variable, **LGr5Sale** and **LGr5Bv**, showed no difference between adoption and non-adoption groups, but in Period II, non-adopters' growth rates were significantly larger than for the adopters. This phenomenon persisted in the sensitivity analyses except for the share-plan comparison test in which no difference was found in either Period I or II. The results of the stockholding variable in both periods confirmed the hypothesis that non-adopters' managers had more own-firm stockholdings than adopters. This hypothesis was also confirmed by the sensitivity analyses except in the share-plan comparison test. In the

1000000000

1000000000

1000000000

1000000000

1000000000

1000000000

share-plan test, the difference was less strong in Period I and no difference was found in Period II.

2 Multivariate Analyses

2.1 Logit Regression Analyses

The multivariate analysis discussed in this section examines the combined impact of the variables on adoption decisions and the degree of multicollinearity among the variables. This analysis includes firm size as a covariate and examines the effect of firm size differences on other variables and the adoption decisions. Since the adoption decision variable takes a binary form, estimation via the ordinary least square method produces unbiased but inefficient estimates. Instead, the logit model was used.⁵⁵

Logit Regression: The logit regression constrains the dependent variable to a range between zero and one and produces unbiased and efficient estimates. In the logit model the dependent variable is dichotomous, having a value of one when adoption is made during the period and a value of zero otherwise. The logit model of each period to be estimated is as follows:

$$\text{ADOPT} = b_0 + b_1 \text{ TURNOVER} + b_2 \text{ AGE} + b_3 \text{ UNCERTAINTY} + \\ b_4 \text{ GROWTH} + b_5 \text{ HOLDING} + b_6 \text{ SIZE}$$

where: ADOPT = 1 if adoption was made during the period,
and 0, otherwise.
TURNOVER and AGE are the turnover and age
variables in the time-horizon dimension,
UNCERTAINTY is the riskiness variable in the risk-
aversion dimension,

1000-1000-1000

1000-1000-1000

1000-1000-1000

1000-1000-1000

1000-1000-1000

1000-1000-1000

GROWTH and HOLDING are the growth rate and own-firm stockholding variables in the performance measurement dimension, and SIZE is a firm size covariate.

The association between adoption and the time-horizon variables (turnover and age) did not have a hypothesized direction of association. Therefore, significance tests of the turnover and age variables were done by two-tailed tests while the riskiness, growth rate and stockholding variables were tested by one-tailed tests. However, since the age variable showed a positive relation with adoption in the univariate analyses, it was expected that the age variable's coefficient (b_2) will have a positive sign. The probability of adoption is hypothesized to be a decreasing function of the riskiness, growth rate, and stockholding variables, and thus it is expected that the variables' coefficients (b_3 , b_4 and b_5) will have negative signs in the regression.

Significance Tests: In the following sections, the logit models for Period I and II are separately examined. In each period, the dimensional logit models are set up and the significance of each variable is measured by the maximum likelihood chi-square test. After the dimensional analyses, the combined logit models are set up using those variables which are significant in the dimensional logit models. The combined analyses examine the effect of the size covariate on the overall fit of the model and the significance of the other variables.

To test the overall fit of the model, two scalar



measures were reported: model likelihood ratio chi-square (with the corresponding p-value) and the R value. The chi-square statistic tests the joint association of all independent variables with the dependent variable. The R value for the model is calculated based on the likelihood ratio chi-square for the model (p. 281, SAS Institute Inc.). Since both measures produced similar results in all the following analyses, the R value was used in the explanation of model fit.

Selection of Sample Firms: Multivariate analyses were done using the original sample and several other samples which had been used in the univariate sensitivity analyses. In the following analyses, only one result of the multivariate tests will be reported in each period. These are the results of the multivariate tests using the sample without the 15 smallest firms in Period I, and the sample used in the unit-plan comparison test in Period II. These model have been selected since the tests using these samples showed the most significant results in the model fit tests.⁵⁶ Even if other samples were selected, there would be no changes in the inference drawn from the testing of the hypotheses, because all the samples basically produced similar results in the chi-square tests of the individual variables (the same signs for the coefficients and similar magnitudes of significance in the chi-square tests). They would produce a lower model fit than the reported results

but significances of individual variables would be identical.

2.2 Analyses in Period I

2.2.1 Dimensional Analyses

Selection of Proxies: Since there were high correlations among the proxies of each variable (as shown in Table 6.1), if the logit model has more than one proxy per variable, there might be multicollinearity problems which lower the overall fit of the model. **CEOchnng**, **Cat_Ave**, **LLeverage**, **LSer**, **LGr5Sale** and **LHold2** were selected as the proxies to be included in the dimensional logit model. The second column of Table 6.13 lists the univariate t -statistics for these proxies excerpted from Panel A, Table 6.11. **CEOchnng**, **Cat_Ave**, **LGr5Sale** and **LHold2** were chosen because they produced the highest t -statistics. For the riskiness variable, **LLeverage** and **LSer** are selected. **LLeverage** is included in the model as a proxy of the environmental riskiness measured by accounting numbers and **LSer** is included as a proxy measured by the stock market's performance. Even though **LVolaRetu** is the most significant among the stock market measures of the riskiness, it is not included in the model because of its possible multicollinearity problem. Since **LVolaRetu** showed high correlations with the accounting proxies, it is likely that the inclusion of **LVolaRetu** with **LLeverage** would lower the

Table 6.13
Dimensional Logit Analyses in Period I^{1,2}

	Univariate t-statistics ⁴	Estimated Coefficients (Chi-square Statistics) ³			
		Time-horizon (A) (B)		Risk-aversion (A) (B)	
Intercept		-.50 (2.30)	-.45 (2.10)	.80 (.67)	-.67 (.54)
TURNOVER					
CEOchng	-1.35	.82 (2.14)			
AGE					
Cat_Ave	2.57**	-.51 (6.31)***	-.48 (6.15)**		
UNCERTAINTY1					
LLverage	2.12**			-1.10 (1.37)	
UNCERTAINTY2					
LSer	2.39***			-24.6 (2.37)*	-29.7 (3.84)**
GROWTH RATE					
LGr5Sale	- .86			.99 (1.28)	
HOLDING					
LHold2	3.23***			-.59 (5.52)***	-.59 (5.58)***
Model Chi-square		9.36	6.58	4.91	4.66
p-value		.0093	.0103	.0858	.0309
R value		.19	.18	.08	.14
				.18	.20

Table 6.13 (con't)

- ¹ The Logit analyses used the adoption and non-adoption firms which were collected from the available sample but minus the smallest 15 firms. Thus this sample is the same as the sample of Group B in Panel A, Table 6.11.
- ² The dependent adoption variable has a value of one if a firm adopted PPs between 1978 and 1981, and a value of 0 if a firm had never adopted by 1981.
- ³ The chi-square statistics are Maximum Likelihood Estimate (MLE) statistics. Two-tailed tests were done for the coefficients of *CEOchng* and *Cat_Ave*, and intercepts. For the other coefficients, one-tailed tests were done.
- * Significant at the .10 level.
- ** Significant at the .05 level.
- *** Significant at the .01 level.
- ⁴ The *t*-statistics are excerpted from Group B in Panel A, Table 6.11.



chi-square scores of both coefficients.

Results by Dimensions: In the time-horizon dimension **Cat_Ave** was tested both with **CEOchng** and without **CEOchng**. Column (A) and (B) under the title of "Time-horizon" reports the estimated coefficients and the corresponding chi-square statistics of these two proxies. The coefficients of **Cat_Ave** are negative and significant at the .01 level (A) and the .05 level (B), but the coefficient of **CEOchng** is not significant at the .10 level. This is consistent with the t-test results.

In the risk-aversion and performance measurement dimensions, similar analyses are done, i.e., **LSer** is tested with and without **LLeverage**. The coefficients of both proxies show negative signs, which is consistent with the environmental hypothesis. However, both proxies show weaker results in both the (A) and (B) tests than in the univariate tests. The coefficient of **LLeverage** is not significant at the .10 level and the coefficient of **LSer** is marginally significant in the test with **LLeverage**. In the test without **LLeverage**, **LSer**'s chi-square score increases and it is significant at the .05 level. Also, **LHold2** is tested with and without **LGr5Sale**. The results are consistent with the univariate analyses: **LHold2** shows a very strong negative relationship with the adoption decision but **Gr5Sale** shows no such association.

2.2.2 Combined Logit Models

Cat_Ave, **LSer** and **LHold2**, for which the coefficients were significant in the dimensional analyses, are included in the combined logit model. The second column of Table 6.14 shows the results of the logit model which includes these selected variables. In the selected model the coefficients of all the variables are negative and significant at the .05 level, which is consistent with the hypotheses. The R value is .254 and the model chi-square score is 14.77 with 3 degrees of freedom. The hypothesis that all coefficients are zero is rejected at the .01 level (the p-value is .0020).

Since **LSer** and **LHold2** show a high positive correlation (.294) (see Panel A, Table 6.15), it was necessary to examine how the result changes when one or the other of the variables is excluded. The third and fourth columns under the title of "Reduced Model" in Table 6.14 reports results of the logit models after these exclusions. Without **LSer**, **LHold2**'s chi-square score increases significantly at the .01 level (A). Without **LHold2**, **LSer**'s chi-square also increases significantly at the .01 level (B). The chi-square statistic of **Cat_Ave** does not change in either case. When the **LSer** is excluded from the model, the R value does not change, but when the **LHold2** is excluded from the model, the R value decreases. This result, along with the weak result of the risk-aversion variables in the dimensional analysis indicates that riskiness is not as important to adoption as

Table 6.14
Multivariate Logit Models in Period I^{1,2}

Estimated Coefficients (Chi-square Statistics) ³					
	Selected Model	Reduced Models		Control for Size	
		(A)	(B)	Size Only	w/ Size
Intercept	1.66 (2.72) *	.25 (.32)	1.58 (2.54)	-4.15 (5.54) **	.04 (.00)
TIME-HORIZON Cat_Ave	-.50 (5.75) **	-.48 (5.61) **	-.51 (6.26) **		-.51 (5.93) **
RISK-AVERSION Lser	-26.1 (2.74) **		-32.8 (4.62) ***		-25.3 (2.61) *
MEASUREMENT LHold2	-.46 (3.06) **	-.65 (5.62) ***			-.39 (1.98) *
SIZE LogSale				.38 (3.08) *	.19 (.54)
Model Chi-square	14.77	13.56	10.98		15.31
p-value	.0020	.0011	.0041	3.06 .0850	.0041
R value	.254	.257	.226	.084	.232
1,2,3 The same as Table 6.13					

^{1,2,3} The same as Table 6.13

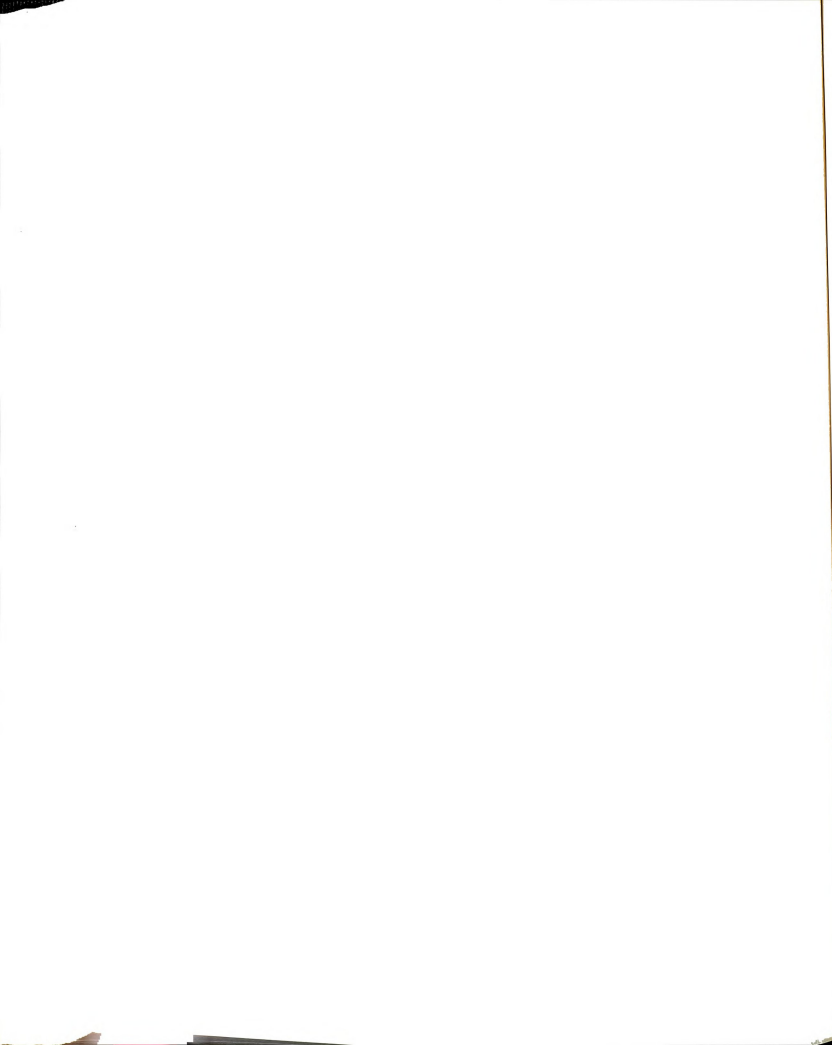


Table 6.15
Correlation Coefficients among Selected Variables^{1,2}

Panel A: Period I³

	LSer	LHold2	LogSale
Cat_Ave	-.152*	.067	.053
LSer		.294***	-.111
LHold2			-.357***

Panel B: Period II⁴

	LSer	LGr5Sale	LHold2	LogSale
Cat_Age1	-.034	-.067	-.006	.089
LSer		-.099	.154	-.163*
LGr5Sale			.169*	-.078
LHold2				-.124

¹ For definitions of variables, see Table 5.2.

² **LogSale** is used as the size variable. The definition of LogSale is the same as in Table 5.5.

³ The firms used in the correlation calculation were the adoption and non-adoption firms collected from the available sample but minus the smallest 15 firms, which is the same as the sample of Group B, Panel A of Table 6.11.

⁴ The firms used in the correlation calculation were unit-plan adoption firms and non-adoption firms, which were used in Unit Plan, Panel B of Table 6.12.

* Significant at the .10 level (two-tailed test).

*** Significant at the .01 level (two-tailed test).

the other firm characteristics in the time-horizon and measurement dimensions.

Control for Size: The last two columns report the results of the logit models for the selected variables with firm size. When **LogSale** is tested alone it is marginally significant, but when **LogSale** is tested with other selected variables, it is not significant at the .10 level. In the test with the size covariate, the covariate does not affect the time-horizon and risk-aversion variables but **LHold2** shows a much weaker result than in the selected test. This may be due to the high correlation (-.357) between **LHold2** and **LogSale**. This could induce a multicollinearity problem. Due to this multicollinearity, the R value dropped slightly as compared to the selected model. This indicates that firm size seems to be a factor in the adoption decision but other firm characteristics, such as **LHold2**, already reflect this size difference.

2.3 Analyses in Period II

2.3.1 Dimensional Analyses

Selection of Proxies: **CEOchng**, **Cat_Age1**, **LSer**, **LGr5Sale** and **LHold2** were selected as the proxies included in the logit model. The second column of Table 6.16 lists the univariate t-statistics for these proxies excerpted from Panel B, Table 6.12. These are the most significant proxies for the respective variables.

1000
1000
1000
1000
1000

1000
1000

Table 6.16
Dimensional Logit Analyses in Period II^{1,2}

	Univariate t-statistics ⁴	Estimated Coefficients (Chi-square Statistics) ³		
		Time-horizon (A)	Risk-A. (A)	Performance Measurement (A) (B) (C)
Intercept		-.33 (.80)	.29 (.13)	4.79 4.69 -.39 (3.16)* (3.19)* (1.70)
TURNOVER				
CEOchng	- .82	.44 (.76)		
AGE				
Cat_Age1	2.16**	-.50 (5.88)**	-.41 (4.41)**	
UNCERTAINTY				
LSer	1.52*		-17.7 (2.25)*	
GROWTH RATE				
LGr5Sale	2.24**			-1.57 -1.70 (3.72)* (4.59)**
HOLDING				
LHold2	3.23***			-.68 (4.39)**
				-.67 (4.83)**
Model Chi-square				
p-value		7.13 4.62 .0283 .0317	2.51 .1133	11.02 5.22 6.47 .0040 .02234 .0110
R value		.16 .14	.06	.24 .16 .19

Table 6.16 (con't)

- ¹ The Logit analyses used the unit-plan adoption firms and non-adoption firms. Thus this sample is the same as the sample of Unit Plan in Panel B, Table 6.12.
- ² The dependent adoption variable has a value of one if a firm adopted unit plans between 1982 and 1986, and a value of 0 if a firm had never adopted by 1986.
- ³ The chi-square statistics are Maximum Likelihood Estimate (MLE) statistics. Two-tailed tests were done for the coefficients of *CEOchng* and *Cat_Ave*, and intercepts. For the other coefficients, one-tailed tests were done.
- * Significant at the .10 level.
- ** Significant at the .05 level.
- *** Significant at the .01 level.
- ⁴ The *t*-statistics are excerpted from the Unit Plan in Panel B, Table 6.12.



In the time-horizon and risk-aversion dimensions, the results of the logit model were very similar to the univariate results. The coefficient of **CEOchng** is not significant, and the coefficients of **Cat_Age1** and **LSer** are negative and significant at the .05 level and the .10 level, respectively. In the performance measurement dimension both the growth rate and stockholding variables seem to be factors in the adoption decision. Not only are the coefficients of both variables significant but the R value of the logit model decreases substantially after either of the variables is excluded. The R value of the model with both variables is .24, while after the exclusion of **LHold2** and **LGr5Sale** they are .16 and .19, respectively.

2.3.2 Combined Logit Model

Cat_Age1, **LSer**, **LGr5Sale** and **LHold2**, all of which showed strong results in the dimensional analysis, are included in the combined logit model. The second column of Table 6.17 reports the test results for these selected variables. All the variables have negative coefficients, which is consistent with the hypotheses. All coefficients are significant at the .05 level. In order to examine which variable is less important in the adoption decisions, **LSer** and **LHold2**, which have smaller chi-square scores, were alternatively removed from the model. In both cases the magnitudes of significance of the remaining variables did not change (as shown in the column (A) and (B) of "Reduced

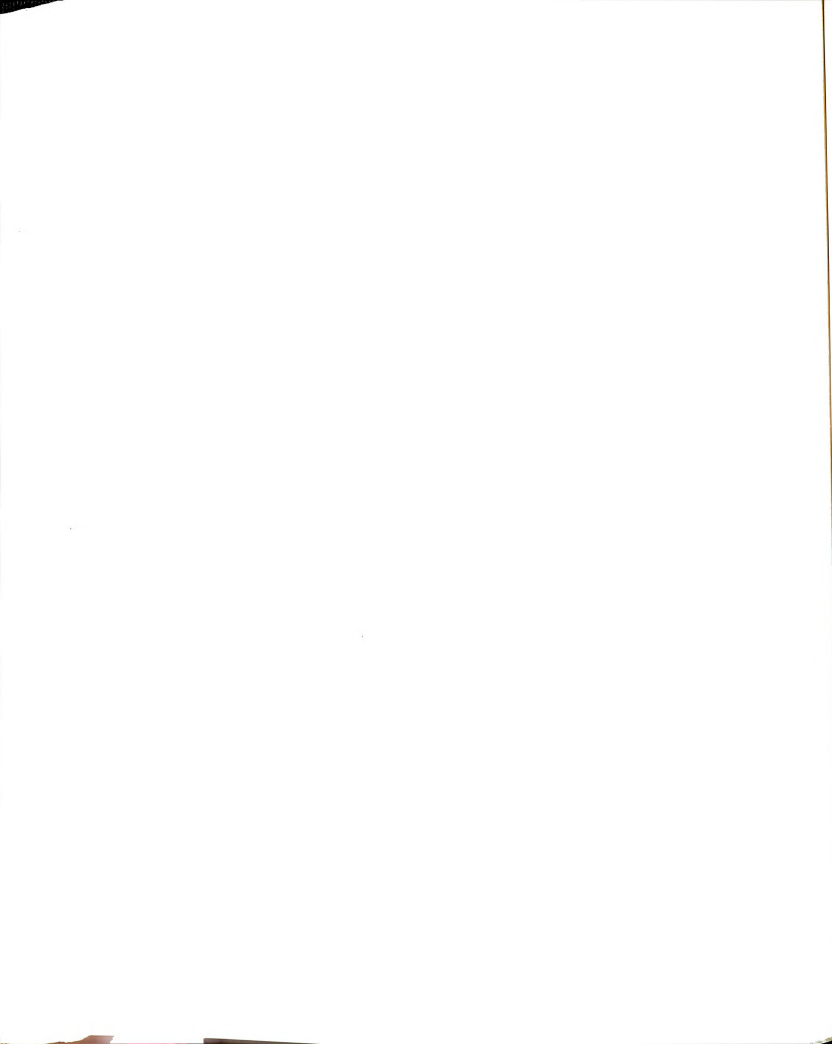


Table 6.17
Multivariate Logit Models in Period II^{1,2}

Estimated Coefficients (Chi-square Statistics) ³				
Selected Model	Reduced Models		Control for Size	
	(A)	(B)	Size Only	w/ Size
Intercept	5.85 (4.20)*	9.61 (6.54)**	-3.86 (4.13)**	8.33 (3.13)*
TIME-HORIZON Cat_Age1	-.53 (5.75)**	-.55 (5.86)**		-.59 (6.09)**
RISK-AVERSION Lser		-29.2 (4.38)**		-25.2 (3.01)**
MEASUREMENT LGr5Sale	-1.65 (3.80)**	-2.37 (5.78)**		-2.23 (4.98)**
LHold2	-.78 (4.89)**			-.64 (2.92)**
SIZE LogSale			.36 (2.43)*	.13 (.23)
Model Chi-square p-value	16.95 .0007	14.20 .0026	2.43 .1193	19.54 .0015
R value	.294	.256	.057	.276

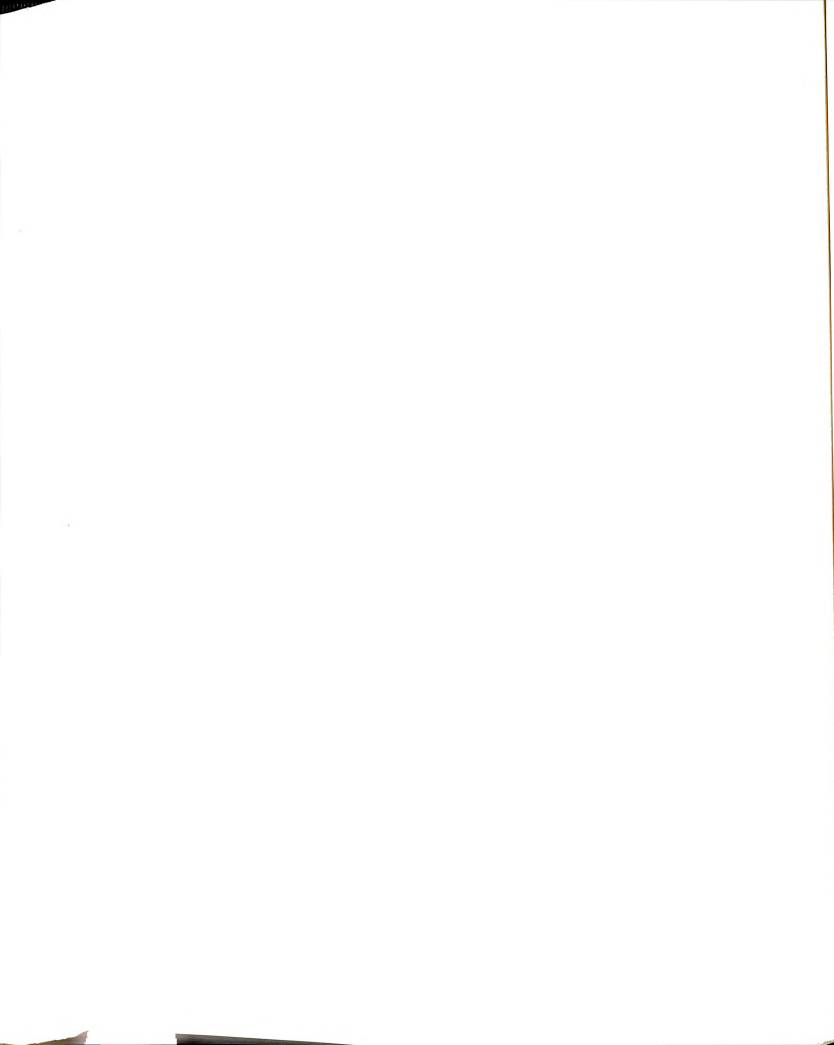
^{1,2,3} The same as Table 6.16

Models"). However, when **LHold2** is excluded, the R value decreases very much, but when **LSer** is excluded there is no change in the R value. This result and the weak result in the dimensional analysis indicate that the risk-aversion dimension was not as important as the other two dimensions in Period II.

Control for Size: The last two columns of the table report the results of the logit models with firm size included. The size covariate in Period II shows a pattern very similar to that of firm size in Period I. When **LogSale** is tested alone it is marginally significant, but when it is tested with the other selected variables, it ceases to be significant at the .10 level. In the test with the size covariate, the covariate does not significantly affect the time-horizon and risk-aversion variables but **LHold2** shows a much weaker result than in the selected test. As in Period I there is a potential multicollinearity problem between the size and stockholding variables. Due to this multicollinearity, the R value dropped slightly in comparison to the selected model. This indicates that firm size alone seems to be a factor in the adoption decision but other firm characteristics such as **LHold2** already reflect the size difference.

2.4 Summary of Major Findings

Even though there is some differences in proxy



selection, all the variables show exactly the same results between Period I and II. The result of the dimensional and combined analyses in both Period I and II indicate that: (1) the results of the selected variables are similar to those of the univariate tests; (2) the environmental uncertainty or riskiness is less important in adoption decisions than the time-horizon and performance measurement variables; and (3) the performance measurement variable (LHold2) appears to reflect the size differences among firms.

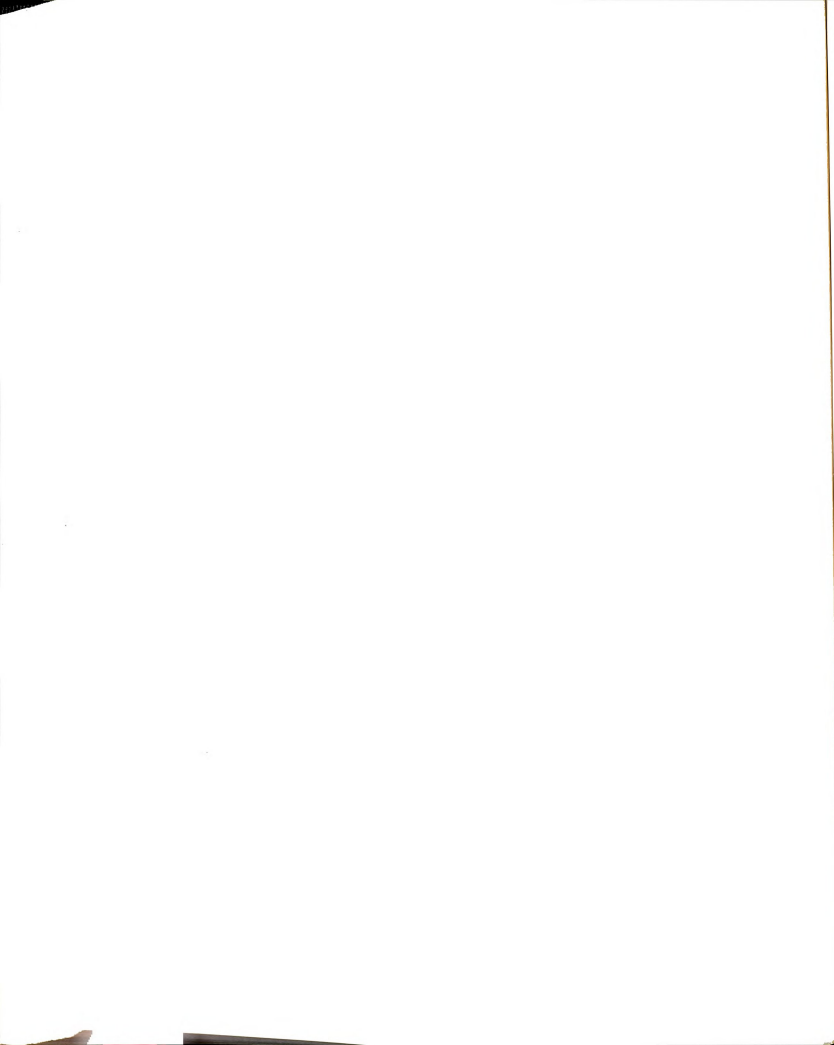
However, the magnitude of the R value in Period II is larger than in Period I. This implies that the firm characteristics in Period II have more explanatory power than in Period I. This phenomenon may stem from the tax act difference between periods. Since there was a tax advantage to using SOPs in Period II, PPs were at a relative disadvantage in this period. Thus, for a firm to adopt a PP during this period in spite of this disadvantage, the firm's environment would have to be very well suited to PPs. On the other hand, in Period I, a certain number of the PPs adoptions might have been the result of a substitution of PPs for SOPs. It can be conjectured that these firms may not have characteristics significantly different from non-adoption firms. However, the question as to whether the difference arises from the differences in taxation remains unanswered.



VII SUMMARY AND CONCLUSION

This study has investigated some characteristics of firms which adopted PPs prior to the adoption of the plans. The results of all variables except executive turnover were found to be consistent with the hypotheses. In the time-horizon dimension, managers of adoption firms are younger than those of non-adoption firms, but the executive turnover of adoption firms was not found to be different from that of non-adoption firms. In the risk-aversion dimension, six measures were used as proxies for environmental uncertainty. Among these, the standard deviation of the monthly stock returns (LVolaRetu) and the standard error of residuals of the market model regression (LSer) showed results consistent with the hypothesis. However, the volatility of time-series sales (LVolaSale) and the ratio of R & D expenditures to total assets (LR&Dratio) produced opposite results to those predicted. The anomaly in the R & D result appears to be due to missing data but the former anomaly could not be explained.

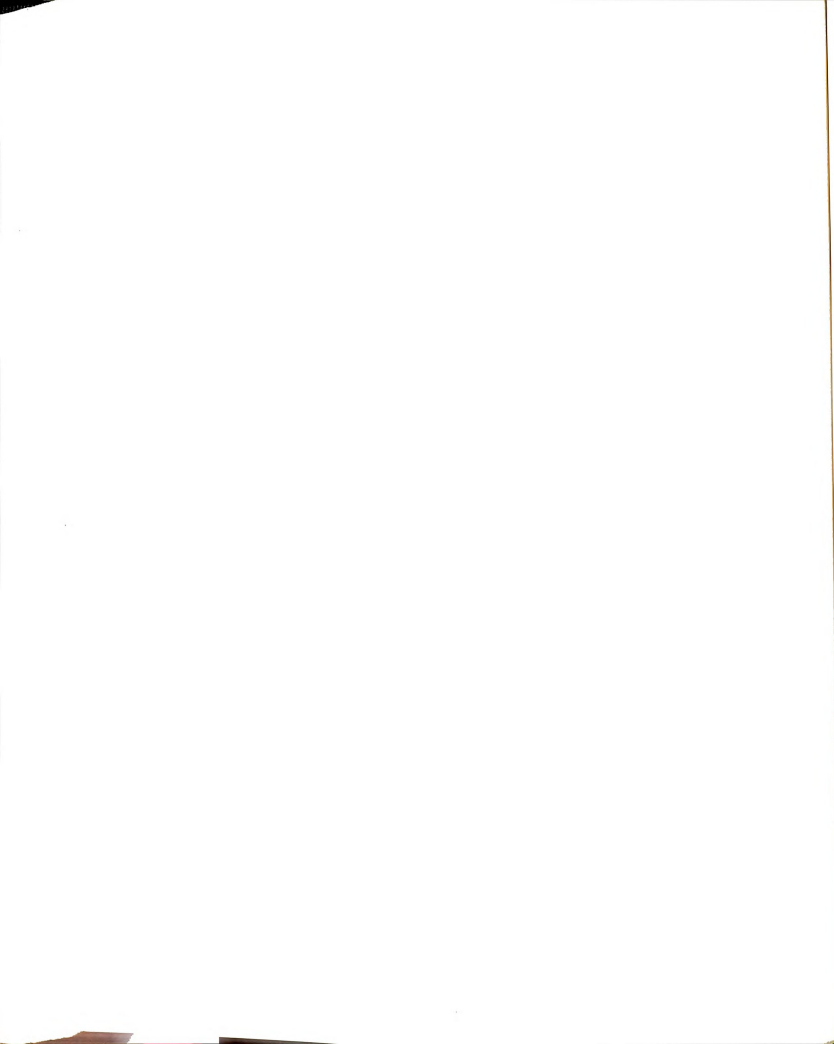
In the performance measurement dimension, the hypothesis regarding own-firm stockholdings was confirmed in both periods but the hypothesis regarding growth rates was confirmed only in Period II; the growth rate variable in Period I did not show any difference between adoption and non-adoption firms. It is conjectured that the difference in



taxation rules between the periods might have caused the contrasting results.

In the multivariate analyses, the logit model was composed of the selected variables. In general, the results were similar to those of the univariate tests. The findings of the multivariate analyses are threefold. First, environmental uncertainty seemed to be a less important factor than other variables in the adoption decision. Second, no control for size difference could be accomplished in this study because of high correlations of the size covariate with other variables. Third, the magnitude of the R value in Period II was larger than in Period I. Perhaps due to the difference in taxation, the multivariate model in Period II had a larger explanatory power than that in Period I.

This study has three major limitations. First, industry differences among adoption firms was not controlled for because of the practical reason outlined in Chapter V. This lack of the control could reduce the possibility of finding significant results. Second, since a categorical dependent variable (adoption or non-adoption) was used, the degree of impact of PPs' adoption on decision making could not be examined. The proportion of the PPs' award amounts to the total compensation, should influence the degree of the relationship between the adoption decision and firm



characteristics. For instance, if the PPs award is trivial compared to the total compensation, it is not likely that high correlations between firm characteristics and the adoption would be found.

Third, the results of this study are not readily applicable to different firm samples because the external validity of the results was threatened in two ways. The first threat comes from firm size. Since the sample firms are among the Fortune 200 firms, the findings of this study basically explain only the adoption behavior of large firms. The same results might not be found in tests using samples including smaller firms. The second threat stems from the exclusion of non-industrial firms. Since the Fortune 200 are all industrial firms, utility, bank, financial service, and insurance firms are not included.

Keeping in mind the above limitations, the findings of this study could contribute to compensation research in the following ways. First, this study examined alternative explanations for the adoption of incentive plans. Most previous studies tested the motivation hypothesis and considered only the owners' interests. They examined how effective incentive plans are in disciplining managers but did not consider why the plans were adopted. This study examined managers' interests as well as owners' interests.

Second, combining this study with post-adoption

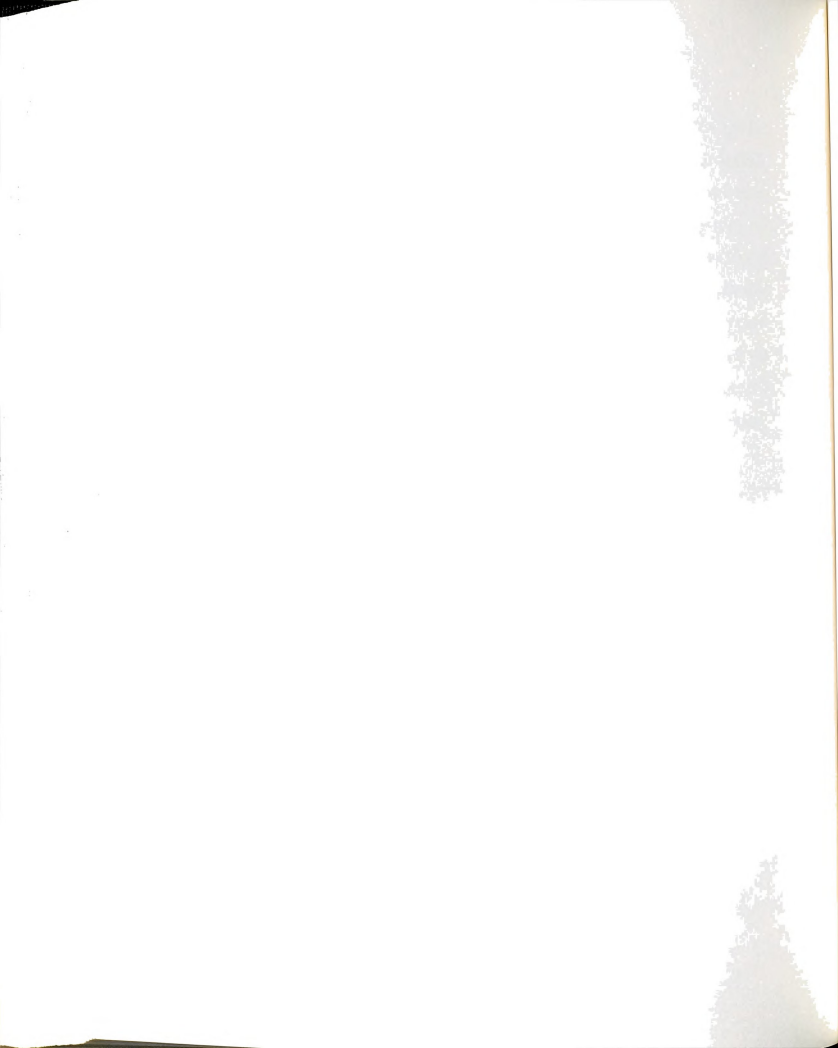
1000
1000
1000

characteristic studies could refine the methodology of the managers' behavior change studies. As Larcker (1983) pointed out, most previous studies about the effectiveness of compensation plans were plagued by self-selection problems since they did not control for pre-adoption characteristics. This study provides a basis that should ameliorate the problem by allowing future research to control for pre-adoption differences between adoption and non-adoption groups when it investigates post-adoption behavior changes.

Third, this study has attempted to control for the taxation difference over sample periods. That the findings of Period I and II were different implies that the taxation difference may be a factor in the adoption of PPs. Finally, the results of the sensitivity analyses suggested that when PPs are studied, the type of PPs must be distinguished. Specifically, the unit plan adopters showed significantly different characteristics from those of non-adopters, while the share plan adopters did not.



APPENDICES



APPENDIX A

Stock Option Plans

General characteristics

Stock option plans (SOPs) are financial arrangements in which managers are given the right to purchase (or "exercise") company stocks at a future date, at a price established when the option was granted (usually the current market price). SOPs are widely used by large companies.

Tax Benefit of Stock Option Plans

Since 1972 when PPs were introduced to public corporations, there have been three major tax reforms regarding SOPs and their capital gains treatment. Before 1976, there were qualified SOPs which had a capital gain tax advantage. Managers received this benefit if the stocks obtained from exercising the qualified SOPs were held more than three years. The Tax Reform Act (TRA) of 1976 repealed the qualified SOP, only nonqualified SOPs remained and SOPs no longer held a tax advantage over other types of compensation plans.

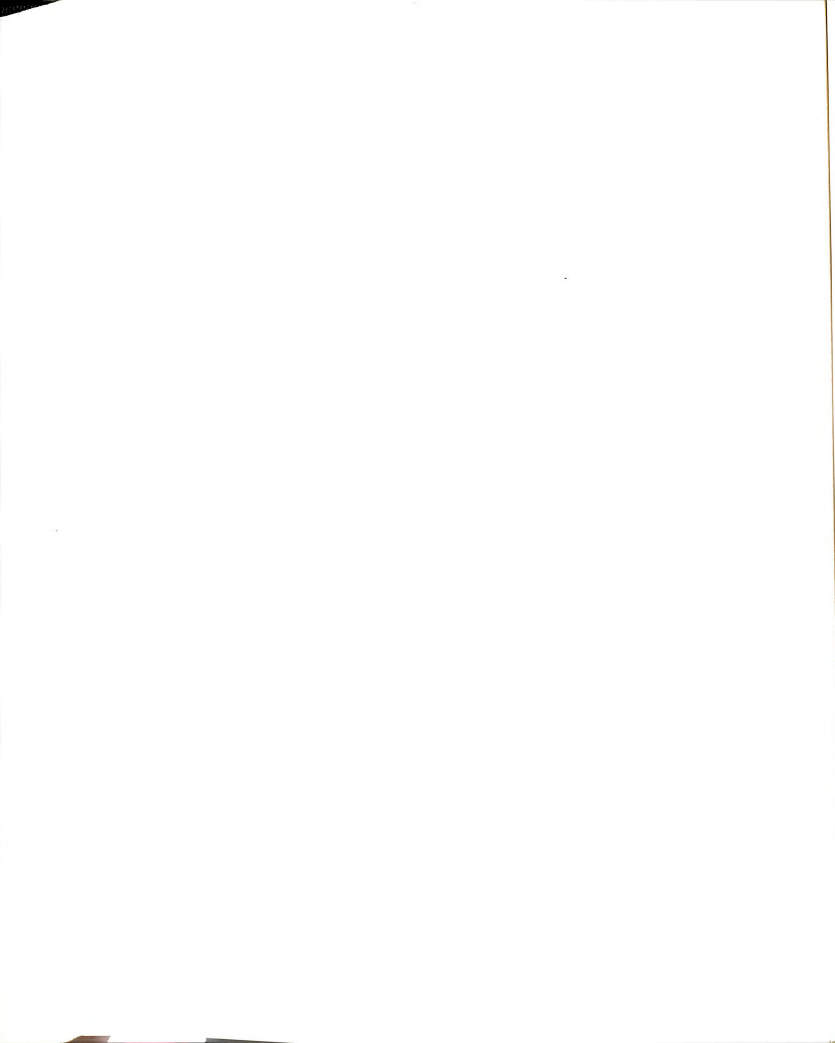
In 1981, the Economic Recovery Tax Act (ERTA) created a statutory stock option which was called Incentive Stock Option (ISOP). The ISOP was taxed in a manner similar to the qualified SOP. This 1981 version was at least as favorable for managers as the old qualified stock option. One purpose of ERTA was stated as follows: "the provision was designed to encourage the use of stock options for key employees" (U.S. Congress, JCT, 1981, p. 159). In fact the number of companies having an ISOP has increased since 1981, "reversing a four-year trend of net decreases between 1977 and 1980" (Frederic W. Cook & Co., Inc., 1982), and it seems clear that this increase was due to the tax act reform.

Recently, new tax act reform has leveled the advantage. The Tax Reform Act of 1986 reduced the benefit of ISOP when it increased the maximum tax rate applicable to net capital gains from 20% to 28%.

Current Practice

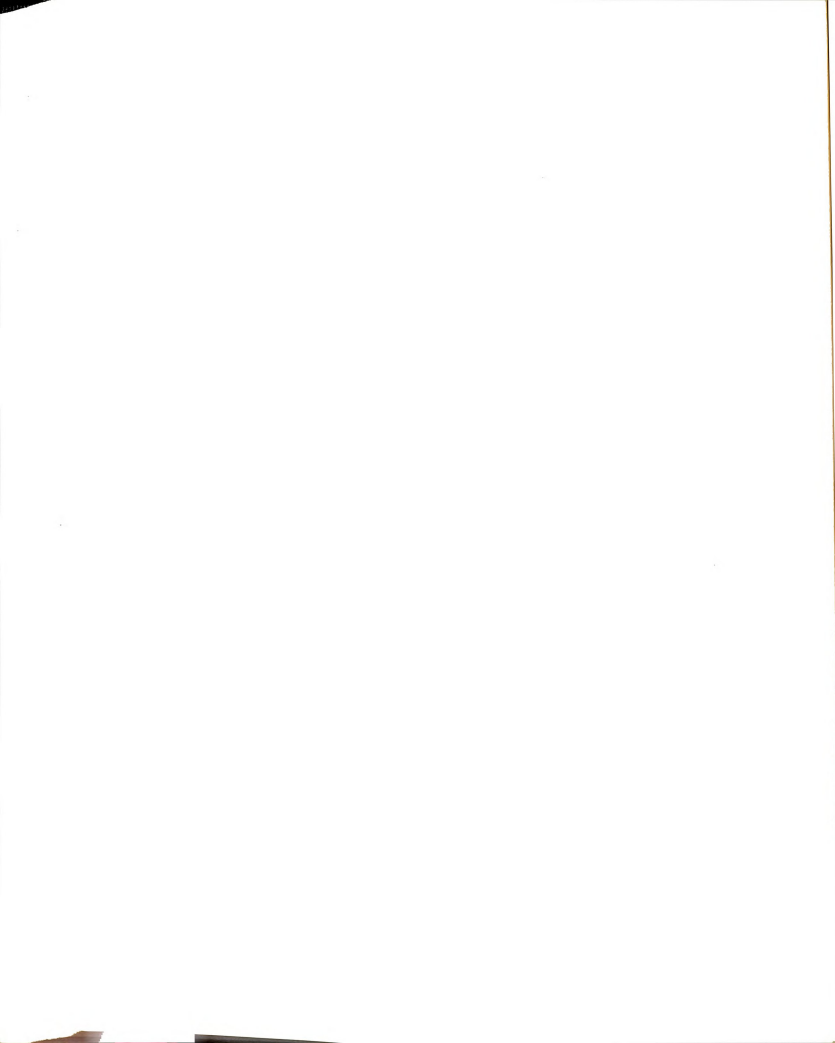
If the market value of the share drops substantially below the option prices, technically, the firm cannot lower the option price. But it can cancel the existing option shares and to reissue new option shares at an option price that is equal to today's lower market value (Crystal, 1984). This action, so called, option swaps, are reported in the Wall Street Journal in a denouncing tone,

Cancelling stock options issued at the peak of the



market and reissuing them at new, lower, profit enhancing prices. Steve Gross, a consultant at Hay Group in Philadelphia , says "a client, a high-technology defense company, recently cancelled and reissued options at two-thirds their pre-crash peak." (3/28/88)

Regarding the exercise time, each company can impose different exercise restrictions, but in practice, a predetermined portion of total shares granted can be exercised gradually during the exercise period (at 10-year maximum) after waiting for one year or more from the date of grant. Since managers can exercise a part of the total awarded shares annually, the payoff from the option exercise can be spread over the award period. If managers resign voluntarily, they are not, by law, permitted to exercise their options beyond a period of ninety days following the termination (Crystal, 1984, p. 70).



APPENDIX B

199 Available Sample Firms

OBS	CUSIP	NAME	ADOPT	TYR	TYPE	PERIOD	INDUSTRY	RANK	SALE
1	002824	ABBOTT LABORATORIES	.				PHARMACEUT	114	
2	009158	AIR PRODUCTS & CHEMICA	79	UNIT	I		CHEMICAL	164	
3	017372	ALLEGHENY INTERNATIONAL	70	SHARE			ELECTRONIC	129	
4	019512	ALLIED SIGNAL INC	80	UNIT	I		TRANS EQUIP	32	
5	022249	ALUMINUM CO OF AMERICA	.				METAL	56	
6	023127	AMAX INC	.				MINING	132	
7	023551	AMERADA HESS CORP	.				PETROLEUM	35	
8	024703	AMERICAN BRANDS INC-DE	.				TOBACCO	74	
9	025321	AMERICAN CYANAMID CO	70	UNIT			CHEMICAL	88	
10	026609	AMERICAN HOME PRODUCTS	.				PHARMACEUT	66	
11	028861	AMERICAN PETROFINA -C	.				PETROLEUM	138	
12	029717	AMERICAN STANDARD INC	70	UNIT			TRANS EQUIP	125	
13	030177	AMERICAN TELE & TELEGR	78	SHARE	I		ELECTRONIC	3	
14	031897	AMP INC	.				ELECTRONIC	172	
15	031905	AMOCO CORP	83	UNIT	II		PETROLEUM	10	
16	035229	ANHEUSER-BUSCH COS INC	.				BEVERAGE	53	
17	037833	APPLE COMPUTER INC	.				COMPUTER	195	
18	039483	ARCHER-DANIELS-MIDLAND	.				FOOD	75	
19	042170	ARMCO INC	84	UNIT	II		METAL	65	
20	042476	ARMSTRONG WORLD INDS I	.				TEXTILE	179	
21	044540	ASHLAND OIL INC	78	UNIT	I		PETROLEUM	36	
22	048825	ATLANTIC RICHFIELD CO	76	UNIT			PETROLEUM	12	
23	054303	AVON PRODUCTS	84	UNIT	II		SOAPS	105	
24	087509	BETHLEHEM STEEL CORP	.				METAL	57	
25	091797	BLACK & DECKER CORP	81	UNIT	I		INDUS EQUIP	184	
26	097023	BOEING CO	.				AEROSPACE	26	
27	097383	BOISE CASCADE CORP	70	BOTH			FOREST PROD	91	
28	099599	BORDEN INC	75	UNIT			FOOD	73	
29	110097	BRISTOL-MYERS CO	79	UNIT	I		PHARMACEUT	80	
30	117043	BRUNSWICK CORP	.				INDUS EQUIP	186	
31	126149	CPC INTERNATIONAL INC	76	UNIT			FOOD	77	
32	134429	CAMPBELL SOUP CO	81	UNIT	I		FOOD	94	
33	149123	CATERPILLAR INC	.				INDUS EQUIP	48	
34	158525	CHAMPION INTERNATIONAL	78	UNIT	I		FOREST PROD	70	
35	166751	CHEVRON CORP	80	SHARE	I		PETROLEUM	9	
36	171196	CHRYSLER CORP	85	UNIT	II		MOTOR	19	
37	190441	COASTAL CORP	87	UNIT			PETROLEUM	49	
38	191216	COCA-COLA CO	82	UNIT	II		BEVERAGE	42	
39	194162	COLGATE-PALMOLIVE CO	.				SOAPS	60	
40	196864	COLT INDUSTRIES INC-DE	77	UNIT			INDUS EQUIP	163	
41	200273	COMBUSTION ENGINEERING	79	UNIT	I		INDUS EQUIP	97	
42	205887	CONAGRA INC	70	SHARE			FOOD	86	
43	212363	CONTROL DATA CORP	80	UNIT	I		COMPUTER	67	
44	216669	COOPER INDUSTRIES INC	70	SHARE			ELECTRONIC	140	
45	228255	CROWN CORK & SEAL CO I	.				METAL PROD	181	
46	231021	CUMMINS ENGINE	80	UNIT	I		INDUS EQUIP	148	
47	235811	DANA CORP	84	UNIT	II		MOTOR	109	
48	244199	DEERE & CO	86	UNIT	II		INDUS EQUIP	72	
49	253849	DIGITAL EQUIPMENT	.				COMPUTER	68	
50	257867	DONNELLEY (R.R.) & SON	.				PUBLISHING	169	
51	260543	DOW CHEMICAL	86	UNIT	II		CHEMICAL	22	
52	261597	DRESSER INDUSTRIES INC	86	UNIT	II		INDUS EQUIP	81	
53	263534	DU PONT (E.I.) DE NEMO	.				CHEMICAL	8	
54	277461	EASTMAN KODAK CO	82	UNIT	II		PHOTO EQUIP	23	
55	278058	EATON CORP	82	UNIT	II		ELECTRONIC	113	

OBS	CUSIP	NAME	ADOPTYR	TYPE	PERIOD	INDUSTRY	RANKSALE
56	291011	EMERSON ELECTRIC CO	79	SHARE	I	ELECTRONIC	85
57	291210	EMHART CORP	87	SHARE		INDUS EQUIP	153
58	292845	ENGELHARD CORP	.			CHEMICAL	137
59	297659	ETHYL CORP	.			CHEMICAL	159
60	302290	EXXON CORP	.			PETROLEUM	1
61	302491	FMC CORP	70	SHARE		TRANS EQUIP	90
62	345370	FORD MOTOR CO	86	SHARE	II	MOTOR	6
63	347460	FORT HOWARD CORP	.			FOREST PROD	198
64	364730	GANNETT CO	78	UNIT	I	PUBLISHING	155
65	368682	GENCORP INC	.			RUBBER PROD	133
66	369550	GENERAL DYNAMICS CORP	83	SHARE	II	AEROSPACE	41
67	369604	GENERAL ELECTRIC CO	78	UNIT	I	ELECTRONIC	11
68	370334	GENERAL MILLS INC	80	UNIT	I	FOOD	58
69	370442	GENERAL MOTORS CORP	82	UNIT	II	MOTOR	2
70	370838	GENERAL SIGNAL CORP	87	UNIT		PHOTO EQUIP	160
71	373298	GEORGIA-PACIFIC CORP	.			FOREST PROD	47
72	375766	GILLETTE CO	84	UNIT	II	METAL PROD	136
73	382388	GOODRICH (B.F.) CO	85	UNIT	II	RUBBER PROD	98
74	382550	GOODYEAR TIRE & RUBBER	.			RUBBER PROD	30
75	383492	GOULD INC	.			ELECTRONIC	175
76	383883	GRACE (W.R.) & CO	70	BOTH		CHEMICAL	46
77	391090	GREAT NORTHERN NEKOOSA	87	UNIT		FOREST PROD	167
78	398028	GREYHOUND CORP	84	UNIT	II	.	110
79	400181	GRUMMAN CORP	.			AEROSPACE	135
80	413875	HARRIS CORP	.			ELECTRONIC	157
81	423074	HEINZ (H.J.) CO	70	UNIT		FOOD	79
82	427056	HERCULES INC	.			CHEMICAL	122
83	427866	HERSHEY FOODS CORP	78	SHARE	I	FOOD	156
84	428236	HEWLETT-PACKARD CO	85	BOTH	II	COMPUTER	59
85	438506	HONEYWELL INC	79	SHARE	I	COMPUTER	52
86	440452	HORMEL (GEO. A.) & CO	.			FOOD	177
87	449268	IC INDUSTRIES INC	82	UNIT	II	FOOD	78
88	450679	ITT CORP	77	UNIT		ELECTRONIC	20
89	456866	INGERSOLL-RAND CO	75	SHARE		INDUS EQUIP	124
90	457472	INLAND STEEL INDUSTRIE	84	BOTH	II	METAL	104
91	458506	INTERCO INC	.			APPARAL	119
92	459200	INTL BUSINESS MACHINES	.			COMPUTER	7
93	459884	INTL MINERALS & CHEMIC	.			MINING	173
94	460146	INTL PAPER CO	70	SHARE		FOREST PROD	71
95	470349	JAMES RIVER CORP OF VI	.			FOREST PROD	139
96	478160	JOHNSON & JOHNSON	.			PHARMACEUT	50
97	478366	JOHNSON CONTROLS INC	70	UNIT		ELECTRONIC	182
98	487836	KELLOGG CO	.			FOOD	128
99	492386	KERR-MCGEE CORP	.			PETROLEUM	89
100	494368	KIMBERLY-CLARK CORP	.			FOREST PROD	96
101	499040	KNIGHT-RIDDER INC	.			PUBLISHING	174
102	500602	KOPPERS CO	79	SHARE	I	CHEMICAL	161
103	500902	KRAFT INC-NEW	77	BOTH		FOOD	28
104	502210	LTV CORP	75	UNIT		METAL	55
105	532457	LILLY (ELI) & CO	75	SHARE		PHARMACEUT	107
106	538021	LITTON INDUSTRIES INC	.			ELECTRONIC	64
107	539821	LOCKHEED CORP	87	UNIT		AEROSPACE	43
108	546347	LOUISIANA-PACIFIC CORP	.			FOREST PROD	192
109	565020	MANVILLE CORP	70	UNIT		BUILDING	150
110	565097	MAPCO INC	86	UNIT	II	PETROLEUM	141

OBS	CUSIP	NAME	ADOPT	TYR	TYPE	PERIOD	INDUSTRY	RANK	SALE
111	573275	MARTIN MARIETTA CORP	.				AEROSPACE	82	
112	580037	MCDERMOTT INTL INC	81	UNIT	I		METAL PROD	93	
113	580169	MCDONNELL DOUGLAS CORP	86	BOTH	II		AEROSPACE	34	
114	580645	MCGRAW-HILL INC	74	UNIT			PUBLISHING	183	
115	582834	MEAD CORP	.				FOREST PROD	121	
116	589331	MERCK & CO	82	UNIT	II		PHARMACEUT	95	
117	604059	MINNESOTA MINING & MFG	81	UNIT	I		PHOTO EQUIP	40	
118	607059	MOBIL CORP	76	UNIT			PETROLEUM	4	
119	611662	MONSANTO CO	75	UNIT			CHEMICAL	45	
120	619426	MORTON THIOKOL INC	82	UNIT	II		CHEMICAL	178	
121	620076	MOTOROLA INC	84	UNIT	II		ELECTRONIC	69	
122	626717	MURPHY OIL CORP	.				PETROLEUM	131	
123	628862	NCR CORP	84	UNIT	II		COMPUTER	83	
124	629156	NL INDUSTRIES	.				CHEMICAL	162	
125	636540	NATIONAL INTERGROUP IN	70	UNIT			METAL	115	
126	637640	NATIONAL SEMICONDUCTOR	.				ELECTRONIC	171	
127	650111	NEW YORK TIMES CO -CL	74	UNIT			PUBLISHING	191	
128	666807	NORTHROP CORP	77	UNIT			AEROSPACE	101	
129	674599	OCCIDENTAL PETROLEUM C	.				MINING	14	
130	676346	OGDEN CORP	.				TRANS EQUIP	142	
131	680665	OLIN CORP	75	UNIT			CHEMICAL	145	
132	690734	OWENS-CORNING FIBERGLA	80	SHARE	I		BUILDING	117	
133	693506	PPG INDUSTRIES INC	75	SHARE			BUILDING	84	
134	693718	PACCAR INC	81	UNIT	I		MOTOR	165	
135	701094	PARKER-HANNIFIN CORP	.				METAL PROD	190	
136	707271	PENN CENTRAL CORP	.				ELECTRONIC	116	
137	709903	PENNZOIL CO	.				PETROLEUM	134	
138	713448	PEPSICO INC	75	UNIT			BEVERAGE	38	
139	717081	PFIZER INC	80	BOTH	I		PHARMACEUT	87	
140	718154	PHILIP MORRIS COS INC	87	BOTH			TOBACCO	29	
141	718507	PHILLIPS PETROLEUM CO	78	BOTH	I		PETROLEUM	15	
142	721510	PILLSBURY CO	75	SHARE			FOOD	76	
143	724479	PITNEY-BOWES INC	78	UNIT	I		COMPUTER	168	
144	731095	POLAROID CORP	87	SHARE			PHOTO EQUIP	185	
145	742718	PROCTER & GAMBLE CO	.				SOAPS	21	
146	747402	QUAKER OATS CO	80	UNIT	I		FOOD	112	
147	74960L	RJR NABISCO INC	80	UNIT	I		TOBACCO	25	
148	751277	RALSTON PURINA CO	76	BOTH			FOOD	61	
149	755111	RAYTHEON CO	.				ELECTRONIC	51	
150	761763	REYNOLDS METALS CO	.				METAL	92	
151	774347	ROCKWELL INTERNATIONAL	77	SHARE			AEROSPACE	37	
152	775371	ROHM & HAAS CO	70	UNIT			CHEMICAL	146	
153	803111	SARA LEE CORP	82	UNIT	II		FOOD	44	
154	806605	SCHERING-PLOUGH	.				PHARMACEUT	149	
155	809877	SCOTT PAPER CO	82	UNIT	II		FOREST PROD	123	
156	824348	SHERWIN-WILLIAMS CO	.				CHEMICAL	144	
157	829302	SINGER CO	82	UNIT	II		ELECTRONIC	126	
158	832377	SMITHKLINE BECKMAN COR	.				PHARMACEUT	111	
159	851783	SPRINGS INDUSTRIES INC	85	UNIT	II		TEXTILE	197	
160	852206	SQUARE D CO	.				ELECTRONIC	189	
161	852245	SQUIBB CORP	75	UNIT			PHARMACEUT	151	
162	854616	STANLEY WORKS	77	SHARE			METAL PROD	194	
163	861589	STONE CONTAINER CORP	81	SHARE	I		FOREST PROD	199	
164	866762	SUN CO INC	78	UNIT	I		PETROLEUM	16	
165	867323	SUNDSTRAND CORP	.				AEROSPACE	196	

OBS	CUSIP	NAME	ADOPTYR	TYPE	PERIOD	INDUSTRY	RANKSALE
166	872649	TRW INC	84	UNIT	II	MOTOR	54
167	879335	TELEDYNE INC	.			INDUS EQUIP	103
168	879868	TEMPLE-INLAND INC	84	UNIT	II	FOREST PROD	187
169	880370	TENNECO INC	82	UNIT	II	PETROLEUM	18
170	881694	TEXACO INC	81	SHARE	I	PETROLEUM	5
171	882508	TEXAS INSTRUMENTS INC	79	UNIT	I	ELECTRONIC	62
172	883203	TEXTRON INC	82	UNIT	II	INDUS EQUIP	106
173	887224	TIME INC	82	SHARE	II	PUBLISHING	102
174	887360	TIMES MIRROR CO-DEL	.			PUBLISHING	127
175	891490	TOSCO CORP	.			PETROLEUM	120
176	896047	TRIBUNE CO	84	BOTH	II	PUBLISHING	158
177	902905	USX CORP	.			PETROLEUM	13
178	903293	USG CORP	70	BOTH		BUILDING	152
179	905530	UNION CAMP CORP	.			FOREST PROD	154
180	905581	UNION CARBIDE CORP	.			CHEMICAL	31
181	907818	UNION PACIFIC CORP	.			PETROLEUM	39
182	909660	UNITED BRANDS	.			FOOD	108
183	913017	UNITED TECHNOLOGIES CO	79	UNIT	I	AEROSPACE	17
184	915289	UNOCAL CORP	75	SHARE		PETROLEUM	24
185	915302	UPJOHN CO	86	SHARE	II	PHARMACEUT	143
186	918204	VF CORP	84	UNIT	II	APPARAL	193
187	919138	VALERO ENERGY CORP	.			PETROLEUM	147
188	933696	WANG LABORATORIES -CL	.			COMPUTER	166
189	934436	WARNER COMMUNICATIONS	.			ELECTRONIC	100
190	934488	WARNER-LAMBERT CO	82	UNIT	II	PHARMACEUT	99
191	955465	WEST POINT-PEPPERELL	74	SHARE		TEXTILE	188
192	960402	WESTINGHOUSE ELECTRIC	79	SHARE	I	ELECTRONIC	27
193	961548	WESTVACO CORP	.			FOREST PROD	170
194	962166	WEYERHAEUSER CO	.			FOREST PROD	63
195	963320	WHIRLPOOL CORP	.			ELECTRONIC	118
196	969457	WILLIAMS COS INC	.			CHEMICAL	130
197	977385	WITCO CORP	.			PETROLEUM	180
198	984121	XEROX CORP	76	UNIT		PHOTO EQUIP	33
199	989349	ZENITH ELECTRONICS COR	.			ELECTRONIC	176



APPENDIX C

Summary Statistics of Variables¹

Panel A: Period I (1978-81)

	Non-adoption Group					Adoption Group				
	N	Mean (SD)	Skewness	Min	Max	N	Mean (SD)	Skewness	Min	Max
TIME-HORIZON										
Turnover	101	.54 (.78)	1.8	0	4	34	.56 (.99)	2.2	0	4
CEOchng	101	.11 (.31)	2.6	0	1	34	.24 (.43)	1.3	0	1
AveAge	105	58.1 (3.7)	-.4	46.4	67.3	34	56.8 (2.8)	.0	51.2	62.2
Age1	105	61.7 (6.0)	.3	43	80	34	59.3 (6.4)	-.4	44	72
Fix	108	.50 (.16)	.1	.17	.82	34	.51 (.15)	.6	.28	.93
Capital	108	.10 (.04)	.9	.03	.23	34	.10 (.04)	.9	.04	.22
RISK-AVERSION										
VolaSale	107	16.1 (9.2)	1.7	2.3	58.7	34	18.0 (7.8)	.3	4.4	33
R&Dratio	92	.03 (.03)	1.5	.00	.15	33	.03 (.02)	1.2	.00	.09
Leverage	103	.68 (1.0)	6.7	.01	9.37	34	.44 (.25)	.70	.10	1.02
VolaRetu	104	.09 (.03)	1.5	.05	.19	31	.08 (.04)	3.3	.03	.25
Beta	99	1.09 (.45)	.8	.13	2.72	31	1.01 (.49)	-.3	0.02	2.05
Ser	99	.07 (.02)	1.7	.04	.16	31	.06 (.02)	1.0	.03	.11
MEASUREMENT										
Gr5Sale	105	12.9 (7.1)	1.3	-2.0	38	33	13.7 (5.7)	.0	-4	32
Gr5Bv	105	12.1 (7.7)	1.0	-14	42	33	11.3 (3.6)	.0	5	19
Mv/Bv	106	1.31 (.69)	1.3	.21	4.12	33	1.2 (.48)	.8	.62	2.37
Hold1	107	38.0 (94.0)	3.1	.17	409	33	5.6 (7.5)	2.6	.20	36
Hold2	107	13.0 (28.1)	3.2	.03	151	33	3.6 (8.0)	3.8	.02	41

Panel B: Period II (1982-86)

	Non-adoption Group					Adoption Group				
	N	Mean (SD)	Skewness	Min	Max	N	Mean (SD)	Skewness	Min	Max
TIME-HORIZON										
Turnover	76	.70 (.83)	1.1	0	3	37	.78 (.82)	.8	0	3
CEOChng	76	.22 (.42)	1.4	0	1	37	.32 (.48)	.8	0	1
AveAge	78	57.6 (4.7)	-.8	42	67	39	58.2 (3.5)	.0	49	67
Age1	78	61.7 (7.7)	-.6	30	84	39	60.0 (5.9)	-.2	46	72
Fix	79	.57 (.17)	-.3	.13	.83	39	.54 (.14)	.2	.31	.78
Capital	79	.09 (.04)	1.1	.03	.22	39	.08 (.03)	.7	.02	.17
RISK-AVERSION										
VolaSale	79	11.8 (9.5)	1.7	.46	46	39	11.3 (10)	1.9	.98	46
R&Dratio	65	.04 (.03)	1.2	.00	.14	27	.05 (.03)	.7	.01	.12
Leverage	78	.55 (.49)	2.4	.02	3.0	39	.46 (.30)	1.0	.02	1.42
VolaRetu	75	.09 (.03)	.9	.05	.17	39	.08 (.02)	1.1	.05	.16
Beta	75	1.15 (.37)	.4	.43	2.1	37	1.12 (.34)	.0	.28	1.90
Ser	75	.08 (.02)	1.0	.04	.16	37	.07 (.02)	2.4	.04	.14
MEASUREMENT										
Gr5Sale	78	9.4 (13.8)	4.8	-13	107	38	5.4 (7.2)	.2	-10	21
Gr5Bv	77	11.0 (16)	5.3	-15	132	38	5.4 (7.4)	-1.4	-22	22
Mv/Bv	78	1.50 (.85)	1.9	.48	4.65	39	1.3 (.59)	1.0	.55	2.89
Hold1	79	24.2 (80.8)	4.8	.08	484	39	3.7 (5.4)	2.9	.04	24
Hold2	79	7.11 (20.1)	4.9	.02	138	39	1.2 (1.3)	1.4	.01	5.5

¹ For definitions of variables, refer to Table 5.2.



NOTE

1. There is no satisfactory explanation for this decline in the growth rate. The investigation of firm-specific factors in this study could suggest reasons for this phenomenon.

2. In practice, a variety of measures are used: EPS growth, return on equity, return on net assets, etc.. According to Sopariwala's (1985) sample, among 46 firms, 32 firms used EPS growth as a performance criterion. The survey done by McKinsey & Co., Inc. (Rich and Larson, 1984) reported that more than 85 percent of the companies with PPs used EPS growth, either alone or in combination with some other measures. A typical range for the cumulative EPS growth is between 9 to 15 percent per year (Kaplan, 1982). A detailed calculation method will be introduced in endnote 3.

3. Crystal(1984) describes several methods of calculating the EPS growth rate for a period. According to him, the most popular method is the cumulative method. The method has two steps: First, add up EPS's for 4 years of the performance measurement period. The next step is to compute an annuity compound interest rate. When the base EPS is compounded at this rate, the terminal value of \$1 (the base EPS) is equal to the sum of 4-year EPS's.

Illustration using the case of ABC Co.:

First step; $\$1.10 + 1.18 + 1.39 + 1.43 = \5.10

Second step; $\$1.0 \times \sum_{n=1,4} (1 + X\%)^n = \5.10

Answer; $X = 10\%$.

4. According to Brickley, Bhagat and Lease (1985), most incentive plan proposals on which New York Stock Exchange firms voted from 1979 through 1982 were passed.

Mr. Walsh [a NYSE proxy specialist] believes that all of the plans we examine were adopted. He has not heard of one case where the plan was not ratified. Executive compensation plans only require a majority vote to pass.(p. 119)

5. Sometimes companies have more than one PP. Before a PP's award-period ends, a new PP may be adopted. The newly adopted plan may be of the same type, or different in terms of performance measures, award period, and eligibility. In fact it is very likely that a firm has several PPs whose award periods overlap. Many plans have limited eligibility. Most companies offer long-term PPs to fewer executives than those participating in BPs and SOPs. As an example, in 1986, Honeywell Corp. applied PPs to 24 top executives but BPs and SOPs applied to 68 executives.

6. The Wall Street Journal (1988) also reports this friendly relationship, when it reports the trend to de-emphasize stock-related plans after the market crash in 1987:

This year, some boards will pay big annual bonuses as a kind of consolation prize for the stock value lost in the crash, predicts Michael Emig, a principal in Wyatt Co., a consulting firm. . . . Stock price reflects chief executive's performance only if the market is rising. If it's flat or falling, Mr Emig says, they argue that the stock market is beyond our control. (March 28, 1988)

7. In the 1960s and 1970s, many economists examined the structural relationship between executive compensation and various measures of firms' performance. Their major concern was to examine performance measures which determined **total compensation** amounts. Earlier studies in this direction (McGuire, Chiu and Elbing, 1962; Ciscel, 1974) provided evidence to support the sales maximization hypothesis (that financial motivation causes executives to maximize sales **at the expense of profit**). However, Masson (1970) and Murphy (1985) cast doubt on this hypothesis. Their evidences suggest that present value of a firm was the most important factor related to total compensation.

8. Waegelein's footnote 5 says, "It was not possible to use a control group composed of companies that had not adopted a short-term bonus plan because almost all companies have short-term bonus plans" (p. 46). This implies that his experimental firms might be smaller or less established than the control firms.

9. Suppose a slowly growing firm, which already has large capital expenditures, is likely to adopt PPs, PPs-adoption firms already have large capital expenditures before the adoption. In this case, it is not likely that the adoption would increase capital expenditures even if PPs are effective in increasing a firm's decision-horizon. Sopariwala suggested this possibility. The adoption reason would be "other than to make their executives long-term oriented. . . . It is unlikely that the performance plans were adopted to make already long-term oriented executives even more long-term oriented" (Sopariwala, p. 139).

10. For details, see Appendix A.

11. In addition, managers of firms without PPs suffered a wealth reduction of their own-firm shareholding as a consequence of the negative share price reaction on their acquisition decision. Therefore, their actions were unlikely to be simply motivated by self-interest.

1100 000
1100 000
1100 000
1100 000
1100 000

12. Alternatively, PPs may have been adopted simply because they "may confer tax advantages or serve to retain managers who accumulate industry-specific (hence transportable) human capital" (Johnson, 1987, p. 81).

13. This forfeit clause does not apply to executives who are retiring. Each firm has its own regulation about the benefit from SOPs and PPs after retirement (Crystal, 1984).

14. Although performance share plans are affected by the volatility of the stock market, the effects of the stock market are much less than that in the case of SOPs (Crystal, 1984). The award amounts of SOPs are decided solely by capital gains (the difference between grant prices and exercise stock prices) whereas the share plan's award amounts are determined by several factors; goal attainability, the plan's formula and the stock price at the end of the award period.

15. Larcker's capital expenditures and Lewellen et al.'s fixed asset ratios were included in the statistical tests without setting hypotheses. Both surrogates did not show significant results in either the original or the modified tests.

16. In order to convert the number of resignations to tenure periods, the following two steps are necessary: (1) calculate the turnover ratio; (2) divide 1 by the turnover figure to convert the turnover ratio to tenure years.

For instance, the resignation of 9.8 managers/year among the top two executives in 100 companies can be converted as follows:

$$(1) 9.8 / (2 \times 100) = .049;$$

$$\text{and } (2) 1 / .049 = 20.4 \text{ (years).}$$

17. Besides, it is not known how much firms suffer from the turnover problem. If most of the turnovers were caused by the firm's personnel regeneration policy or strategic planning such as merger and acquisition activities, voluntary turnover, which might be unfavorable to the firm, would be smaller than the rates shown in the table.

18. Lambert (1983) showed that in his finite horizon model, the uncertainty can be partially but not completely diversified away. He applied his results of the internal wage revision process to the external wage revision process, and inferred that the wage revision process does not lead to the full ex-post settling up phenomenon (p. 447). Another study about budget-based contracts under complete and incomplete market settings was done by Demski and Feltham (1978). They demonstrated that market incompleteness and risk aversion are necessary conditions for budget-based

ACTED BY THE
VICTIMS OF THE
CRIMINALS OF THE
CRIMINALS
WITH THE
CRIMINALS
IN THE

contracts to be Pareto superior to other contracting alternatives. Considering the wide use of budgetary control systems, the market would not be complete and therefore Fama's ex-post settling up process would not occur in full scale in reality. Similar results of partial ex-post settling up were found in the laboratory markets conducted by DeJong, Forsythe, Lundholm and Ucker (1985).

19. Another interpretation is possible. Since stock-related payment does not include any accounting performance-based plans the positive relationship can be evidence of their reluctance to use incentive plans based on accounting numbers. However, this interpretation is far-fetched because their sample period (1964-73) is prior to active usages of PPs.

20. Also, stock prices in part rise and fall because of noncontrollable events. The uncertainty of the stock market, therefore, introduces an additional risk, the effect of which is not efficient for increasing the work incentive because management is not responsible for short-term random events. This unmanageable risk may make the stock option a less-effective incentive scheme in regard to the risk-aversion problem.

21. The lack of research in this area might be due to the difficulty of including the noisiness in the model. "The minimum (necessary) conditions for monitoring to be valuable appear to be very difficult to formulate" (Harris and Raviv, 1979, p. 25).

22. Lambert suggested future research about the multi-period model with multi-period effects. "One obvious area for future work is studying situations in which the periods are interdependent. For example, there could be some uncertainty concerning . . . the form of production functions" (p. 451).

23. Among several studies, Healy (1985) rigorously analyzed the format of typical bonus contracts and provided a comprehensive characterization of their incentive effects and manipulation problems. He suggested that managers are more likely to choose income-decreasing accruals when their BPs' upper or lower bounds are binding, and income-increasing accruals when these bounds are not binding (p. 106). He also found that voluntary changes in accounting procedures by managers are associated with adoption or modification of BPs.

24. In the managerial accounting literature, several articles have pointed out that performance measures should depend on the firm's life-cycle stage. In early stages of

the life-cycle, according to the National Association of Accountants (1986), firms should emphasize monitoring revenue growth and capital investment requirements and they should be less concerned about profitability. As the entity becomes mature, it should be "primarily concerned with return on assets employed and equity . . . and profitability to achieve high return" (p. 11). The classification of Lambert and Larcker is analogous to the life-cycle stage classification.

25. As a matter of fact, executives could diversify their income sources by reducing their existing stockholdings. However, as Lewellen et al. (1987) suggested, they may be reluctant to do so in practice, because of adverse signalling implications or because of an implicit contract with shareholders that they will not liquidate holdings obtained as a payout from previous stock-based compensation arrangements. (p. 292)

26. The means of 'total after tax compensation' and 'value of own-firm common shareholdings' were \$169,217 and \$2,559,335 (Lewellen, et al., 1987, Table 1, p. 295).

27. This report has been published by a compensation consulting firm, Frederic W. Cook & Co., Inc annually under several different names such as Stock Ownership and Incentive Plans for Executives. However, all the reports for 1975-1987 deal with the same data. The Top 200 firm list covers a little more than the largest 200 firms since several firms within the 200th ranking did not report their compensation data.

28. This criteria also deleted 14 firms which did not exist by 1986, since these firms are listed in the Compustat research tape, not the annual tape.

29. The no tax-benefit period includes 1977 but 1977 was excluded in the first period because of data collection problems. In order to identify the adoption year and types of PPs, the proxy statement should be examined, but Michigan State University does not have a complete set of the proxy statements before 1978.

30. The adoption year does not always coincide with the calendar year. Since the Long-term Incentive Compensation Plans Among Top 200 uses the Fortune 200 firm list which is published in May, in the case of 1981-adoption firms they adopted the plans between 1980 spring and 1981 spring. Thus, the ERTA of 1981 which is effective from August 13, 1981 must not influence on adoption decision of the 1981-adoption firms. Therefore, 1981 is included in Period I.

31. If such personnel data changed within one or two years, it might result in measurement error which would work against finding significant firm characteristics. However, significant results were found for the stockholdings and age variables and it is expected the measurement error was not serious.

32. The turnover ratio of five managers between t and $t-4$ was examined but the results were not different from the turnover between t and $t-2$. In the result chapter, only the latter will be reported.

33. The volatility of sales reflects the difficulty in forecasting sales. Since the sales forecast is critical to budgeting and consequent managers' behavior, the VolaSale can be an indicator of environmental uncertainty managers face. Leverage also reflects financial riskiness of a firm. The more debt a firm has, the larger the variance of earnings is and the harder managers forecast EPS or other earning measures.

34. Compustat data numbers are listed in Table 5.2.

35. The coefficient of variation was not used in this volatility measure because the stock returns are already standardized.

36. If one of the three-year base periods is negative, Value Line treats the data item as missing value. Thus, there are more missing values in these data points than in other points.

37. The highest paid manager could be either the CEO or the chairperson of the board. The stockholding of the highest paid manager was used instead of that of the CEO since it is assumed that managers who were paid the most probably had more authority than any of the other managers.

38. The stock ownership, and the cash and cash-equivalent compensation are mandatory items reported in the proxy statement. The proxy statement also reports contingent compensation which is composed of stock options, retirement plans and unrealized long-term plans. The items of contingent compensation vary so much that this study does not include them.

39. Since the proxy statement does not always provide the stockholdings of the five highest paid officers although it reports the five highest officers' remuneration, the measure of the five managers could not be constructed.

40. Another way to categorize age groups is to determine age intervals for each group such as above 60, 56-59, 52-56 and below 52. Since a functional relationship between age and decision time spans is unknown, this age interval method is also arbitrary.

41. The distributional properties of the characteristics between adoption firms and non-adoption firms are reported in Appendix C.

42. **CEOchng** was measured by counting turnover for 3 years which has two-year interval ($t-2$ to t). Thus in order to convert to a tenure period, the following two steps were necessary: (1) divide this turnover by 2 to get annual turnover and (2) divide 1 by the annual turnover figure to convert the turnover ratio to a tenure period.

For instance, the average turnover of .14 in Period I was converted as follows:

$$(1) .14 / 2 = .07$$

$$\text{and } (2) 1 / .07 = 14 \text{ (years).}$$

43. However, the 7.7 years in Period II is longer than any long-term compensation plan's award period. This tenure period is similar to Lee and Milne's (1988) finding (6.3 years). Investigating the CEO's tenure in Fortune 500 companies for 1976-85, they concluded that "the empirical evidence provided here strongly contradicts the common belief that the short tenure of U.S. executives is one of the primary reasons for the weak competitive strength of U.S. companies" (p. 28).

44. The Fortune classification has 26 industry categories, whereas the SIC 2-digit classification has 33 manufacturing industry categories.

45. Owens-Corning Fiberglass Corp. is the last adopter (1980) in the building material industry, and PACCAR Inc. is the first adopter (1981) in the motor vehicle industry.

46. However, since many industries in the available sample have less than 4 firms in them, the control for the industry effect seems to be imperfect.

47. Since the skewnesses of **Logsale** are relatively high (.55 for Period I and 1.28 for Period II), the t -test is less effective than the Wilcoxon test.

48. **Turnover** was measured by counting the turnover among 5 persons for 3 years which have two-year interval ($t-2$ to t). Thus in order to convert to tenure period, the following three steps were necessary: (1) divide the turnover by 5 to

get turnover ratio per manager; (2) divide this turnover by 2 to get annual turnover per manager; and (3) divide 1 by the annual turnover figure to convert to tenure period.

For instance, the average turnover of .55 in Period I was converted as follows:

$$(1) .55 / 5 = .11;$$

$$(2) .11 / 2 = .055;$$

$$\text{and } (3) 1 / .055 = 18.2 \text{ (years).}$$

49. The total compensation in the remuneration tables consists of "cash and cash-equivalent" and various "contingent forms" which consist of SOPs, pension plans, etc.. Since total amounts of "contingent forms" are not as much as "cash and cash-equivalent", the award amounts of PPs, which are one element of the contingent forms, should not be substantial.

50. In addition to this division, another division was tested. Firms adopting in 1982 were included in Period I and excluded in Period II. This period-division is based on the opposite assumption that the tax reform acts should be reflected in the compensation plan decision with a one-year lag from the effective dates of the tax reform acts. Since results were similar to the original results, results of this test were not reported.

51. The average sales amounts for 1982 to 84 were used for this calculation. In addition to the size difference, industries of the top 15 are very different from those of the bottom 15 as shown in Appendix B. Specifically, the former group has eight petroleum refining companies which are 31% of all the petroleum refining companies in the 199 available sample. On the other hand, the latter group does not have petroleum refining companies but it has four forest products companies which is 25% of all forest products companies.

52. Since the number of share-adopters is small (10 in Period I and 4 in Period II), it is possible that random occurrence might produce the results in the risk-aversion dimension

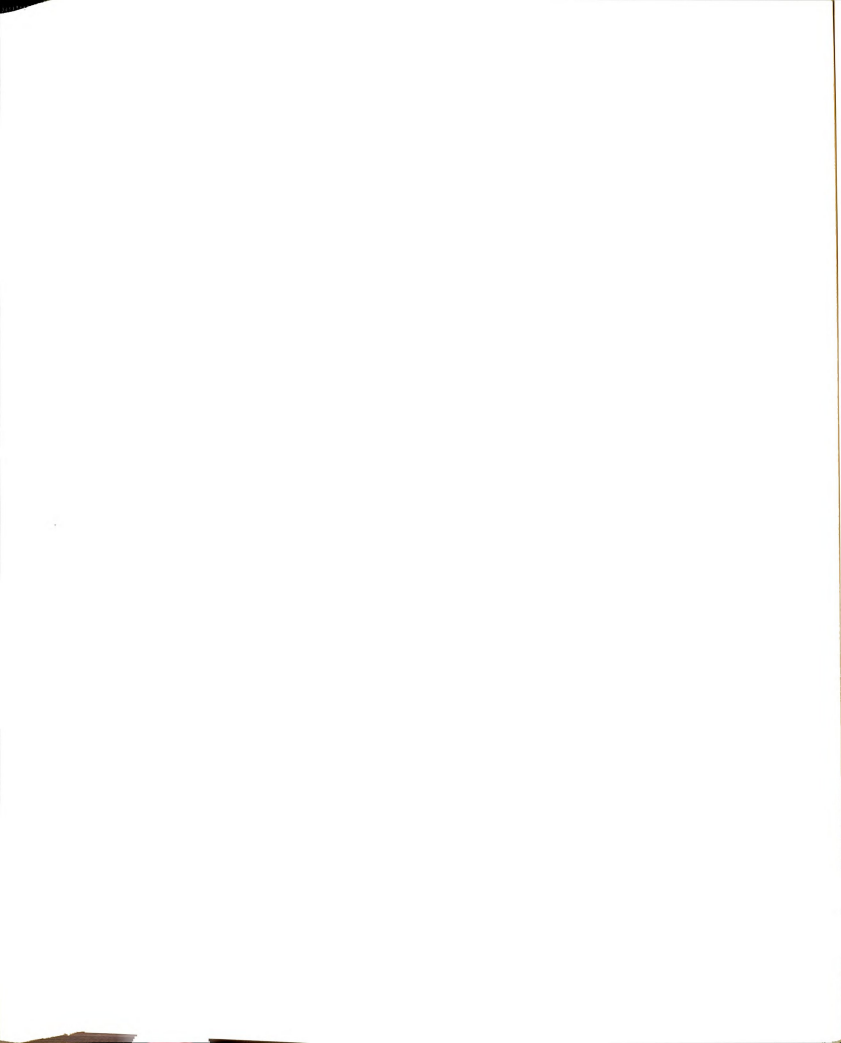
53. The stockholding variable shows much weaker results than the original test in both periods. Stockholdings of share-plan adopters are a little less than non-adopters' in Period I but similar to non-adopters' in Period II. These findings are partly explained when the size difference between share-plan adopters and non-adopters is considered. In both periods, share-plan adopters are significantly larger than non-adopters (p -value of $\text{LogSale} = .08$ in both Period I and II). In larger firms, the managers' compensation and numbers of the outstanding shares are larger and hence it is

less likely that the proportion of own-firm stockholding to the compensation or the proportion to the outstanding shares are large. Thus it is expected that share-plan adopters have lower proportions than non-adopters, other things being equal.

54. In the share-plan comparison test, no difference was found in either periods but this is a trivial finding in the sense that in the share-plan test all results were insignificant.

55. The SAS LOGIST routine was used to estimate the logit regression.

56. In fact, this applies to the results of univariate tests, too. In the univariate analyses, the sample without the smallest 15 firms and the sample used in the unit-plan comparison test produced the strongest results in Period I and Period II, respectively (see Panel A, Table 6.11 and Panel B, Table 6.12).



REFERENCES

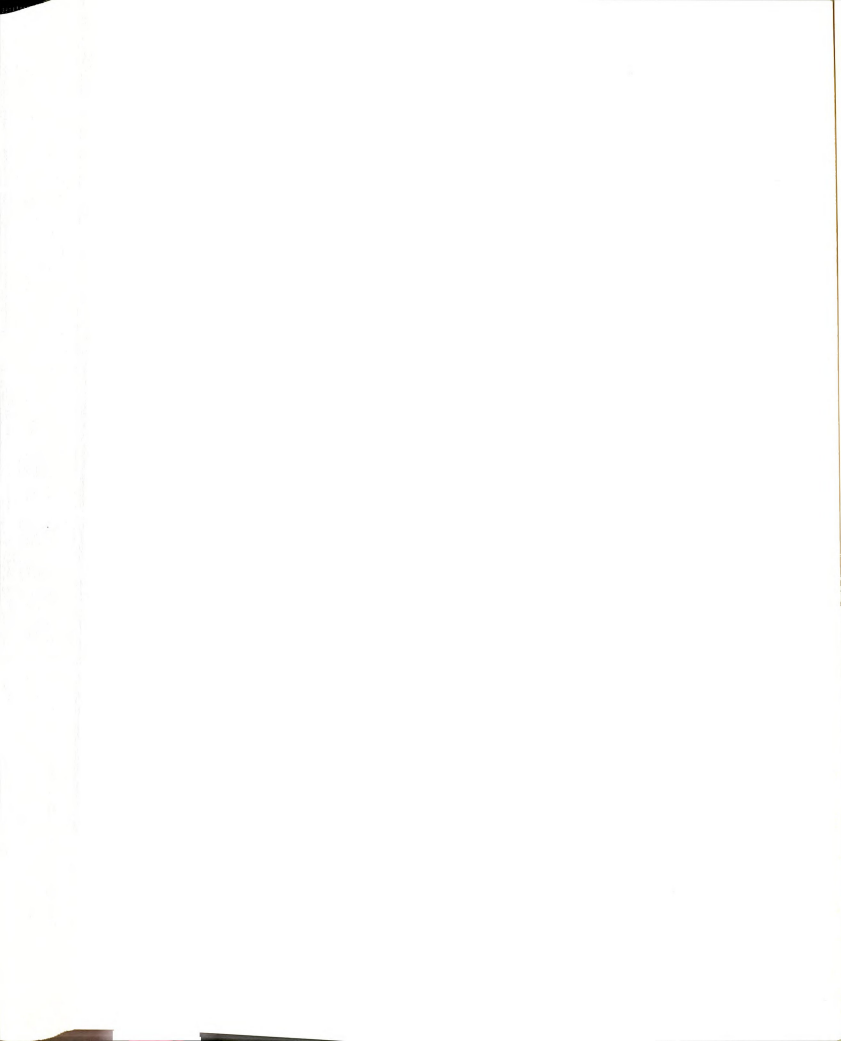


REFERENCES

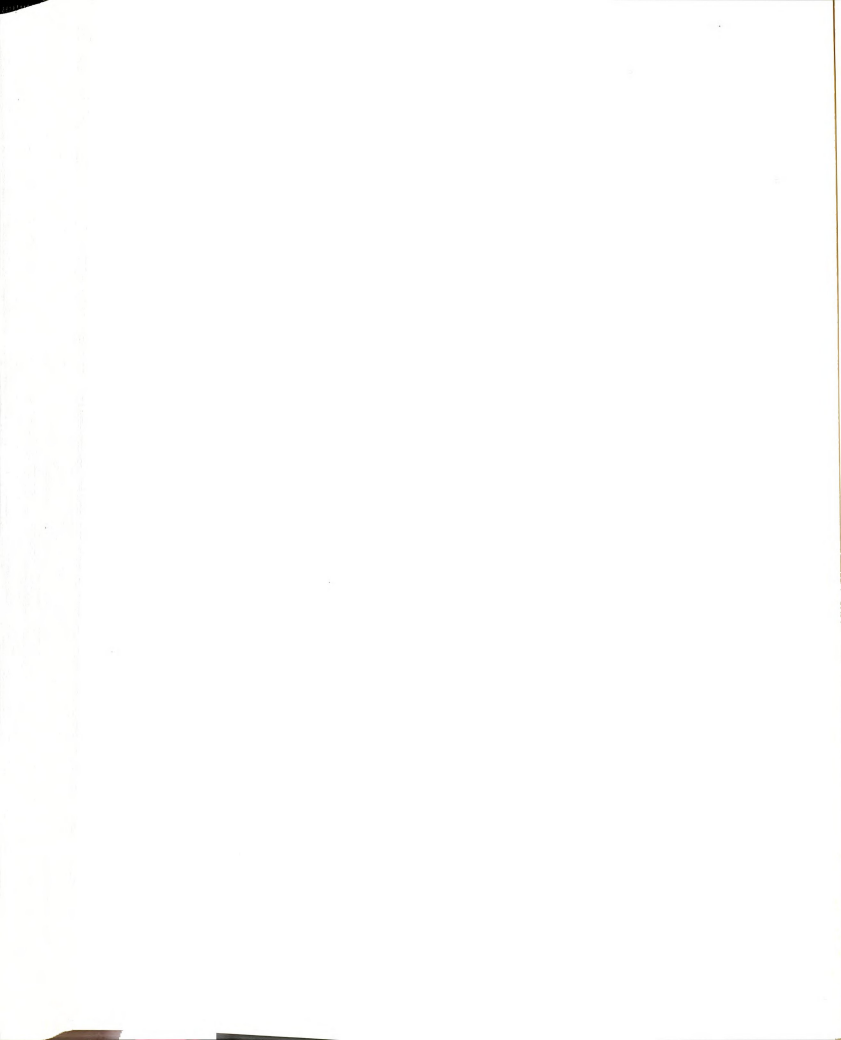
- Agrawal, A. and G. Mandelker (1987), "Managerial Incentives and Corporate Investment and Financing Decisions," Journal of Finance (September 1987), pp. 823-37.
- Amihud, Y. and B. Lev (1981), "Risk Reduction as a Managerial Motive for Conglomerate Mergers," Bell Journal of Economics (Autumn 1981), pp. 605-17.
- Antle, R. and A. Smith (1985), "Measuring Executive Compensation: Method and Application," Journal of Accounting Research (Spring 1985), pp. 184-220.
- Antle, R. and A. Smith (1986), "An Empirical Investigation of the Relative Performance Evaluation of Corporate Executives," Journal of Accounting Research (Spring 1986), pp. 1-39.
- Benston, G. (1985), "The Self-Serving Management Hypothesis: Some Evidence," Journal of Accounting and Economics (Vol. 7, 1985), pp. 67-84.
- Bickford, L. C. (1981), "Long-term Incentives for Management, Part 6: Performance Attainment Plans," Compensation Review, (Third Quarter 1981), pp. 14-29.
- Black, F. and M. Scholes (1973), "The Pricing of Options and Corporate Liabilities," Journal of Political Economy (May-June 1973), pp. 637-54.
- Blandin, J., W. Brown and J. Koch (1974), "Uncertainty and Information-Gathering Behavior: An Empirical Investigation," Proceedings of the 34th Annual Meeting of the Academy of Management, pp. 54-55.
- Brickley, J. A., S. Bhagat and R. C. Lease (1985), "The Impact of Long-range Managerial Compensation Plans on Shareholder Wealth," Journal of Accounting and Economics (Vol. 7, 1985), pp. 115-29.
- Business Week (1983), "Turnover at the Top," Business Week (December 19, 1983), pp. 104-15.
- Ciscel, D. H. (1974), "Determinants of Executive Compensation," Southern Economic Journal 40 (April 1974), pp. 613-17.
- Conference Board (1987), Top Executive Compensation (Conference Board, New York, 1987).

- Coughlan, A. and R. Schmidt (1985), "Executive Compensation, Management Turnover, and Firm Performance: An Empirical Investigation," Journal of Accounting and Economics (Vol. 7, 1985), pp. 43-66.
- Crystal, G. (1984), Questions and Answers on Executive Compensation (Englewood Cliffs, N.J. : Prentice-Hall, 1984).
- DeJong, D., R. Forsythe, R. Lundholm, and W. Uecker (1985), "A Laboratory Investigation of the Moral Hazard Problem in an Agency Relationship," Journal of Accounting Research (Supplement 1985), pp. 81-120.
- Demski, J. S. (1985), "Demand for Accounting Procedures in Managerial Setting," 1985 Unpublished Manuscript, Stanford University.
- Demski, J. S. and G. A. Feltham (1978), "Economic Incentives in Budgetary Control Systems," The Accounting Review (April 1978), pp. 336-59.
- Downey H. K. and J. Slocum (1975), "Uncertainty: Measures, Research, and Sources of Variation," Academy of Management Journal (September, 1975), pp. 562-78.
- Govindarajan, V. (1984), "Appropriateness of Accounting Data in Performance Evaluation: An Empirical Examination of Environmental Uncertainty as an Intervening Variable," Accounting, Organization and Society (Vol 9, No. 2), pp. 125-35.
- Fama, E. F. (1980), "Agency Problems and the Theory of the Firm," Journal of Political Economy (Vol. 88 No. 2), pp. 288-307.
- Frederic W. Cook & Co., Inc. (1974-87), Long-Term Incentive Compensation Plans Among the Top 200 (Annual Report) (Frederic W. Cook & Co. Inc., New York, 1974-87).
- Grossman, S. and O. Hart (1983), "An Analysis of the Principal-Agent Model," Econometrica (January 1983), pp. 7-45.
- Harris, M. and A. Raviv (1979), "Optimal Incentive Contracts with Imperfect Information," Journal of Economic Theory (Vol. 20, 1979), pp. 231-59.
- Healy, P. M. (1985), "The Effect of Bonus Schemes on Accounting Decisions," Journal of Accounting and Economics (Vol. 7, 1985), pp. 85-107.

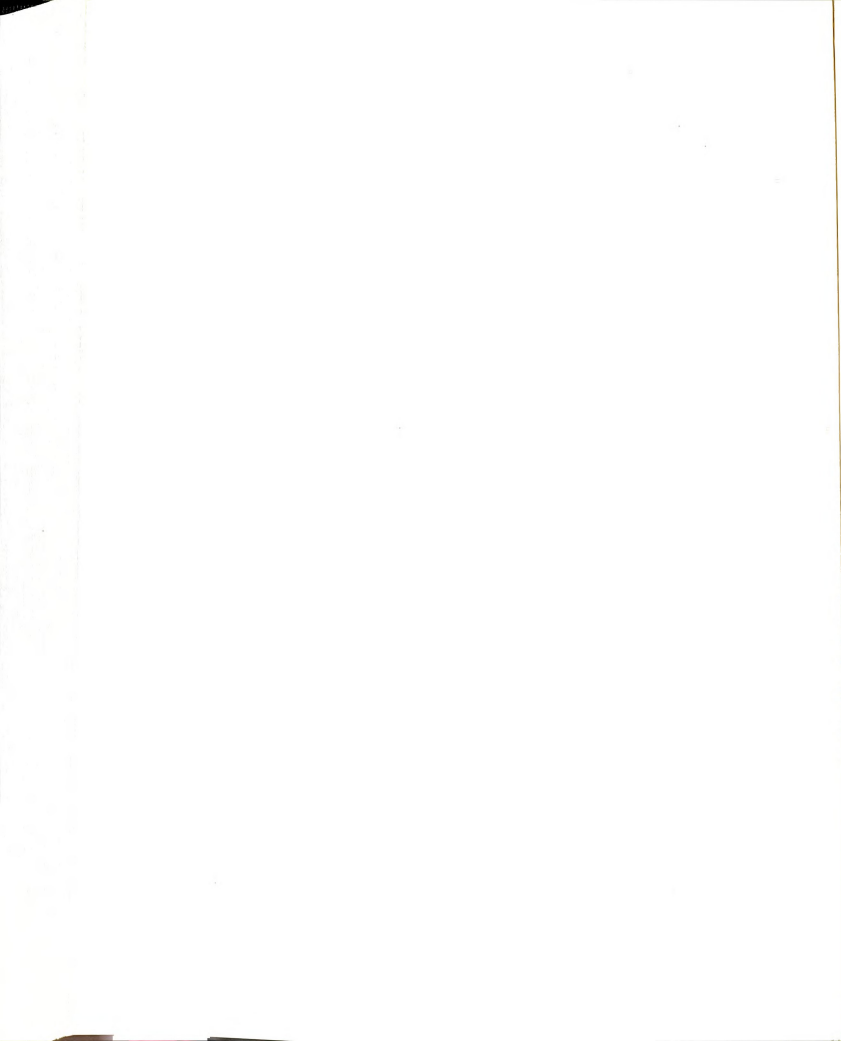
- Hite, G. L. and M. S. Long (1982), "Taxes and Executive Stock Options," Journal of Accounting and Economics (Vol. 4, 1982), pp. 3-14.
- Holmstrom, B. (1979), "Moral Hazard and Observability," Bell Journal of Economics (Spring 1979), pp. 74-91.
- Illig, B., Executive Compensation - A Total Pay Perspective, (New York : McGraw-Hill, 1982).
- Jensen, M. C. and W. H. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," Journal of Financial Economics (Vol. 3, 1976), pp. 305-60.
- Jensen, M. C. and J. L. Zimmerman (1985), "Management Compensation and the Managerial Labor Market," Journal of Accounting and Economics (Vol.7, 1985), pp. 3-9.
- Johnson B. (1987), "Discussion of Management Compensation Contracts and Merger-Induced Abnormal Returns," Journal of Accounting Research (Supplement 1987), pp. 77-84.
- Kaplan, R. S. (1982), Advanced Management Accounting (Prentice-Hall, Englewood-Cliffs, 1982).
- Lambert, R. (1983), "Long Term Contracts and Moral Hazard," Bell Journal of Economics (Autumn 1983), pp. 441-52.
- Lambert, R. and D. Larcker (1985), "Executive Compensation, Corporate Decision-Making and Shareholder Wealth: A Review of the Evidence," Midland Corporate Financial Journal (Winter, 1985), 6-22.
- Lambert, R. and D. Larcker (1987), "An Analysis of the Use of Accounting and Market Measures of Performance in Executive Compensation Contracts," Journal of Accounting Research (Supplement 1987), pp. 85-125.
- Larcker, D. F. (1983), "The Association Between Performance Plan Adoption and Corporate Capital Investment," Journal of Accounting and Economics (Vol. 5, 1983), pp. 3-30.
- Lee, J. Y. and R. A. Milne (1988), "Does High Executive Turnover Promote a Short-term View?" Business Forum (Summer 1988), pp. 25-28.
- Lewellen, W., C. Loderer, and K. Martin (1987), "Executive Compensation and Executive Incentive Problems," Journal of Accounting and Economics (Vol. 9, 1987), pp. 287-310.



- Lewellen, W., C. Loderer, and A. Rosenfeld (1985), "Merger Decision and Executive Stock Ownership in Acquiring Firms," Journal of Accounting and Economics (Vol. 7, 1985), pp. 209-31.
- Louis, A. M. (1984), "Business Is Bungling Long-Term Compensation," Fortune (July 23, 1984), pp. 64-69.
- Masson, R. T. (1971), "Executive Motivations, Earnings, and Consequent Equity Performance," Journal of Political Economy (November 1971) pp. 1278-92.
- McGuire, J. W., J. S. Chiu, and A. O. Elbing (1962), "Executive Incomes, Sales, and Profits," American Economic Review (September 1962), pp. 753-61.
- Murphy, K. J. (1985), "Corporate Performance and Managerial Remuneration: An Empirical Analysis," Journal of Accounting and Economics (Vol. 7, 1985), pp. 11-42.
- National Association of Accountants (1986), "Measuring Entity Performance" Statements on Management Accounting Statement No. 40, (January 1986).
- Patton, A. (1983), "Why So Many Chief Executives Make Too Much," Business Week (October 17, 1983), pp. 24-26.
- Raviv, A. (1985), "Management Compensation and the Managerial Labor Market: An Overview," Journal of Accounting and Economics (Vol. 7, 1985), pp. 239-45.
- Rich, J. T. and J. A. Larson (1984), "Why Some Long-Term Incentives Fail," Compensation Review (First Quarter 1984), pp. 26-37.
- Shavell, S. (1979), "Risk Sharing and Incentives in the Principal and Agent Relationship," Bell Journal of Economics (Spring 1979), pp. 55-73.
- Smith, C. W. and R. L. Watts (1982), "Incentive and Tax Effects of Executive Compensation Plans," Australian Journal of Management 7 (1982), pp. 139-57.
- Sopariwala, P. R. (1985), "An Empirical Examination of the Association Between the Adoption of Long-term Performance Plans and the Subsequent Growth of Research and Development Expenditures," Dissertation, Michigan State University (1985).



- Tehranian, H., N. G. Travolos and J. F. Waagelein (1987a), "Management Compensation Contracts and Merger-Induced Abnormal Returns," Journal of Accounting Research (Supplement, 1987), pp. 51-76.
- Tehranian, H., N. G. Travolos and J. F. Waagelein (1987b), "The Effect of Long-Term Performance Plans on Corporate Sell-Off-Induced Abnormal Returns," The Journal of Finance (September 1987), pp. 933-42.
- Tehranian, H. and J. F. Waagelein (1985), "Market Reaction to Short-term Executive Compensation Plan Adoption," Journal of Accounting and Economics (Vol. 7, 1985), pp. 131-44.
- Tehranian, H. and J. F. Waagelein (1986), "Short-Term Bonus Plan Adoption and Stock Market Performance -- Proxy and Industry Effects: A Note," Financial Review (May 1986), pp. 345-53.
- Waagelein, J. F. (1988), "The Association Between the Adoption of Short-Term Bonus Plans and Corporate Expenditures," Journal of Accounting and Public Policy (Vol 7, 1988), pp. 43-63.
- Walking R. and M. Long (1984), "Agency Theory, Managerial Welfare, and Takeover Bid Resistance," The Rand Journal of Economics (Spring , 1984), pp. 54-68.
- Wall Street Journal (1988), Corporate Chiefs' Pay Far Outpaces Inflation and the Gains of Staffs, Wall Street Journal (March 28, 1988).





MICHIGAN STATE UNIV. LIBRARIES



31293006094837