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Primes and scores: Value, volatility, and vehicles for financing

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PRIMES and SCORES: Value, Volatility, and Vehicles for Financing

by

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CHAPTER ONE

INTRODUCTION

In the mid 1980's, Americus Shareholder Corporation invited the shareholders of twenty-six large corporations to swap their shares for units of ownership in various trusts. The trusts had five-year lives. At maturity, the shares would be returned to the investors in the trust. The units of ownership in the trust (one share=one unit) were separable into two pieces: PRIMES (Preferred Right to Income and Maximum Equity) and SCORES (Special Claim on Residual Equity). Each component and the units were separably tradeable on the American Stock Exchange. Primes and scores could be recombined into units and the stock redeemed from the trust, at any time, by swapping units for shares.

Unit holders were entitled to the same income and rights as common stockholders. Prime holders obtained many of the rights of common stockholders and were entitled to all of the dividends paid by the underlying stock. At the trust's maturity, prime holders were entitled to a limited capital gain. Score holders received no income during the life of the trust, and had no rights with respect to the underlying stock. At the trust's maturity, score holders were entitled to any capital appreciation above a fixed value (the termination claim). Thus, primes and scores are, respectively, covered calls and European call options written on the stock held by the trust.

This dissertation is a study of primes and scores. A detailed description of the Americus Trusts is in chapter two. A study of primes and scores can make a contribution to our understanding of finance in several ways. These will be discussed further below.

If capital markets are perfect, dividing or consolidating the cashflows generated by an asset should neither create nor destroy value. However, primes and scores provide an example where repackaging cash flows did result in the creation of value. The combined value of primes and scores should, if the principle of value additivity holds, neither exceed nor fall below the price of the underlying stock. However, even after transactions costs and other imperfections in the capital markets are considered, the sum of the prices of primes and score consistently exceeded that of the underlying stock.

In chapter three of the dissertation, it is shown that primes and scores consistently sell at a premium (premium= prime + score - stock) to the underlying stock. The size of the premium for each trust is assessed. It is shown that some of the premiums are large and persistent. Three tests of market efficiency are performed in this chapter. It is found that the market is not inefficient because the costs of arbitrage prevent arbitrageurs from profiting from the large and persistent premiums.

Several causes for the premium at which primes and scores sell are also examined in chapter three. These include: (1)

primes and scores are unique assets and complete the market either by offering a unique set of payoffs or by reducing transactions costs; (2) when issued trading before the trusts became effective (which affected only open trusts);(3) investors' heterogeneous expectations about the value of the prime, score and stock; and (4) noise trading in the underlying stock. The empirical results provide support for the when-issued trading hypothesis and mixed support for the other hypotheses.

The analysis in chapter three highlights two points: institutional factors may cause prices to deviate from values in an efficient market, and (2) when arbitrage is not possible, dividing the cash flows generated by common stock can create value. Thus, the principle of value additivity does not always hold in imperfect markets.

Scores are the first long term call options that were issued independently of the underlying firm. There has been a great deal of study of the stochastic properties of the implied standard deviations (ISDs) of one to six month options. Scores offer a unique opportunity to compare the ISDs of long term and short term options.

In chapter four, the relationship between the ISD of long term and short term options at a given moment in time is examined. The chapter will focus on examining two aspects of ISDs. First, the ISDs of short term and long term options will be compared. It will be shown that the slope of the "term structure of ISDs" may depend on whether expected returns on the underlying stock are independent or serially correlated. A second focus will be on whether short term options' volatilities are more sensitive to shocks than are long term options' volatilities. In this part of the chapter, the hypothesis that ISD is mean reverting will be examined. This chapter will contribute to our understanding of how investors formulate their expectations of volatility and will improve our understanding of how long term options should be priced.

The Black-Scholes option pricing model was used to estimate the ISDs analyzed in chapter four. The results in this chapter indicate that ISDs are very sensitive to the dividend adjustment used as an input into the Black-Scholes model. Also, the results suggest, although not conclusively, that the term structure of implied volatility is downward sloping during the time period studied. In addition, the results strongly support the hypothesis that the volatility of long term options is less sensitive to shocks than the volatility of short term options (as measured by the elasticity of the score ISD with respect to the call ISD).

Primes and scores were financial innovations which were equity derivatives. In the final chapter of the dissertation, three other types of financial innovations developed in the late 1980's and early 1990's will be analyzed. Based on the analysis in chapter three and the design of the assets, a focus of the chapter is on whether these assets offer packages of cashflows that create "extra" value for either the issuer or investors.

CHAPTER TWO

INSTITUTIONAL FRAMEWORK

The Americus Trusts were established during the years 1985-1987 for twenty six stocks.[1] The purpose of the trusts was to create a financial instrument that would enable investors to purchase separately the cash income or capital gains components of stocks. Thus, they were designed to offer investors additional flexibility, by partitioning the income and risk of twenty-six high quality stocks. The trusts expire after approximately five years.

The shareholders of twenty-seven firms were invited by the Americus Trust to tender their shares in exchange for units in the trust.[2] (one unit=one share) Each unit consists of one prime and one score. Each component (unit, prime, score) can be traded separately on the American Stock Exchange. Because the trusts are closed funds, a unit (or prime plus score) can be exchanged for the net asset value per

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[1]The firms are American Express, American Home Products, AT&T(2), Amoco, Atlantic Richfield, Bristol Myers, Chevron, Coca Cola, Dow Chemical, DuPont, Eastman Kodak, Exxon, Ford, General Electric, General Motors, GTE, Hewlett Packard, International Business Machines (IBM), Johnson & Johnson, Merck, Mobil, Philip Morris, Proctor and Gamble, Sears, Union Pacific, and Xerox.

[2] Several of the firms advised their shareholders not to participate. They thought that separating the income distributed to stockholders into two components would create a conflict of interest among stockholders. The trust for 3M never became effective.

unit[3] at any time before the trust expires, without fee. This feature was intended to prevent the discounts associated with closed-end mutual funds. Due to S.E.C. regulations, the size of each trust is limited to five percent of the underlying firm's outstanding shares. Moreover, the offer to tender shares expired when the trust reached its maximum size, or approximately one year after the offer was initiated, or if the score went into the money (whichever happened first).

A SCORE (Special Claim on Residual Equity) is a long term European call option on the stock held by the trust. The exercise price of the score is the Termination Claim. These were set for each trust at their inception and were approximately twenty percent higher than the value of the stock when the trust was established.

At the termination of the trust, score owners receive Max(S-T,0), (where S is the end of day stock price on the expiration date, and T is the termination claim). Precisely, score owners receive stock equal in value to the difference between the net asset value per unit and the termination claim.[4] If the net asset value is less than the termination

[3]If the net asset value per unit is less than the value of a share due to accrued expenses, the unit holder may pay the expenses and receive a share. Otherwise, the unit holder may receive the net asset value per unit.

[4]The net asset value per unit may or may not equal the stock price. The net asset value per unit equals: all cash and other distributions held by the trust less: taxes, governmental charges paid by the trust, accrued fees and expenses, any cash and stock distributed to holders of prime

claim, score holders receive nothing. Therefore, scores are much like warrants, without the dilution effects that result when warrants are exercised. Also, warrants tend to be issued by high risk firms. Scores are written on "blue chip" stocks.

An example of the in-kind distribution made to score holders follows: suppose T=$50 and the net asset value at termination =$75. Score owners would receive (75-50)/75, or one-third share per score owned. Consequently, the fraction of the share received by score holders increases as the score goes deeper into the money. (Cash is paid in lieu of fractional shares.)

Holders of PRIME (Prescribed Right Income and Maximum Equity) retain the rights granted to common stockholders.[5] Prime holders receive the cash dividends paid on the stock held by the trust,[6] less operating expenses ($.05 per share, annually). They are also entitled to all other cash distributions made by the underlying firm, unless the firm is making a distribution in exchange for stock. Prime holders receive all non-cash distributions made by the underlying firm to shareholders when the distribution is both taxable and is

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components.

[5]In order to participate in a possible tender offer for stock the prime owners must reconstruct a unit (by purchasing a score) and then exchange the unit for shares. The trust is prohibited from participating in tender offers.

[6]The record date is the same as for common stock. However, the payment date is seven business days following the payment of dividends to stockholders.

worth less than five percent of the net asset value of the trust.[7] Other rights held by prime owners include voting rights, receipt of all shareholder communications (if the underlying firm reimburses the trust for ensuing expenses), and ownership of any rights to purchase additional shares of stock.

At the termination of the trust, prime holders will receive Min(S,T). Therefore, primes are long term covered calls. If the net asset value per unit is less than the termination claim, prime owners will receive stock equal in value to the net asset value per unit. If it exceeds the termination claim, prime owners will receive stock equal in value to the termination claim. Thus, if the termination claim is $ 50 and the net asset value at expiration is $75, then prime owners would receive T/S shares (50/75) or two-thirds of a share. Consequently, the fraction of a share received by prime owners decreases as the value of the underlying stock increases, although the dollar value of the payoff remains constant. Again, cash will be paid in lieu of fractional shares. At a date prior to the termination date, to be determined by the trust, all distributions received and held by the trust, such as non cash distributions worth more than five percent of the trust's net asset value, will be divided

[7]Non-taxable distributions or distributions in excess of five percent of the net asset value of the trust are held by the trust until it is terminated. At that time they are distributed on a pro-rata basis to prime owners.

among prime owners.

Unit holders own a score and a prime and have the rights of score holders and prime holders. The prime holders and unit holders are the legal owners of the underlying stock.

Primes and scores are unique for two reasons. First, they are long term derivative assets. Consequently, they enable investors to establish long term positions in calls and covered calls while avoiding the risk and expense of rolling over similar short term positions. Secondly, scores are long-term calls (like warrants) which, unlike warrants, are written on blue-chip stocks.

Primes, scores, and units trade separately on the American Stock Exchange. While trading in some of the primes and scores was initially low, volume has increased substantially over time. The market for scores is considerably more active than the market for primes, while the trading in units is negligible. In the beginning, the American Stock Exchange allowed trading to take place on a when-issued basis for the trusts that had not yet met the exchange's requirements for listing but were expected to do so.

Tax Consequences of Participating in the Trusts[3]

Initially, the Internal Revenue Service considered the

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[3]All tax considerations are based on the opinions of legal counsel to the trust and are stated in the prospectus of each trust. They are not formal decisions of the IRS. Individual investors are advised, in the prospectus, to consult their own tax advisors.

Americus Trusts to be a "grantor" trust. This resulted in favorable tax consequences for participants in the trusts since all income received by the trust could be passed on to the participants without being taxed. Furthermore, at the trusts' expiration, shares can be redeemed without tax consequences. However, in a revenue procedure of 1983, the IRS reclassified trusts with multiple classes of ownership as a corporation for Federal Income Tax purposes. Due to a lawsuit brought by the trusts' initiators, the original 27 trusts were exempted from this ruling. However, as a consequence of the ruling, no new trusts will be formed since all income will be taxed at the trust as well as personal levels.

The Federal Income Tax consequences of the trusts, as described in the prospectus are:

1. Depositing or redeeming shares has no tax effect. Only outright sales have tax effects.
2. If the stock had been held prior to being tendered to the trust, the original purchase price was the basis for the unit.
3. Primes and scores are separate properties. Neither one is an option for federal tax purposes.
4 If shares are capital assets/long term assets of the depositor, so are the corresponding units, primes, and scores and proceeds from sales are taxed accordingly.
5. When the prime or score component of an original unit

> is sold, the unit holder's basis in the original unit is divided between the component sold and the component retained. The division of basis is according to the relative fair market values of the two components are the time of the sale. A gain or loss is recognized on the component sold.

For example, if an investor paid $20 for a share of stock which was subsequently tendered to the trust when its market value was $50 would have a tax basis of $20 in the unit. Assume that at a future date, the market price of the unit is $100, the score price is $40 (40% of the total) and the prime price is $60 (60% of the total). Assume the investor sells the score for $40. The tax basis is .4 x $20=$8. The taxable capital gain is $32. Had the investor sold the prime, the tax basis would be .6 x $20=$12. If the investor had sold the stock for $100 per share, the taxable gain would have been $80. Therefore, selling one component and retaining the other offers investors the ability to defer taxes. If the investor continues to hold a unit or component of the trust at its maturity, she/he receives a final payoff in stock. This does not have a tax consequence. Therefore, one can continue to defer some taxes indefinitely by holding one component which is converted into stock at the trust's maturity. However, some wealth initially tied up in shares can be converted into cash with some tax savings.

6. When units are recombined, (by matching primes and

scores) the unit holder's basis is the sum of the basis in each component. For example, if the investor in (5) sold the score and retained the prime the basis for the prime would remain at $12. The basis for a recombined unit would be the purchase price of a new score plus the basis of the prime. If a component of the recombined unit is sold the basis of each is again determined according to its relative market values at the time of sale. If an investor holds several components she/he may specify which components will be matched in the recombined units.

7. If, when the trust expires, the score is worthless investors holding only scores can take a tax loss on their investment. Investors holding units can not take a loss on the score component.[9]

Additional tax considerations

If all shares of the underlying firm are exchanged for taxable consideration (e.g. a taxable merger), this will be a taxable event for all unit holders. These include holders of original units, holders of units purchased in the market and holders of recombined units.

Dividends must be recognized as income for Federal Income Tax by all prime and unit holders, regardless of whether they

[9]As the trusts neared maturity, out of the money scores continue to trade at a prices of $ 1/64, $1/128, and $1/256 presumably to permit investors to sell their out of the money scores and take a tax loss.

are distributed. Prime and unit holders may also include a pro-rata share of trust expenses under miscellaneous deductions in their federal income tax.

Corporations are eligible for the dividend received exclusion on the dividends paid by primes and units.

CHAPTER THREE

REPACKAGING CASHFLOWS AND THE CREATION OF VALUE: THE CASE OF PRIMES AND SCORES

Introduction

According to financial theory, if capital markets are perfect, dividing (or consolidating) the cashflows produced by identical assets will neither destroy the original value nor create any additional value. If investors can use existing assets to construct portfolios that offer the payoff structure they desire, they should not be willing to pay a premium for cashflows that are merely "repackaged". On the other hand, investors may be willing to pay a premium to acquire a set of cashflows that was previously unattainable.

The introduction of PRIMEs (Prescribed Right to Income and Maximum Equity) and SCOREs (Special Claim on Residual Equity) has provided an example of repackaged cashflows commanding a premium in the market.

Primes and scores were created by the Americus Trust Shareholder Corporation to enable investors to purchase separately the income and capital gains components of a common stock. Investors were invited (for approximately one year) to tender shares of common stock, from one of twenty-six firms, to a trust in exchange for a UNIT of ownership in the trust. (Each trust holds the stock of a single firm.) Units of ownership in the trust can be divided into two components:

Primes and Scores. Prime holders receive all of the cash dividends paid by the underlying firm, and have the potential to earn a limited capital gain. Prime holders also obtain most of the rights to which common stock holders are entitled. Score holders do not receive any payoff from the trust until it expires. At that time, they receive the stock price appreciation above a fixed value, known as the termination claim. The termination claim was fixed, at the initiation of the trust, at approximately twenty percent above the underlying stock price at that time. If, at the trust's expiration, the stock price is less than the termination claim, the score is worthless. Thus, scores are long term European call options, and primes are equivalent to having written covered calls on the same stock. A unit of ownership in the trust is equal to a prime plus a score. Units of the trust may be exchanged for stock at any time, without fee. It should be noted that both prime and score holders receive their final payoffs in stock, not in cash. Consequently, the acts of tendering shares or receiving shares from the trusts are not taxable events. An example of how the final payoffs will be made follows. If, for example, the price of the underlying stock is $40 per share at the trust's expiration and the termination claim for the prime is $30; then the prime holders would receive three-quarters of a share for every prime held (Termination Claim/Stock Price), and the score holders would receive one-quarter of a share for every score held. Individually, primes and scores may only be exchanged for shares at the time each trust expires. However, they may be recombined into units and then exchanged for shares at any time. Primes, scores, and units are each traded separately on the American Stock Exchange. On Table 3-1 is a list of the Americus Trusts, and the respective termination claim, initiation date, closing date, expiration date, and number of units initially issued.

Jarrow and O'Hara (1989) have conducted the only study (to date) of the market for primes and scores. Venkatesh (1991) studied the ex-dividend behavior of primes. Jarrow and O'Hara's study included the primes and scores issued by the first five trusts (American Home Products, Bristol Myers, DuPont, Exxon, and Merck). With the exception of Exxon, each of the trusts was in its first year of trading. Jarrow and O'Hara concluded that the difference between the combined prices of prime and score, and the underlying stock had a positive mean, and it was significantly different from zero. However, they also found that when measurement errors and transactions costs were considered, the arbitrageurs would have difficulty profiting from these price differentials.

The objectives of this chapter are to extend Jarrow and O'Hara's research and to investigate further the source of the premium. In this chapter:

1. Three to five years of price data for each twenty-six sets of primes, scores, and stock will be

included. The data encompass the period in which trusts are open as well as closed. These prices will be examined to determine whether premiums still exist, and if so, for which trusts.

2. Three sets of tests will be applied to the data in order to assess the efficiency of the market. First, Jarrow and O'Hara's method for assessing deviations from bounds on permissible price deviations will be applied. Second, an ex-ante trading test for market efficiency similar to the one used by Galai (1977) will be applied to test the efficiency of the options market. Finally, a variation of the Jarrow and O'Hara test will also be applied.
3. A cross-sectional and time series analysis of the premium will be undertaken in an effort to determine its sources.

The chapter is organized as follows: a discussion of literature and the conceptual framework for the chapter are presented in the next section. In the section 3, the data used in the analysis are described. The magnitude of the premium is determined in section four. The efficiency tests are discussed in section five. In the final section of the chapter potential causes of the premiums are examined.

Literature Review and Conceptual Framework

In their study of primes and scores, Jarrow and O'Hara considered three possible causes for the non-zero premiums they found (premium(t) = prime (t) + score(t) - stock(t)). First, the primes and scores offer a pattern of cashflows that are unavailable elsewhere (adding to market completeness). Second, scores are the first long term options offered, trading independently of the underlying firm. It is possible to create a synthetic long term call option, but the transactions costs associated with continuous portfolio rebalancing would be excessive. Consequently, the scores command a premium in the market, because they help to minimize transactions costs. Finally, there are two tax based explanations for the premiums. Primes are potentially valuable to corporate investors since they are less expensive than the underlying stock but offer the same dividend stream (less a small management fee). The dividend received exclusion that applies to common stock also applies to primes, rendering much of the dividend tax exempt. However, Venkatesh argued that investors would not buy primes for the purpose of capturing dividends. Jn his study of 1988 trading data he found that the market for primes was too illiquid and transactions costs were too high for primes to be purchased only for the purpose of capturing dividends. He found some weak empirical support for his hypothesis. Jarrow and O'Hara also considered the tax-timing option offered by scores as a possible source of the observed premia.

Jarrow and O'Hara's empirical results provided some support for the transactions cost and market completeness hypotheses. However, their findings were inconsistent from trust to trust. The authors attributed these inconsistencies to empirical difficulties involved in applying the Option Pricing Model.

In their study, all of the trusts were open. However, Jarrow and O'Hara did not consider the effects of institutional trading practice on prices. A partial explanation of the premium for open trusts can be attributed to "when-issued" trading. The American Exchange permitted trading of primes and scores although the trusts had not yet met the exchange's size requirements. Consequently, trades did not settle until the trusts became effective. This meant that the stock did not have to be tendered to the trusts, and primes and scores did not have to be paid for as long as when-issued trading continued. Therefore, some of the premiums which the open trusts commanded may have been due to a payment lag. Investors "owned" the primes and scores but did not have to part with any cash.

In addition to the market completeness and transactions costs arguments tested by Jarrow and O'Hara, and the when issued trading practice noted above, two other causes of the premium will be considered: heterogeneous expectations and noise trading. These will be discussed briefly, below.

Investors may have different beliefs about the risk and return characteristics of the underlying stock. Edward Miller (1977) argued that in a market in which there are no short sales, risk neutrality is present, and a minority of investors can absorb the supply of a security, asset prices are positively correlated to the divergence of opinion about an asset's value. In this framework, prices are determined by the marginal investor, rather than by the average investor. As the range of values placed on a given asset by individual investors increases, it is more likely that the price at which it sells will be higher than its expected value. The asset supply is absorbed by those who value it most highly. Short sale restrictions prohibit investors who value the asset the least from entering the market. Miller assumes that those investors with a negative demand for the asset will effectively have zero demand for that asset if short sales are banned. If number of investors in the market increases, or short sales are permitted, he shows that the market price of the asset will fall to its expected value. Therefore, in a market where there are large numbers of investors, or there are no restrictions on short sales, the impact of heterogeneous expectation on prices is small. Jarrow(1980) reconsidered Miller's argument. He noted that short sale restrictions might not have the impact that Miller expected if asset prices were not determined independently. Although an investor might value a particular asset highly, short sale restrictions on other assets in the economy might affect his or her aggregate demand, and consequently, asset prices. Therefore, he argued, substitution effects must also be considered. He also extended Miller's argument to the case where investors exhibit constant absolute risk aversion. He demonstrated that if two assets are correlated, short sale restrictions can result in price declines as well as increases. However, if asset returns are uncorrelated, or heterogeneity is restricted to beliefs about the return vector and not the covariance structure in the economy, then Miller's result is obtained. That is, short sale restrictions and heterogeneous expectations cause prices to rise above their true equilibrium value.

The number of units in the Americus Trusts is limited to five percent of the number of shares issued by the underlying firm. While the returns of primes and scores are correlated with that of the underlying stock, the structure of the trusts prevents a discount. Consequently, a premium is consistent with the theories of both Jarrow, and Miller.

Allen and Gale(1988) show that when markets are incomplete, and investors have different risk preferences each group of investors will value assets differently, i.e., , each will place different value on consumption in different states. Consequently, the asset will be purchased by the group that values it most highly. The value itself will depend on how payoffs are allocated across states and the marginal utility of consumption in each state. In this framework they argue that firms can increase their value by issuing securities that take advantage of investors' preferences. For example, risk averse investors might value debt more highly than equity of the same firm while risk neutral investors might value the equity most highly. By issuing both types of securities, the firm is able to increase its value.

Their argument differs slightly from the marginal investor theory but the implication for primes and scores is similar. Dividing the income of common stock into two components may increase its value if investors have different preferences, and those who value the specific component most highly, purchase it.

To assess further the potential impact of heterogeneous expectations or a difference in preferences on a premium, consider the following.

Primes consist of two implied positions: a long position in stock and a short position in a call written on the same stock. Therefore,

$$\text{Prime} = T_p - S_p$$

where T represents the underlying stock, S represents the score, and the subscript "p" indicates the position is held by a prime holder.

Score owners hold the call written by the prime owners:

$$\text{Score} = S_s$$

where the subscript "s" indicates the position is held by score owners.

Owners of the underlying stock hold a long position:

$$\text{Stock} = T_t$$

where the subscript "t" indicates the position is held by stock holders.

The premium, which is defined as:

$$\text{Premium} = \text{Prime} + \text{Score} - \text{Stock}$$

can be rewritten as:

$$\text{Premium} = (T_p - T_t) + (S_s - S_p)^1 \qquad \text{if } T < X$$

where T= the price of the underlying stock

X= the termination claim

If all investors have the same beliefs or the same average beliefs about the value of the stock and calls written on the stock, the premium should equal zero.

For a positive premium to exist, score owners would have

[1]If the score is deep-in-the-money, the value of $S_p - S_t$ should be zero. At that time, the prime holder would expect to receive shares that are equal in value to the termination claim. This would be invariant unless the stock price fell to a point where it approached the termination claim.

to expect higher future stock prices and/or higher implied volatility of the stock price than prime owners. Or, prime owners would have to expect higher future stock prices than stock owners themselves.

Heterogeneous expectations might be expected to have the greatest impact on premiums when the score is at-the-money or out- of-the money. If the score is deep-in-the-money, differences in beliefs about the value of the score will be less relevant since the final payoff to prime holders is unchanged by increases in score value. However, when the score is out-of-the-money, a premium may arise if score holders are more optimistic about the stock than are prime holders.

A premium that is caused by heterogeneous expectations would be expected to diminish as the expiration date of the trust approaches. Final payoffs to prime and score holders depend on the underlying stock price at the time of the trust's expiration. As the final payoffs become predictable, heterogeneous beliefs should disappear. Also, as time to maturity approaches, arbitrageurs can more easily exploit remaining premiums.

Noise trading in either the prime, score, or underlying stock (or any combination of the three) may cause prices to diverge from fundamental values. Such a divergence may create a premium.

Noise traders are naive investors who trade on information that is unrelated to the fundamental values of the assets bought or sold. There may be heterogeneity among noise traders. However, the heterogeneity is not related to beliefs about the distribution of the underlying stock price. Consequently, noise trading differs from heterogeneous expectations.

DeLong, Shleifer,Summers, and Waldmann (1990) show that if arbitrageurs are risk averse and have limited investment horizons, they would not act to correct a premium (or discount) caused by noise trading. Noise traders may prevent prices from reverting to their fundamental values, and in fact, may cause such differentials to increase. The potential of an increase in the spread between prices and values imposes the possibility of a loss on arbitrageurs, particularly those with limited horizons. Consequently, if they are risk averse, arbitrageurs will let the premium (or discount) persist.

Investors in primes and scores tend to be large, institutions[2], who might be considered "sophisticated" traders in the model developed by DeLong et. al.. It is probably more likely that naive investors would participate in the market for blue-chip stocks, perhaps as "Go along traders". These are traders who buy and sell shares of stock depending upon the prevailing trend in that stock. Consequently, it is possible that noise trading in the underlying stock causes the

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[2]In a conversation with Peter Broms at Kidder Peabody in April, 1991, I was told that two major investors in primes and scores, at least initially, were TIAA-CREF and GE pension funds.

difference between stock prices and the combined price of the prime and score. If noise traders are pessimistic about the underlying stock, DeLong, Shleifer, Summers, and Waldmann show that noise trading can force the price below its fundamental value. This will cause a premium. Moreover, arbitrageurs will not enter the market to correct the price.[3]

If the premium can be defined as:

$$\text{Premium} = (T_p - T_t) + (S_s - S_p)$$

it can easily be seen that if noise trading forces the stock price down then a premium will result. When the effects of noise trading diminish and the price moves back to its true value, the premium will dissipate.

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[3]In the same conversation with Peter Broms, I was told that arbitrageurs do not step in to eliminate premiums with short term hedges. This behavior is consistent with the "noise trading" hypothesis.

Data

The data used in the chapter are weekly closing prices for the prime, score, and underlying stock. These prices are from Barron's and from Moody's Daily Stock Price Records for the New York Stock Exchange, and for the American Stock Exchange. The data covers the period from the initiation of each trust to March 29, 1991. On occasion, the prime did not trade on Friday. In that case the last trading price for the week was substituted.[4]

For one set of efficiency tests, daily closing prices for the prime, score, and stock were used. These prices are from the CRSP tapes. The time period covered is from the date the trust became effective until December 29, 1989. If a prime or a score did not trade on any particular day, that day was eliminated from the data set.

It should be noted that the starting dates for the weekly data and the daily data differ for many of the trusts. That is because these trusts traded on a when-issued basis. The CRSP tapes do not seem to include prices for this period. Trusts traded on a when issued basis for as little as a week and as long as several months.

Weekly volume of trading were also obtained from Barron's

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[4]If there was no trading for the week, it was assumed that the prime would have been correctly priced and a price was estimated using the prices of the score and the stock. This happened fewer than fifteen times, and did not occur at all for most of the trusts.

and Moody's Daily Stock Price Records. Volume data includes the period from the closing of each trust to March 29, 1991. Daily volume data are from the CRSP tapes. The CRSP tapes do not have volume data prior to April 1987. Volume data for the Americus Trusts were collected for the period April 1987 to December 1989.

The weekly call money rate was obtained from Barron's and was used to approximate the risk-free interest rate.

The major sources of "error" in premium data are from bid-ask spreads, non-synchronous prices, and transactions costs. These types of errors can be expected, at times, to cause the combined prices of the primes and scores to be greater or less than that of the underlying stock. The magnitude of these errors should be the same for premiums or discounts. Any discount that is economically significant can easily be taken advantage of by recombining the prime and score into a unit, and tendering it to the trust without fee, and then selling the stock. Earning arbitrage profits from a premium is not as easy or inexpensive. Therefore, one would expect any negative price deviations (Prime + Score -Stock<0) to be the result of measurement error. Further, if all price deviations were the result of measurement errors, one would expect to see an equal number of positive and negative errors. This is not the case. There are many more premiums (Prime + Score - Stock >0) than discounts. Moreover, the premiums tend to persist for long periods of time. The discounts also tend to be of a smaller magnitude than the premiums.

Description of the Premium

As is indicated on Table 3-2, the median and average premiums are positive for each of the twenty-six trusts. All of the average premiums are statistically different from zero at a one-percent confidence level. For nine of the trusts,(Bristol Myers, Dow Chemical, Eastman Kodak, Ford, General Electric, IBM, Johnson and Johnson, Merck, and Philip Morris), the average premium exceeds one dollar. In fact, these nine trusts often have premiums in excess of two dollars and these premiums tend to persist for months at a time. The premium for Philip Morris ranged as high as eighteen dollars, and remained nearly this large for several weeks. These estimates suggest that the premium is economically as well as statistically significant for some of the trusts.

On Tables 3-3 and 3-4, the data are divided. Table 3-3 includes the period during which the trusts were open, and shares could be exchanged for units of the trust. On Table 3-4, the period subsequent to the closing of each trust, up to March 29, 1991 is included.

When the trusts were open, ten trusts had average premiums greater than one dollar, (Coca Cola, Dow Chemical, DuPont, Kodak, General Electric, IBM, Merck, Philip Morris, Proctor and Gamble, and Xerox). A partial explanation for the premium on open trusts is when-issued trading, which was permitted by the American Stock Exchange before the trusts met the Exchange's size requirements. Due to when-issued trading, stock did not have to be tendered to the trusts, and primes and scores did not have to be paid for as long as when-issued trading continued.

When the trusts were closed, i.e. the number of units was fixed, nine trusts had average premiums in excess of $1.00. (Amoco, Bristol Myers, Dow Chemical, Kodak, Ford, General Electric, IBM, Johnson and Johnson, and Philip Morris.) Of these trusts, five (Dow Chemical, Kodak, General Electric, IBM, and Philip Morris) also had average premiums greater than $1.00 when the trusts were open. Since arbitrage was relatively easy when the trusts were open, if the trusts were effective, it would be expected that premiums would be smaller at that time. The premium is statistically greater for eight of the trusts when they were closed: American Home Products, Amoco, Bristol Myers, Dow Chemical, Kodak, Ford, Johnson and Johnson, and Philip Morris ($p \leq .01$). While the premiums for these trusts rose, the coefficient of variation for the premium of these eight trusts declined, suggesting that the higher premium was accompanied by lower risk.

On the other hand, the premium for thirteen of the trusts declined after the trusts closed. This decline was statistically significant, at a five percent level of confidence for six of them: Coca Cola, Exxon, GTE, Merck, Proctor and Gamble, and Xerox. For six of the thirteen trusts the drop in the average premium was greater than $.45, and for two the drop was over $1.50. These findings are consistent with the hypothesis that when-issued trading, which could only occur when the trusts were open, caused the trusts to sell at a premium.

Thus, the magnitude of the premiums appear to vary across trusts. For many of the trusts, it declined when the trusts were closed. However, this was not consistent across trusts. The average premium rose for eight trusts after stocks could no longer be exchanged for units. While some of the premiums observed do appear to be large, it is not clear whether they are the result of market imperfections (bid-ask spreads, non-synchronous prices, broker's fees, and restrictions on short sales), or market inefficiencies. In the next section of this paper, the efficiency of the market for primes and scores is examined.

Tests of Market Efficiency

Three tests of market efficiency will be applied. The first test is the one applied by Jarrow and O'Hara (1989) to the original five trusts. The second is similar to the one used by Jarrow and O'Hara. The major difference is in the way "true" premiums are separated from random price fluctuations. The third is an ex-ante trading test similar to the one applied by Galai (1977) to the options market. Two tests were applied with the hope that the advantages of one would offset the disadvantages of the other. If the results of both tests are consistent, any conclusions will be more reliable.

Following Jarrow and O'Hara, bounds will be set on the premiums (Prime + Score - Stock) in order to determine whether the prices observed offer unexploited arbitrage opportunities in the market. Deviations outside the boundaries would indicate that market inefficiencies exist. These boundaries reflect various market imperfections and measurement error (bid-ask spreads, non-synchronous prices, transactions costs) which may permit price deviations, such as those observed, to exist.

Two sets of boundaries must be established to reflect the fact that strategies for generating arbitrage profits depend on whether the trust is open or closed. As was previously noted, the trusts closed approximately one year after the initial offer was made, when five percent of the underlying firm's outstanding shares were tendered to the trust, or if the score went in-the-money (whichever happened first). Until that time, shares could be tendered to the trust in exchange for a unit of ownership in the trust. Once the trust has closed, the supply of primes and scores can not be increased. However, supply can decrease, since primes and scores can be recombined into units and exchanged for shares at any time, without fee.

Whenever the combined prices of prime and score exceeds the price of underlying stock (the premium is positive), and the trust is open, the premium can be arbitraged by tendering stock to the trust (for a fee) and simultaneously selling the unit received in two parts: the prime and the score. The cost of this strategy included broker's fees and the fee paid to the trust for tendering shares. If a premium exists and the trust is closed, it can be arbitraged by selling the prime and score short and simultaneously purchasing the stock with the proceeds. This position must be maintained until the trust expires (there is generally a four year period between the closing of a trust and its expiration). The costs associated with this strategy include broker's fees, and the interest costs associated with maintaining a short position.

It the underlying stock price exceeds the combined prices of the prime and score (the prime and score are selling at a negative premium or discount), the price differential can be arbitraged by simultaneously purchasing the prime and score, recombining them into a unit, then exchanging the unit for stock. The stock can then be sold at a higher price than the unit. The costs associated with this strategy include broker's fees for the purchases of prime, and score, and for the sale of stock. There is no fee for exchanging the units for stock.

Since arbitrageurs will let prices fluctuate if it is too costly to drive them back into line, some deviations between the prices of primes and scores, and the underlying stock can be expected to persist. Therefore, the following bounds will be placed on allowable price deviations:

1a. $-c(P_t+S_t+T_t)+\bar{e}_t \leq P_t+S_t-T_t \leq c(P_t+S_t-T_t)+m+\bar{e}_t$

1b. $-c(P_t+S_t+T_t)+\bar{e}_t \leq P_t+S_t-T_t \leq c(P_t+S_t+T_t)+\hat{\imath}(P_t+S_t)+\bar{e}_t$

where P_t=the price of the prime on day t

S_t=the price of the score on day t

T_t=the price of the stock on day t

c=brokers fees, expressed as a proportion of the purchase/sale

$\hat{\imath}$=interest rate paid to maintain the short position

m=the cost of tendering shares to the trust

$\bar{e}_t$=price deviations that are due to non-synchronous prices, bid-ask spreads and any other errors, such as recording errors.

As was noted by Jarrow and O'Hara, discounts must reflect price deviations that are solely due to bid-ask spreads, non-synchronous prices, and transactions costs. Any true arbitrage opportunities caused by discounts can be immediately exploited without incurring any additional costs. Consequently, if the price deviations due to the market imperfections noted above are symmetrical around zero, then discounts can be used as an estimate of these same deviations above zero. Therefore,the only additional cost that needs to be estimated to test the upperbound is the cost of maintaining a short position in the prime and score. This approach limits the number of assumptions that must otherwise be made to estimate the bounds set in equations (1a) and (1b). It also provides a way to estimate the impact of non-synchronous prices and bid-ask spreads on the premium. Since the volume of trading varies greatly from trust to trust, bid-ask spreads and the effects of non-synchronous prices will vary across trusts. Use of the price data in the manner developed by Jarrow and O'Hara permits reflection of these inter-trust differences.

Following Jarrow and O'Hara, the 95 centile for all discounts, (Prime + Score -Stock <0) was used to estimate the price effect of all market imperfections and transactions costs other than the cost of maintaining a short position. The 5% cutoff is shown on Table 3-5a. The samples from which this cutoff was drawn ranged from slightly less than four percent of all observations (for ATT(2)) to approximately thirty-seven percent of all price data for Exxon. (see Table 3-5c) In fact, for eleven of the trusts less than twenty percent of all the price deviations were negative. For twelve of the twenty-six trusts there is at least a $0.75 difference between the 95 centile and the 90 centile. Consequently, for some of the trusts it is possible that the 95 centile represents outliers in the distribution and may not be a good estimate of deviations from the lower bound. In any case, use of the 95 centile makes the test very conservative.

Using order statistics the proportion of premiums that can theoretically be expected to exceed transactions costs can be computed. The probability that additional observations will exceed the five percent cutoff is .10. Assuming that the cost of maintaining a short position is zero, the actual and expected proportions of observations to exceed the upper bound is shown on Table 3-5a. For thirteen of the trusts, the actual proportion of observations exceeded the predicted proportion. For eight of these, the actual proportion of premiums exceeding estimated transactions costs and other price errors was twice the expected proportion. On Table 3-5b, descriptive statistics for the premiums in excess of transactions costs (except the cost of short sales) and other price errors are given. For fourteen of the trusts, the average of the remaining premium was greater than one dollar. For eight, the median exceeded one dollar. These results indicate that substantial price deviations occur frequently for some, but not all, of the trusts. Of the five trusts initially studied by Jarrow and O'Hara, (American Home Products, Bristol Myers, Dupont, Exxon, and Merck), only Bristol Myers, and Merck appear to have sustained the premiums documented in their paper.

When the results on Tables 3-5a and 3-5b were computed, it was assumed that the costs of arbitrage were zero. Thus, while the premiums appear to exceed the combined effects of bid-ask spreads, non-synchronous prices and transactions costs, they may not be large enough for arbitrageurs to enter the market. If for example, the combined prime and score prices was $60.00 and the call money rate was (a constant) 8.0%, the interest costs of the short position would be $4.99 for one year, $10.41 for two years and $16.27 for three years. If costs of these magnitudes were added to the 5% cutoff on Table 3-5a, it is clear that the premiums would have to be extremely large to present exploitable arbitrage opportunities. Also, arbitrageurs would have to be willing to take long term positions.

As was previously noted, the 95 centile may be an outlier in the distribution of discounts, particularly when the proportion of discounts is small. Consequently, attributing all premiums that are less than the absolute value of the "five percent cutoff" to non-synchronous prices, bid-ask spreads, and measurement error may significantly underestimate the frequency with which premiums occur.

Rather than establish a cutoff point, beyond which premiums are presumed to reflect values rather than market imperfections, a slightly different approach, which requires matching negative and positive premiums with the same absolute value, will be used.

Following Jarrow and O'Hara, it is assumed that price deviations due to market imperfections are symmetrical around zero. Consequently, these illusory premiums or discounts should be distributed binomially with half of the deviations positive, and half of them negative.

Since discounts which present arbitrage opportunities would immediately be exploited, it is also again assumed that any discounts observed are caused by market imperfections. If the distribution of discounts and "illusory" premiums is symmetric around zero, then these should be equal in number and magnitude. This implies that a discount of $3.00 should be matched by a premium of $3.00 and so forth.

Consequently, in order to determine which premiums are due to market imperfections, discounts will be matched with premiums of the same magnitude. Any premiums that are not matched to discounts will be considered "true premiums".

Since it is possible that the number of discounts observed in the samples for each of the twenty-six trusts underestimates the true number of discounts in the population, a confidence interval was constructed around the proportion of discounts observed. Using large sample properties, a confidence interval for a variable which is distributed binomially is:

$$p \pm 1.96 \text{ SQRT}(p(1-p)/n)$$

The proportion of discounts and the upper bound of the confidence interval for each of the twenty-six trusts is shown in Table 3-6a. The upper bound is used as an estimate of the proportion of observations greater than zero that can be attributed to market imperfections. Therefore, the number of premiums attributed to market imperfections is slightly larger than the number of discounts. This was assumed in order to minimize sampling error. The actual number of premiums attributed to non-synchronous prices, bid-ask spreads, and measurement error is shown in the last column of Table 3-6a.

The actual matching of discounts and premiums was accomplished as follows: a frequency distribution for discounts was constructed. Each discount observed was matched to one or more premiums. The actual number depended on the ratio of the upper bound of the confidence interval to the proportion of discounts. For example, for American Express, for every one discount observed, 41/31(1.323) premiums were attributed to market imperfections. Therefore, if ten discounts are equal to -\$0.125, these were matched to thirteen premiums equal to +\$0.125. It there were only eight premiums equal to \$0.125, then five additional premiums greater than \$0.125 (but closest in magnitude to \$0.125) were matched to the discounts. If a large discount was not matched by a large premium, it was matched with two of the largest premiums. These steps were taken to bias the results against the hypothesis that premiums exist.

The matched discounts and premiums and observations of zero premiums were deleted from the larger sample. The remaining premiums were considered to reflect the real value placed on primes and scores by the market.

This method causes the deletion of fewer premiums than the one applied by Jarrow and O'Hara, particularly when the proportion of discounts is small. That is because Jarrow and O'Hara eliminate all observations below a fixed point.

Matching premiums and discounts permits some of the smaller premiums to remain in the sample, while some of the larger premiums that Jarrow and O'Hara may have retained, may be discarded. It also circumvents the problem caused by using an outlier in the distribution of discounts as a cutoff point. Consequently, while Jarrow and O'Hara's test is useful for detecting large premiums, this test is useful for detecting a large range of premiums. It should be noted that for Exxon, the trust with the largest proportion of discounts, that the results for the two tests are virtually identical. The major difference between the results shown on Tables 3-5a and 3-6c is in the number of observations considered to be "true premiums". However, both methods generally identified the same trusts as having a substantial number of premiums. The most notable exceptions are AT&T(2), DuPont, and Philip Morris. However, for these three firms, the five percent cutoff was clearly an outlier in the distribution of discounts.

The results of this test are shown on Tables 3-6b and 3-6c. On Table 6b, the number of weeks of discounts, matching premiums, and zero observations deleted from the original samples is shown. The median, average, and standard deviation for this distribution is also shown. The average of deleted premiums is insignificantly different from zero (but positive) for all of the trusts except Chevron. The median is zero for fourteen of the twenty-six trusts. As was expected, this distribution is almost symmetrical around zero.

On Table 3-6c, the premiums remaining in the sample are described. For twenty-one of the twenty-six trusts, over forty percent of the observations were "true" premiums. The average premium ranged from $0.841 to $4.452. The average and median premium for twenty-two of the twenty-six trusts was over $1.00. Thus, the premium appears to be economically as well as statistically significant for most of the trusts.

On Table 3-6b, zero "premiums" were deleted from the sample. On Table 3-6c, the "true premiums" were all greater than zero. On Table 3-6d, the descriptive statistics for matching premiums and discounts deleted from the sample are shown. Here, zero premiums were not deleted from the sample. The average of the deleted premiums was slightly higher when zero premiums were not deleted. The averages of the "true premiums" shown on Table 3-6e, were slightly lower than those shown on Table 3-6c. However, they are all still significantly positive.

Although primes and scores sell at a premium to the underlying stock, the market for primes and scores may not be inefficient. Due to substantial transactions costs that must be incurred to earn arbitrage profits, large premiums may persist.

For an arbitrageur to exploit a premium that occurs after the trusts have closed, she/he must sell short the prime and score and purchase the stock. This position must be held until the trusts expire. This could involve maintaining a short position for up to four years. Although professional investors can easily obtain access to seventy percent of the proceeds from a short sale, the interest costs of a long term short position can still be substantial particularly when the price of the shorted asset is high. Furthermore, future prices and interest rates are not known. Consequently, maintaining a long term short position also involves some risk since interest costs will fluctuate.

Since the Americus Trusts have not yet expired, it is not possible to compute the cost of maintaining the short positions needed to earn arbitrage profits.

In order to estimate whether any arbitrage opportunities exceeded the cost of maintaining a short position, the following assumptions were made: (1) whenever a premium was observed, investors established a hedged position (i.e. sold the prime and score short, and purchased the stock.) (2) investors had use of seventy percent of the proceeds from a short sale. (3) investors expected the call money rate in effect the week that the premium was observed to remain constant throughout the period that the position was held. (4) the price of the prime and score remained constant throughout the period the short position was held. Thus, it is assumed that investors base their expectations of the cost of the short position on current prices.

It is profitable to maintain a short position in the prime and the score when trusts are c: 3ed only if

$$.3i(P_t+S_t) \leq P_t+S_t-T_t$$

where i=exp(call money rate * number of years to the trust's expiration)
$P_t+S_t-T_t$=Premium (R_t)

Thus the interest costs of maintaining the short position must be less than the premium .

This expression can be rewritten as:

$$.3i/(1-.3i) \leq R_t/T_t$$

Therefore, the premium must be large relative to the underlying stock price in order to present an arbitrage opportunity. Also, the longer the time remaining to maturity, the larger the premium must be to offset the interest costs of maintaining a short position.

When the terms in the second inequality are estimated and compared, the costs of maintaining a short position in primes and scores consistently outweighs the relative premium. For those trusts where the costs of maintaining the short position do not exceed the premium any remaining profits are eliminated by considering broker's fees. (From schedules of commissions obtained from brokers it is assumed that the cost of buying or selling primes, scores, and stock is $0.05 per share. Therefore, the total brokers fee is $0.30 for a "round trip".) Thus it can be concluded that the market for primes and scores is efficient, although value is created by repackaging the cash flows.

The costs of arbitrage for open trusts was not considered here because arbitrage was not possible when the trusts were trading on a when-issued basis because the necessary transactions could not be completed. The dates on which when-issued trading ended were not available.

Jarrow and O'Hara's test was designed to reflect many of the market imperfections that tend to drive prices away from their fundamental values. However, their test implicitly assumes that arbitrageurs are always able to exploit any arbitrage opportunity that arises. However, some of the trading in the primes tends to be thin, particularly for some of the smaller trusts. Therefore,while their test may overcome the problem of non-synchronous prices, it may not always reflect the barriers to arbitrage raised by a lack of liquidity in the market.

One way to deal with this latter problem is to use a trading rule in order to determine if arbitrageurs could have made money by exploiting premiums in the market for primes and scores. One such test was used by Galai (1977) to test the efficiency of the options market. Galai used an ex-ante test of efficiency. This test was designed to detect market inefficiencies even when prices are non-synchronous. Non-synchronous prices may cause the market to appear inefficient, when in fact, it is not. Non-synchronous prices and a lack of liquidity in the market pose potential problems in the study of primes and scores because the trading of some of these assets is thin. Therefore, it is important to determine whether arbitrage opportunities not only exist but can be acted upon. An ex-ante test is designed to mimic the opportunities available to traders in the market. Consequently, this test should help to assess whether arbitrage opportunities actually existed in this market.

A modified version of Galai's ex-ante test will be applied to daily closing prices of primes, scores and stock. The sample period studied begins when trading for each trust became effective and ends on December 29, 1989. All data were obtained from the CRSP tapes and were split adjusted. As was noted by Galai, use of daily closing prices may be problematic since it is not necessarily true that the quotes are simultaneous. Also, daily closing prices are subject to manipulation. However, the results of this test will be compared to those of the previous efficiency test as a cross-check on its reliability.

Galai assumed that any deviation from the Black-Scholes option pricing model value presented an arbitrage opportunity. If on day t_0 an arbitrage opportunity was detected, a hedged position was established on day t+1, where $t+1 = t_0 + 1$. All positions held until the premium fell below a pre-established filter ($0.50) on day t+2, which can be one or more days after day t+1. Positions were unwound on day t+3, which is day t+2+1. Here, a filter of $0.50 will be applied to detect the presence of an arbitrage opportunity and also to determine whether prices have moved back into line. The purpose of applying a filter was to eliminate price discrepancies that are caused by random price fluctuations. Since premiums tend to persist for fairly long periods of time, it is assumed that investors would not unwind their positions unless they believed that prices had moved back into line. Otherwise they would not make a profit, and if the premium increased, they would suffer a loss. It was assumed that all transactions costs are zero.

Therefore, if on any day "t_0"

$$\text{Prime} + \text{Score} - \text{Stock} \geq \$0.50$$

a hypothetical investor will assume that an arbitrage opportunity exists. Consequently, at the next available price, an arbitrageur would sell the prime and score short and buy the stock with the proceeds. So, on day t+1, a hedge will be established. If there was no trading in the prime or the score on day t+1, the position will be established on the next day that both assets trade.

When the premium falls below $0.50, (day t+2) it will be assumed that prices have returned to their fundamental values:

$$\text{Prime} + \text{Score} - \text{Stock} < \$0.50$$

Therefore, on day t+3, the hedged position will be reversed. The arbitrageur's profit is the difference in the premium on days t+1 and t+3. It is possible for the arbitrageur to suffer a loss if the arbitrage opportunity disappears between days t and t+1, or if the price deviation increases between days t+2 and t+3. Consequently,this type of arbitrage is risky and arbitrageurs should want a return that is higher than the risk-free interest rate.

Examination of the data suggests that the appearance and disappearance of premiums is not predictable. When the daily trading test was applied hedged positions were as short as two days and in one case, as long as two years. Positions were reversed on one day and reestablished on the next. If positions were held for any length of time, they were costly in addition to being risky.

DeLong, Shleifer, Summers, and Waldmann(1990) demonstrated that risk averse arbitrageurs with short time horizons would not engage in this type of arbitrage if the source of the price deviations was noise trading. In that case, the direction in which price deviations might move would be unpredictable which, in the short run, could create losses.

As Table 3-7 shows, application of the ex-ante trading rule yields a small, positive average profit for every trust, except Kodak. Whether these profits are economically significant depends on how long the hedged positions had to be maintained. As was previously noted, the durations of the actual hedged positions taken ranged from two days to over two years (for Kodak). In the end of 1989, many hedged positions had to be held for several months in order to prevent a loss. Consequently, it appears that these positions were not uniformly profitable or unprofitable. However, the profits, if any, appear to be low, especially if risk is considered.

A comparison of Tables 3-5a and 3-7 shows that some of the results of the two tests were consistent. Eight of the trusts with average profits greater than $0.25 when the trading rule was applied also had a high proportion of premiums exceeding the upper bound. The most notable exceptions were American Express, and Kodak, which had a high proportion of premiums exceeding the upper bound but low profits from the trading test. American Home Products and Atlantic Richfield had relatively high profits from the trading test and a low proportion of premiums in excess of the upper bound.

Overall, it appears that the trusts do command substantial premiums in the market. However, the expense of maintaining long term short positions and the riskiness of short term hedging makes it difficult for arbitrageurs to exploit price differentials.

Explanation of Premium

There are a number of factors which may contribute to primes and scores selling at a premium to the underlying stock, when the trusts have closed.

(1) Market completeness. Primes and scores may add to market completeness. They are unique assets because they are long term covered calls and calls, respectively. Scores are similar to warrants. However warrants are issued by corporations. Scores are written on firms considered to be

"blue-chip". If primes and scores add to market completeness then arbitrageurs should not be able to exploit any premiums that arise.

(2) Transactions costs. It may be possible to create primes and scores synthetically. However, the transactions costs incurred to create long term synthetic positions in options may be excessive. Thus, primes and scores may command a premium in the market because they permit investors to maintain positions in long term derivative assets without incurring transactions costs. Primes and scores may also be used to create other payoff structures not previously available. For example, scores are sometimes combined with zero coupon bonds to create a type of high quality convertible bond, where both components are usable, and tax liabilities are minimal.

(3) Heterogeneous expectations. Investors may have different beliefs about the risk and return characteristics of the underlying stock. A premium that is caused by heterogeneous expectations would be expected to diminish as the expiration date of the trust approaches. Final payoffs to prime and score holders depend on the underlying stock price at the trust's expiration. As the final payoffs become more predictable, heterogeneous beliefs should disappear. Also, as maturity approaches, arbitrageurs can more easily exploit any remaining premiums.

(4) Noise trading. Noise trading in either the prime,

score, or underlying stock (or any combination of the three) may cause prices to diverge from their fundamental values. Such a divergence may create a premium.

Variables Included in the Regression Model

The following variables are included in a regression model which is used in an attempt to explain the statistically significant premiums at which the Americus Trusts sell: Present Value of the Termination Claim/Stock Price (X/T), $((X/T)-1)^2$, Time (Years) Remaining to Maturity, Weekly Score Trading Volume, Weekly Prime Trading Volume, and the Two-Week Return of the Underlying Stock. Volume data were included in the analyses of the closed trusts only.

The variables X/T and $((X/T)-1)^2$ (the present value of the termination claim is used) are included in the model to capture the impact of heterogeneous expectations on the premium. As was previously noted, heterogeneous expectations might cause a premium when the score is out-of-the-money or at-the-money. The coefficient of X/T would indicate how the premium varies with the score's in-the-moneyness and the variable $((X/T)-1)^2$ is intended to detect any downward trends in the premium that might begin when X/T is equal to one.

The time remaining until the expiration of the trust was also included to capture the effect of heterogeneous expectations on prices. This variable should be positively related to the premium. The impact of heterogeneous expectations should decrease as time to maturity decreases. The combined prices of the prime and score should converge to the underlying stock price, since, at maturity, the prime and score will be swapped for stock. If primes and scores command a premium in the market because they complete the market, then the length of time investors have use of the asset should also be positively related to the premium.

Volume of trading of primes and scores were also included to reflect heterogeneous expectations. It has been shown that trading volume is positively correlated with the degree of heterogeneity in investors' expectations, at least in the stock and futures markets. It may apply here as well.

The two-week return of the underlying stock may reflect the impact of noise trading on the premium. If noise trading drives the stock price below its fundamental value while the prime and score remain near theirs, then the premium and the two week return will be negatively related as the spread between the prices will increase when the stock price moves down and decrease as it moves back towards its value.

It is difficult to test whether primes and scores complete the market and/or sell at a premium because they complete the market. However, a positive intercept in the regression would support both of these hypotheses.

Model

Two sets of regressions were run for each trust: one using data for the period the trusts were open; the second set using data from the closing of each trust to March 29, 1991. The total time period covered for each trust ranges from slightly longer than three years to five years. For most trusts, approximately four years of weekly data are analyzed.

As the Tables in Appendix A show, several of the independent variables are highly correlated. Multicollinearity does not bias the estimates of the coefficients in OLS. However, estimates of the standard errors of the coefficients are inefficient. Furthermore, the coefficients themselves may become difficult to interpret.

In order to eliminate the problem of multicollinearity, a series of regressions were run on the independent variables used to explain the premiums. The purpose of these regressions was to purge each independent variable of the effects of the other variables. The regressions were run sequentially. The residuals from one regression were added to the next one as independent variable. For example, in equation one, the residuals e_2 represent the portion of $(X/T-1)^2$ that is not explained by X/T. "e_2" is then entered into the second regression as an independent variable. "e_3" represents the portion of the time to maturity variable that is not explained by X/T and e_2. All of the remaining residuals can be interpreted in the same way.

These models follow:

(1) $(X/T-1)^2 = a_2 + b_{2,1}(X/T) + \bar{e}_2$

X/T was expressed in deviation form since in the final model all other variables will be in deviation form.

(2) Time-to-Maturity $= a_3 + b_{3,1}(X/T) + b_{3,2}e_2 + e_3$

(3) Ln(Score Volume)[5] $= a_4 + b_{4,1}(X/T) + b_{4,2}e_2 + b_{4,3}e_3 + e_4$

(4) Ln(Prime Volume) $= a_5 + b_{5,1}(X/T) + b_{5,2}e_2 + b_{5,3}e_3$ $b_{5,4}e_4 + e_5$

(5) 2-Wk. Ret. $= a_6 + b_{6,1}(X/T) + b_{6,2}e_2 + b_{6,3}e_3 + b_{6,4}e_4 + b_{5,5}e_5 + e_6$

Two sets of regressions were run for each trust. One set for open trust, the second for closed trusts. Equations 3 and 4 which reflect the impact of volume of trading on the premium were done for closed trusts only.

The results of these intermediate regressions are in Appendix B.

The final regression model for closed trusts is:

$$\text{Premium} = a_0 + b_1(X/T) + b_2e_2 + b_3e_3 + b_4e_4 + b_5e_5 + b_6e_6 + e$$

where X/T = the present value of the termination claim/ the underlying stock price

e_2 = the residual effect of $(X/T-1)^2$

e_3 = the residual effect of time remaining to the trust's expiration

e_4 = the residual effect of the log of score volume (closed trusts only)

e_5 = the residual effect of the log of prime volume (closed trusts only)

e_6 = the residual effect of the two week return of the underlying stock

[5]Volume data were included in the models for closed trusts only.

Thus, all variables in the final model are uncorrelated and each explains a portion of the premium that was not explained by the variables preceding it. It should be noted that the model's estimated coefficients will change if we alter the order in which the variables are entered. With the exception of the two week return of the underlying stock, each of the six variables entered into the equation are expected to reflect the impact of heterogeneous expectations on the premium. The variable entered first, X/T is expected to have the greatest explanatory power. The impact of heterogenous beliefs on a premium is directly related to whether the score is in, out or at the money. $(X/T-1)^2$, (e_2 in the actual regression), was entered second, since it was closely related to X/T, and was in the equation to detect whether the premium reached a maximum when X/T=1.
Volume of trading for some of the primes and scores increased substantially over time. Consequently, these variables were highly correlated with each other and with the time to maturity variable. To determine the order in which the variables were entered into the equation the correlation between each variable and the premium was estimated. The average correlation coefficient between each variable and the premium was approximately the same. Therefore, the order in which these variables were entered into the equation was determined by the ease of theoretical explanation. The two week return of the underlying stock was not highly correlated

with the other independent variables. Therefore, the order in which it was entered into the equation did not affect the final results.

Interpretation of Results

Since all independent variables are expressed in deviation form, the intercept for each trust represents its mean premium when all other effects are at their average.[6] Since the source of the premiums when trusts are open and closed is expected to differ the results for each set of regressions will be separately discussed. The results of the regressions for closed trusts will be presented first.

The coefficients of X/T and $(X/T-1)^2$ must be carefully interpreted. The interpretation depends on whether the average of X/T is greater than, less than, or equal to one. (If the average of X/T is greater than one, the score was, on average, out of the money, if the average of X/T is less than one, the score was, on average, in the money.) It is hypothesized that the premium is maximized when X/T=1. The premium should be smallest when the score is deep in-the-money (X/T<1) or when the score is deep out-of-the-money (X/T>1).

If the average value for X/T is greater than one, the premium is expected to increase when X/T falls towards one (the stock price rises), and X/T is less than its average. The

[6]When a regression model is estimated: $Y_i = a + bX_i$. If the independent variable is in deviation form: $Y_i = a^* + b^*(X_i - \bar{X})$, then $b^* = b$ and $a^* = \bar{Y}$.

premium is expected to decrease if X/T rises above its value(the stock price falls). Consequently, the coefficient of X/T should be negative. If $X/T=1$ is point at which the premium reaches a maximum the function describing the relationship between X/T and the premium should turn down at $X/T=1$. If this is true, the coefficient of $(X/T-1)^2$ should be positive.

If the average value for X/T is less than one, the premium is expected to increase as X/T increases above its average, by moving closer to one. If an observation of X/T is less than its average, the premium should fall. If the hypothesis that the premium is maximized at $X/T=1$ is correct, the coefficient of X/T should be positive. The coefficient of $(X/T-1)^2$ should be negative.

Hypothesized signs for each of the independent variables are summarized on Table 3-8.

Table 3-8

Expected Signs of Regression Coefficients
For Each Hypothesis
Closed Trusts

Hypotheses	Int.	X/T >1 <1	$(X/T-1)^2$ >1 <1	Time to Maturity	Score Vol	Prime Vol	2-Wk.Ret.
Market Comp.	+	0,0	0	+	0	0	0
Trans. Costs	+	0,0	0	0	0	0	0
Heter. Exp.	0	-,+	+, -	+	+	+	0
Noise	0	0	0	0	0	0	-

The results of the final regressions are on Tables 3-9 and 3-10 .The results of the auxiliary regressions are in Appendix B. Each set of final regressions will be analyzed separately, below.

Regression Results: Closed Trusts

The estimates of R^2 range from a low of .11 (Amoco, Atlantic Richfield) to a high of .57, (IBM, Philip Morris) suggesting there is a great deal of diversity among the trusts. For eight of the trusts the estimate of R^2 is less than .15, suggesting that the model performs very poorly for these trusts (Amoco, Atlantic Richfield, Coca Cola, Exxon, Merck, Mobil, and Proctor and Gamble). The low R^2 suggests that any premiums observed were not systematic, or that possible variables that would explain them were not included in the model. On the other hand, for nine of the trusts, the model performed fairly well, with coefficients of determination in excess of .3. (American Express, Dow Chemical, Kodak, Ford, GM, IBM, Johnson and Johnson, Philip Morris, and Xerox).

The intercepts for twenty-five of the twenty-six closed trusts are positive and significantly different from zero. As was previously noted, all of the variables in the model are expressed in deviation form. Consequently, the intercept is equal to the average premium for each trust. If all of the other variables are at their average value, a significant premium remains. A positive intercept is consistent with the predictions of the transactions costs and market completeness theories. These hypotheses are supported if a positive premium exists even if the other variables have no impact.

As was previously noted, the interpretation of the coefficient of (X/T) depends on whether the average value is greater than or less than one. The average of X/T is greater than one for nine trusts: American Express, Dow Chemical, Kodak, General Electric, General Motors, Hewlett Packard, IBM, Sears, and Xerox. If the premium on these trusts is maximized at X/T=1, then the coefficient of X/T should be negative and the coefficient of $(X/T-1)^2$ should be positive. This is the case for American Express and Dow Chemical. The premiums for these two trusts are maximized when X/T=1.

When the average of X/T is less than one, scores written on the trust were, on average, in the money. For seventeen trusts, the average of X/T was less than one: American Home Products, AT&T(2), Amoco, Atlantic Richfield, Bristol Myers, Chevron, Coca Cola, DuPont, Exxon, Ford, GTE, Johnson and Johnson, Merck, Mobil, Philip Morris, Proctor and Gamble and Union Pacific. If the premiums for these trusts are maximized at X/T=1, then the coefficient of X/T should be positive and the coefficient of $(X/T-1)^2$ should be negative. The coefficients are both of the correct sign and are statistically significant for: Chevron and Merck. The coefficients have the correct sign, but are not significant for: AT&T(2), Atlantic Richfield, Coca Cola, and GTE.

Thus, for nine of the twenty-six trusts, the signs of the coefficients of X/T and $(X/T-1)^2$ were consistent with the hypothesis that the premium is maximized at X/T=1. This is supportive evidence for the hypothesis that heterogeneous expectations causes primes and scores to sell at a premium.

For seven trusts: DuPont, Ford, General Motors, Hewlett Packard, Philip Morris, Sears, and Union Pacific, the signs of the coefficients of X/T and $(X/T-1)^2$ are both negative. This indicates that the premium is maximized when X/T is less than one. (The score is in-the-money).[7] With the exception of Hewlett Packard, the maximum is reached before the score is deep in-the-money.[8]

For three trusts: Bristol Myers, Kodak, and Proctor and Gamble, the coefficient of X/T was zero and the coefficient of $(X/T-1)^2$ was negative. This also indicates that the premium is maximized at X/T=1.

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[7]The equation for a parabola concave to the origin and centered at one is: $y = a + bx - c(x-1)^2$. The sign of the first derivative of the equation must be positive, (or zero); the sign of the second derivative must be negative. If b is negative, the sign of the first derivative is positive if x is greater than 1 - b/2c. The function if maximized when $x = 1 - b/2c$, which is less than one. Although all of the variables are expressed in deviation form, when n gets large, x is maximized at the point noted above. It should also be noted that when b=0, the first derivative is positive when x is less than one, and the function is maximized when x=1.

[8]The values of X/T for which the premium was maximized were: DuPont, .9604; Ford, .9406; GM, .919; Hewlett Packard, .629; Philip Morris, .976; Sears, .893; and Union Pacific, .826. The highest value of X/T attained for Philip Morris was .929. The lowest value of X/T attained for Hewlett Packard was 1.05. Therefore, these maximums were projected.

The signs of the coefficients of X/T and $(X/T-1)^2$ were both positive for American Home Products and for Exxon. The value of X/T was never greater than one for either trust. The highest value of X/T attained for Exxon was .666; the highest attained by American Home Products was .935. Therefore, a maximum could not be reached.

Thus, the data support the hypothesis that the premium is maximized when the score is at or out-of-the-money. Therefore, it may be, at least partially, due to heterogeneous expectations.

The time to maturity variable is significant and negative for ten of the trusts: American Express, Amoco, Bristol Myers, Dow Chemical, DuPont, Kodak, Ford, General Motors, GTE, and Xerox. Thus, when the time to maturity of the trust is less than the average maturity of the trust, the spread between the prime, score and underlying stock price increases. It would be expected that the premium would decline with maturity because the prime and score will, at that time, be converted into shares of stock. Moreover, there should be less difference of opinion with regard to the expected stock price at maturity as the expiration date of the trust approaches. The increase in the premium as time to maturity approaches may reflect noise trading in the underlying stock, which is unrelated to the time remaining to maturity. As was previously noted, if noise trading drives the underlying stock price below its true value, while prime and score prices remain at, or above, their true values, the premium will increase. Noise trading may coincidentally be driving the price of the underlying stock down as the trusts approach maturity. It should be noted that most of the trusts had approximately one year to one and a half years left to maturity on March 29, 1991. (Most will expire in the Spring or Summer of 1992 (or earlier)). Maintaining a risk-free hedge may still be too expensive for arbitrageurs to force the prices of primes and scores down to their value. Also, arbitrageurs may be unwilling to undertake a risky short term hedged position.

In contrast, the sign of time to maturity variable is positive for six of the trusts,(AT&T, Chevron, Exxon, IBM, Johnson and Johnson, and Philip Morris) This is consistent with the heterogeneous expectation and market completeness hypotheses. The premium for these trusts declined when time to maturity was less than its average value. This indicates that there was more agreement about the expected value of the underlying stock as maturity approached. Also, if investors are paying a premium for the unique payoffs offered by primes and scores, the premium should be positively related to how long the investor can "use" the unique asset. Therefore, the premium should decline with time to maturity if primes and scores help to complete the market.

The logarithms of primes and scores weekly volume of trading were highly positively correlated. Consequently, the volume of the prime adds little to the final regression model.

The logarithm of score volume contributed positively to the premium for eleven trusts (i.e. when the volume of trading was higher than average, the premium was higher, and when it was less than average, it was lower). The eleven trusts are: American Express, AT&T(2), Bristol Myers, Chevron, Dow Chemical, Kodak, Hewlett Packard, IBM, Mobil, Sears, and Xerox. The logarithm of the volume of score trading was inversely related to the premium of two trusts and was zero for the remaining eleven. Overall, the data again show some support for the heterogeneous expectation hypothesis, since volume of trading has been linked to the degree of heterogeneity in the market. The data also indicate that the premium is not the result of an illiquid market, which might cause non-synchronous prices. If that were the case, the sign of the volume variable would be negative; the premium would increase as trading volume decreased below its average. The premium would be maximized when trading volume was zero.

The coefficient of the two-week return is negative and significant for twenty-five of the twenty-six trusts. This is the most striking result of the regressions. It implies that when the two week return of the stock is greater than average, (prices are rising), the premium decreases and when it is less than average, (prices are falling),it decreases. Other researchers have shown that there is an inverse relationship between stock prices and the variance of stock prices. Thus, when prices are rising, volatility may fall below its average level. At the same time, the premium decreases. On the other hand, when prices are falling, the volatility of the stock rises. At the same time, the premium rises. This would suggest that the premium is due to the score since the price of the score would rise and fall directly with volatility.

This relationship between the premium and two week return may also indicate that the noise trading contributes to the premium of every trust but one. The noise trading hypothesis suggests that noise traders force prices away from their values and that risk averse arbitrageurs with short term horizons will not enter the market to bring the price back to their value because noise traders may cause the spread to increase, with losses resulting for the arbitrageurs. Noise trading may force stock prices up or down. If the underlying stock price rises above its value, holders of primes and scores could swap units for stock and immediately benefit by selling the stock. If the stock price falls below its fundamental value while primes and scores are at their value, arbitrage will not take place. The premium will increase if noise trading continues to force the stock price below its value. As it rises back to its value,(returns fall), the premium will decline.

An alternative explanation for the negative coefficient of the two week return is that the premium and the volatility of the underlying stock are positively related. When the two week return falls below its average, the price of the stock must be falling. However, the price of the stock and the volatility of the stock are inversely related. Consequently, as the stock price falls, the two week return falls, and volatility rises. However, as the two week return falls below its average, the premium rises. When the two week return rises above its average, the premium falls. Therefore, the premium and the volatility of the stock are positively related.

Regression Results: Open Trusts

Since the supply of units can be increased when trusts are open, premiums can be arbitraged by tendering shares to a trust and simultaneously selling the prime and score. There is a fee associated with tendering shares to the trusts, so some positive premiums may persist even when the trusts are open if the premiums do not exceed the cost of tendering shares.

Trading on when issued basis is a second reason a premium might arise for open trusts. When this occurred, payment for the primes and scores did not have to be made until the trusts became effective. Also, investors were able to hold their shares and not tender them to the trust until it became effective.

The regression models performed fairly well when applied to the open trusts. For thirteen trusts, the coefficient of determination, R^2 was greater than .25. (Chevron, Coca Cola, Dow Chemical, Kodak, Ford, GM, GTE, IBM, Johnson and Johnson, Merck, Mobil, Proctor and Gamble, and Xerox) The highest coefficient of determination (R^2) was for Coca Cola, it was .693. For six trusts, the model had little explanatory power. These models had R^2 that were less than .15 (American Express, Amoco, Bristol Myers, Exxon, General Electric, and Union Pacific). However, each model had a least one term that was statistically significant.

A positive intercept would be consistent with the premium not exceeding the transactions costs that would be incurred to take advantage of an arbitrage opportunity as well as with the when-issued trading explanation. If the costs of arbitrage alone explain the premium, then no other variable should be significant.

If when-issued trading explains the premium, then the intercept might be positive or zero. The coefficient of the time to maturity variable should be positive because the premium should fall to zero when trading became effective, and the number of years to maturity declined. Since most of the trusts were issued during the bull market of 1987, the underlying stock prices were rising during the early weeks of the trust. Consequently, X/T was initially falling for all of the trusts. If the premium was falling at the same time because the trusts became effective, there may be a statistical relationship between the variables (X/T) and $(X/T-1)^2$ and the premium which is not really economically significant. If the signs of X/T and $(X/T-1)^2$ are non-zero, a negative coefficient for the X/T variable and a positive coefficient for the $(X/T-1)^2$ variable would indicate that the premium was minimized around X/T=1 (when the average of X/T is less than one. If the average of X/T was greater than one, the coefficient of $(X/T-1)^2$ would be positive if a minimum was attained.) The sign of the coefficient of the two week return should be zero if the when-issued trading caused the premiums.

Summary of Results

The intercept is positive for twenty-one trusts indicating that there is a range in which arbitrageurs are willing to let prices deviate without entering the market. For one trust, American Home Products, the intercept is not significantly different from zero. The most striking result here is that all intercepts are either zero or positive. Although a small discount might be expected due to the transactions costs associated with tendering shares to the trust, it is not, on average, reflected in the prices of primes and scores.

However, the positive intercept is consistent with the when-issued trading explanation. If trading on a when-issued basis did cause a premium, one would expect it to decrease over time. For ten of the trusts, the sign of the coefficient of the time to maturity variable is positive and significant. For the remaining trusts, it is insignificantly different from zero. Again, these results are consistent with the when issued trading explanation.

For fourteen of the trusts, the coefficient of (X/T) was significant and negative (American Express, Amoco, Coca Cola, Kodak, Ford, GM, GTE, IBM, Johnson and Johnson, Merck, Mobil, Proctor and Gamble, Sears, and Xerox). This is not inconsistent with the when-issued trading explanation. As was noted above, the stock prices for many of the stocks underlying the trust were rising during the time the trusts were open. Therefore, X/T would be falling while when issued trading was allowed. For four of the twelve trusts the sign of the coefficient of $(X/T-1)^2$ was also negative indicating that the premium for these trusts was minimized when X/T=1.

The two week return of the underlying stock was negatively related to the premium for fourteen of the trusts, and was not related to the premium of the remaining trusts. This result is consistent with the noise trading hypothesis previously discussed. However, noise trading should have no impact upon arbitrageurs willingness to exploit the premium when trusts are open since premiums and discounts could be taken advantage of (unless the trust was in the money). However, stock prices and the variance of the stock prices are inversely related. When the two week return falls below its average, the price of the stock must be falling, and the variance of the price must be rising. If the premium rises as the two week return falls below its average, it is possible that the premium is positively related to volatility for open as well as closed trusts.

Conclusions

Primes and scores provide an example of "repackaged" cash flows commanding a premium in the market. However, the premium is not uniform across trusts or through time. Approximately half of the trusts sell at premiums which exceed estimates of the effect of bid-ask spreads, non-synchronous prices, and broker's fees on prices. The premiums persist because the costs of maintaining the long term short positions necessary for arbitrage are too high. Short term hedge positions, held until price deviations dissipate do not appear to be profitable, and, in fact seem to be risky since premiums do not shrink to zero in a predictable way. At times the premium increases, or they may decline to near zero only to jump again.

The premiums that arose while the trusts were open appear to be the result of an institutional trading practice: when-issued trading. However, the evidence for closed trusts is far less conclusive. The empirical results do, however, indicate that there are several plausible causes for the premium at which primes and scores sell to the underlying stock. The results of the regression consistently suggest that primes and scores are unique assets and help to complete the market. They may be perceived to be unique in and of themselves, or because they reduce the transactions costs that would be incurred to create the payoff structure they offer synthetically. The evidence also strongly suggests that noise trading in the underlying stock may contribute to the existence of a premium. It also indicates that the volatility of the underlying asset may be an important contributing factor. This noise trading hypothesis also explains why arbitrageurs do not exploit these price deviations in the short run. Finally, the empirical results suggest that heterogeneous expectations of investors plays an important role in generating a premium.

Table 3-1
Description of Trusts

Trust	Termination Claim[a]	Initiation Date	Closing Date	Expiration Date	No. of Units (Millions)
American Exp.	$ 50	07/87	06/88	08/92	7.500[b]
Amer.Home Prod.	45	12/86	11/87	12/91	4.116
AT&T(2)	30	02/87	04/87	02/92	10.000[b]
Amoco	52.50	04/87	03/88	03/92	6.421
Atlantic Rich.	116	07/87	05/88	07/92	2.353
Bristol Myers	55	02/87	01/88	02/92	5.831
Chevron	75	06/87	05/88	07/92	4.427
Coca Cola	28	07/87	06/88	07/92	5.000[b]
Dow Chemical	73.33	04/87	03/88	05/92	4.527
DuPont	36.67	01/87	12/87	03/92	12.030
Eastman Kodak	61.33	05/87	04/88	04/92	3.048
Exxon	60	09/85	08/86	09/90	5.500
Ford	52	05/87	04/88	06/92	7.556
GE	70	04/87	04/88	05/92	14.987
GM	53.50	07/87	05/88	06/92	7.808
GTE	22	06/87	05/88	07/92	7.500[b]
Hew. Packard	90	07/87	06/88	07/92	3.879
IBM	210	07/87	06/88	06/92	9.999[b]
J&J	59	08/87	06/88	04/92	9.103
Merck	66.67	03/87	03/88	04/92	9.103
Mobil	60	07/87	06/88	06/92	5.960
Phil. Morris	27.50	07/87	06/88	07/92	11.017
P&G	52.50	05/87	04/88	06/92	4.583
Sears	64	06/87	05/88	07/92	5.365
Union Pacific	87	05/87	04/88	04/92	1.681
Xerox	97	07/87	06/88	07/92	1.658

[a] All termination claims are split adjusted.
[b] These trusts were fully subscribed.
Source: Americus Shareholder Corporation

Table 3-2
Statistics for Premium[a,b]
Weekly Data from Trust Initiation - March 29, 1991

Trust	No. of Weeks	Median	Average	Standard Deviation	t
Amer.Exp.	194	$ .500	$ .535	$ .575	12.111
Am.HomeProd.	223	.625	.753	1.085	10.364
AT&T(2)	215	.750	.847	.706	17.591
Amoco	208	.750	.896	1.270	10.245
Atl.Rich.	194	.500	.544	.945	8.028
Br.Myers	214	1.000	1.284	1.803	10.418
Chevron	198	.500	.619	.848	10.271
Coca Cola	194	.250	.517	1.453	4.956
Dow Chem.	206	1.500	2.349	2.850	11.830
DuPont	218	.750	.421	2.880	2.143
E.Kodak	205	1.313	1.993	2.117	13.479
Exxon[c]	262	.125	.210	.879	3.867
Ford	201	1.250	1.500	1.917	11.093
GE	207	1.250	1.329	1.695	11.281
GM	194	.750	.870	1.304	9.293
GTE	197	.375	.424	.802	7.417
Hew.Pack.	192	.375	.505	.783	8.937
IBM	193	.875	1.424	1.654	11.961
J&J	190	.875	1.218	1.475	11.382
Merck	210	.750	1.074	2.948	5.282
Mobil	196	.375	.469	.699	9.393
Phil.Morris	192	2.125	3.365	4.034	11.558
P&G	201	.625	.698	1.055	9.381
Sears	197	.250	.290	.646	6.294
Un.Pacific	204	.625	.633	.853	10.651
Xerox	192	.625	.641	.895	9.924

[a]Premium=Prime+Score-Stock
[b]All premiums are split adjusted.
[c]Expired, September 1990

Table 3-3
Statistics for Premium[a,b]
Weekly Data from Trust Initiation to Closing

Trust	No. of Weeks	Median	Average	Standard Deviation	t
American Exp.	50	$ .625	$ .593	$ .491	8.540
Am. HomeProd.	51	.500	.294	1.171	1.792
AT&T(2)	6	Not enough observations for analysis			
Amoco	51	.625	.502	.995	3.600
Atl. Rich.	44	.750	.773	1.062	4.828
Bristol Myers	42	.563	.438	1.286	2.207
Chevron	47	.875	.790	.645	8.396
Coca Cola	48	1.313	1.979	2.018	6.794
Dow Chemical	49	.875	1.099	2.779	4.906
DuPont	47	.750	1.109	2.779	2.736
E. Kodak	51	1.125	1.442	1.747	5.895
Exxon	49	.875	.691	.549	8.811
Ford	48	.688	.802	1.250	4.445
GE	51	1.500	1.017	1.533	4.738
GM	47	.750	.787	1.561	3.456
GTE	48	.875	.805	.437	12.762
Hew.Pack.	47	.375	.548	.807	4.655
IBM	48	1.375	1.633	1.360	8.319
J&J	45	.375	.583	1.100	3.555
Merck	52	2.000	2.792	3.368	5.978
Mobil	48	.375	.362	.721	3.478
Phil. Mo.	46	1.063	1.011	1.743	3.933
P&G	50	1.975	1.143	1.218	6.636
Sears	48	.625	.625	.613	7.064
Union Pacific	51	1.000	.784	.933	6.020
Xerox	45	.875	1.050	1.049	6.714

[a]Premium= Prime+Score-Stock
[b]All premiums are split adjusted

Table 3-4
Statistics for Premium[a,b]
Weekly Data from Closing of Trust to March 29, 1991

Trust	No. of Weeks	Median	Average	Standard Deviation	t
American Exp.	144	$ .500	$ .506	$ .602	10.086
Amer.Home Prod.	172	.750	.889	1.022	11.406
AT&T(2)	209	.750	.832	.684	17.585
Amoco	157	.750	1.018	1.325	9.628
Atlantic Rich.	150	.375	.485	.902	6.603
Bristol Myers	172	1.000	1.491	1.854	10.547
Chevron	151	.375	.565	.897	7.740
Coca Cola	146	.000	.037	.742	.602
Dow Chemical	157	1.750	2.738	3.045	11.267
DuPont	171	.750	1.032	1.339	10.078
E.Kodak	154	1.625	2.175	2.201	12.263
Exxon[c]	213	.000	.099	.904	1.598
Ford	153	1.500	1.719	2.037	10.438
General Elec.	156	1.187	1.430	1.738	10.276
General Motors	147	.750	.896	1.216	8.934
GTE	149	.125	.301	.854	4.302
Hewlett Packard	145	.375	.491	.778	7.599
IBM	145	.875	1.355	1.793	9.100
Johnson&Johnson	145	1.250	1.415	1.523	11.187
Merck	158	.375	.466	2.517	2.319
Mobil	148	.500	.504	.690	8.886
Philip Morris	146	2.750	4.107	4.264	11.638
Proctor&Gamble	151	.500	.553	.953	7.178
Sears	149	.125	.182	.620	3.583
Union Pacific	153	.625	.583	.822	8.830
Xerox	147	.500	.515	.805	7.756

[a]Premium=Prime+Score-Stock
[b]All premiums are split adjusted.
[c]Expired, September 1990.

Table 3-5a
Test of Market Efficiency[a]
Weekly Data from Trust Initiation to March 29, 1991

Trust	No. of Weeks	5% Cutoff[b]	No. of Obs.> Cutoff	Percent of Obs.>Cutoff Actual	Predicted
Am.Exp.	194	$ - 0.500	87	44.84	13.07
Am.HomePr.	223	- 3.044	3	1.34	12.39
AT&T(2)	215	- 1.875	9	4.19	12.56
Amoco	208	- 2.069	34	16.35	12.72
AtlRich.	194	- 1.575	24	12.37	13.07
Bris.My.	214	- 1.875	59	27.57	12.59
Chevron	198	- 0.856	72	36.36	12.97
Coca Cola	194	- 1.800	20	10.31	13.07
Dow Chem.	206	- 2.203	74	35.92	12.77
DuPont	218	-10.550	1	.46	12.29
E.Kodak	205	- 2.781	62	30.24	12.79
Exxon[c]	262	- 1.505	12	4.58	11.70
Ford	201	- 2.813	48	23.88	12.89
GE	207	- 6.725	1	.48	12.65
GM	194	- 2.000	30	15.46	13.07
GTE	197	- 1.650	15	7.61	12.99
Hew Pack	192	- 2.100	6	3.13	13.12
IBM	193	- 1.406	72	37.31	13.04
J&J	190	- 1.650	67	35.26	13.17
Merck	210	- 3.500	28	13.33	12.68
Mobil	196	- 1.088	34	17.35	13.02
Phil.Mo.	192	- 9.363	22	11.46	13.12
P&G	201	- 1.500	34	16.92	12.89
Sears	197	- 2.250	1	.51	12.99
Un. Pac.	204	- 2.113	6	2.91	12.77
Xerox	192	- 1.344	36	18.75	13.12

[a]All data are split adjusted.
[b]This number was obtained from the distribution of discounts. Ninety five percent of all discounts were below this point. This number is used as an estimate of brokers' fees, bid-ask spreads, non-synchronous prices, and other errors. Any premium that exceeded this point was assumed to be a "true" premium.
[c]Expired, September 1990.

Table 3-5b
Statistics for Premiums Exceeding 5% Cutoff[a,b,c]
Weekly Data from Trust Initiation to March 29, 1991

Trust	No. of Weeks	N of Obs.> Cutoff	Median	Average	Standard Deviation	t
Amer.Exp.	194	87	$ 1.000	$ 1.063	$ .863	11.489
Am.HmeProd.	223	3	4.250	4.542	3.895	2.018
AT&T(2)	215	9	2.750	2.958	2.855	3.108
Amoco	208	34	2.687	2.908	2.917	5.813
Atl.Rich.	194	24	1.738	2.175	2.480	4.296
Bris.Myers	214	59	3.250	3.648	3.270	8.569
Chevron	198	72	1.375	1.509	1.533	8.352
Coca Cola	194	20	3.625	3.969	3.442	5.157
Dow Chem.	206	74	4.781	5.366	4.849	9.519
DuPont	215	1	*	16.375	*	*
E.Kodak	205	62	4.500	4.718	4.178	8.892
Exxon[d]	262	12	2.188	2.448	2.415	3.511
Ford	201	48	3.751	3.982	3.901	7.072
GE	207	1	*	10.000	*	*
GM	194	30	2.563	3.021	3.268	5.063
GTE	197	15	2.250	2.350	2.064	4.410
HewPack	192	6	2.188	2.250	2.258	2.441
IBM	193	72	3.125	3.155	2.795	9.578
J&J	190	67	2.625	3.564	2.622	11.126
Merck	210	28	5.563	6.198	5.759	5.695
Mobil	196	34	1.251	1.511	1.671	5.273
Phil.Mo.	192	22	11.000	11.807	11.850	4.673
P&G	201	34	2.313	2.397	2.071	6.749
Sears	197	1	*	2.625	*	*
Un. Pac.	204	6	2.349	2.355	2.235	2.581
Xerox	192	36	1.688	1.951	2.072	5.650

[a] Premium=Prime+Score-Stock
[b] All premiums are split adjusted.
[c] The cutoff was obtained from the distribution of discounts. Ninety-five percent of all discounts were below this point. This number is used as an estimate of brokers' fess, and the price effects of bid-ask spreads, non-synchrounous prices and other errors. Any premium that exceeds this point was assumed to be a "true" premium.
[d] Expired, September 1990.

Table 3-5c
Statistics for Negative Premiums[a,b]
Weekly Data from Trust Initiation to March 29, 1991

Trust	No. of Weeks of Discounts	Percent of Full Sample	Negative Premiums 95 Centile	90 Centile
American Exp.	31	15.98	- 0.500	- 0.500
Amer.Home Prod.	40	17.94	- 3.044	- 1.475
AT&T(2)	8	3.72	- 1.875	- 1.975
Amoco	48	23.07	- 2.069	- 1.637
Atlantic Rich.	43	22.16	- 1.575	- 1.325
Bristol Myers	43	20.01	- 1.875	- 1.650
Chevron	42	21.21	- 0.856	- 0.750
Coca Cola	68	35.05	- 1.800	- 1.250
Dow Chemical	24	11.65	- 2.203	- 1.406
DuPont	41	18.81	-10.550	- 9.725
Kodak	24	11.71	- 2.781	- 1.562
Exxon[c]	98	37.40	- 1.505	- 1.125
Ford	36	17.90	- 2.813	- 1.288
General Elec.	30	14.49	- 6.725	- 3.288
General Motor	41	21.13	- 2.000	- 1.550
GTE	51	25.89	- 1.650	- 0.750
Hewlett Pack.	42	21.88	- 2.100	- 0.875
IBM	26	13.47	- 1.406	- 0.913
J&J	35	18.42	- 1.650	- 1.225
Merck	69	32.86	- 3.500	- 2.125
Mobil	42	21.43	- 1.088	- 0.838
Philip Morris	20	10.42	- 9.363	- 6.350
Proctor&Gamble	40	19.90	- 1.500	- 1.250
Sears	50	25.38	- 2.250	- 0.863
Union Pacific	39	18.93	- 2.113	- 1.250
Xerox	40	20.83	- 1.344	- 0.750

[a]Premium=Prime+Score-Stock
[b]All premiums are split adjusted.
[c]Expired, September 1990.

Table 3-6a
Sample Distribution of Negative Premiums[a,b]
Weekly Data from Trust Initiation to March 29, 1991

Trust	No.ofWeeks of Discounts[c]	Proportion of full Sample	UpperBound of Confidence Interval Proportion	UpperBound of Confidence Interval N of Weeks
Amer. Exp.	31	15.98%	21.13	41
AmHomeProd.	40	17.94	22.97	51
AT&T(2)	8	3.72	6.20	13
Amoco	48	23.07	28.79	60
Atl.Rich.	43	22.16	28.00	54
Bris.Myers	43	20.01	25.37	54
Chevron	42	21.21	26.90	53
Coca Cola	68	35.05	41.76	81
Dow Chem.	24	11.65	16.03	33
DuPont	41	18.81	23.99	52
E.Kodak	24	11.71	16.11	33
Exxon[d]	98	37.40	43.26	113
Ford	36	17.90	23.20	47
GE	30	14.49	19.29	40
GM	41	21.13	26.87	52
GTE	51	25.89	32.00	63
Hew Pack.	42	21.88	27.72	53
IBM	26	13.47	18.29	35
J&J	35	18.42	23.93	45
Merck	69	32.56	39.21	82
Mobil	42	21.43	27.17	53
PhilMorris	20	10.42	14.74	28
P&G	40	19.90	25.42	51
Sears	50	25.38	31.46	62
Un. Pac.	39	18.93	24.28	50
Xerox	40	20.83	26.57	51

[a]Premium=Prime+Score-Stock
[b]All premiums are split adjusted.
[c]The upperbound for p was computed as follows:
$p + 1.96\ SQRT(p(1-p)/n)$
[d]Expired, September 1990.

Table 3-6b
Statistics for Premiums Deleted From Sample [a,b,c]
Weekly Data from Trust Initiation to March 29,1991

Trust	No. of Weeks Deleted	Percent of Full Sample	Median	Average	Standard Deviation	t
Amer.Exp.	90	46.39	$0.000	$0.039	$0.261	1.417
Am.HomePr.	105	47.08	0.125	0.151	1.057	1.464
AT&T(2)	31	14.42	0.000	0.145	0.692	1.167
Amoco	114	54.81	0.125	0.114	0.881	1.382
Atl.Rich.	111	57.22	0.000	-0.016	0.603	-0.279
Bris.My.	109	50.93	0.000	0.160	1.162	1.420
Chevron	102	51.52	0.063	0.103	0.491	2.119
Coca Cola	166	85.56	0.000	0.067	0.710	1.831
Dow Chem.	75	36.41	0.188	0.166	0.785	1.831
DuPont	115	52.75	0.125	0.330	1.908	1.857
E.Kodak	64	31.22	0.094	0.075	0.778	0.771
Exxon[d]	250	95.42	0.000	0.119	0.767	1.546
Ford	90	44.78	0.188	0.150	1.741	0.817
GE	79	38.16	0.250	0.234	2.034	1.016
GM	101	52.06	0.000	0.038	0.759	0.506
GTE	138	70.05	0.000	0.111	0.684	1.906
Hew.Pack	107	55.73	0.000	0.033	0.629	0.538
IBM	71	36.79	0.000	0.083	0.571	1.225
J&J	94	49.47	0.438	0.153	0.781	1.899
Merck	160	76.19	0.125	0.254	2.631	1.122
Mobil	114	58.16	0.063	0.067	0.470	1.519
Phil.Mo.	50	26.04	0.500	0.280	2.778	0.713
P&G	110	54.73	0.000	0.055	0.724	0.797
Sears	135	68.53	0.000	0.036	0.578	0.734
Union Pac.	106	51.96	0.000	0.072	0.836	0.808
Xerox	103	53.65	0.125	0.056	0.577	0.985

[a]Premium=Prime+Score-Stock
[b]All premiums are split adjusted.
[c]Deleted premiums include: negative premiums (discounts), matching positive premiums and zero premiums.
[d]Expired, September 1990.

Table 3-6c
Statistics for Premiums Retained in Sample[a,b]
Trust Initiation to March 29,1991

Trust	No. of Weeks Retained	Percent Full Sample	Median	Average	Standard Deviation	t
Am Exp.	104	53.61	$0.875	$ 0.965	$0.399	24.664
AmHomePr.	118	52.91	1.250	1.280	0.791	17.578
AT&T(2)	184	85.58	0.875	0.965	0.638	20.517
Amoco	94	45.19	1.750	1.834	0.986	18.129
Atl.Rich.	83	42.78	1.125	1.284	0.799	14.728
Bris.My.	105	49.06	2.000	2.450	1.601	15.681
Chevron	96	48.48	1.000	1.167	0.803	1.239
Coca Cola	28	14.43	2.313	3.187	1.836	9.185
Dow Chem.	131	63.59	3.598	2.500	2.852	10.033
DuPont	103	47.91	1.625	1.866	1.097	17.265
E.Kodak	141	68.78	2.439	2.863	1.953	17.407
Exxon[c]	12	4.58	1.687	2.104	0.953	7.648
Ford	111	55.22	2.500	2.595	1.237	22.092
GE	128	61.83	2.000	1.990	0.986	22.834
GM	93	47.94	1.500	1.769	1.170	14.581
GTE	59	29.95	1.000	1.155	0.542	16.368
HewPack.	85	44.27	1.125	1.098	0.506	20.003
IBM	122	63.21	1.625	2.205	1.575	15.463
J&J	96	50.53	2.188	2.260	1.228	17.843
Merck	50	23.80	3.250	3.700	2.315	11.301
Mobil	82	41.84	0.875	1.029	0.568	16.405
Phil.Mo.	142	73.96	2.875	4.452	0.778	68.190
P&G	91	45.27	1.500	1.490	0.853	16.663
Sears	62	31.47	0.750	0.841	0.394	16.807
Un Pac.	98	48.04	1.125	1.203	0.496	24.024
Xerox	89	46.35	1.125	1.317	0.698	17.800

[a]Premium=Prime+Score-Stock
[b]All data are split adjusted.

Table 3-6d
Statistics for Non-Zero Premiums Deleted From Sample[a,b,c,]
Weekly Data from Trust Initiation to March 29, 1991

Trust	No. of Weeks Deleted[e]	Percent of Full Sample	Median	Average	Standard Deviation	t
Amer.Exp.	71	36.59	000	.039	.261	1.259
Am.HomePr.	97	43.50	.250	.160	1.099	1.466
AT&T(2)	21	9.77	.125	.214	.839	1.171
Amoco	104	50.00	.250	.124	.917	1.383
Atl.Rich.	93	47.94	-.125	-.019	.656	-.275
Bris. Myers	97	43.33	.250	.180	1.230	1.443
Chevron	93	46.97	.125	.113	.513	2.121
Coca Cola	148	72.29	.125	.075	.752	1.216
Dow Chem.	65	31.55	.250	.191	.842	1.833
DuPont	104	47.71	.250	.369	2.035	1.823
E.Kodak	58	28.29	.156	.083	.818	.772
Exxon[d]	222	84.73	.125	.134	.813	2.458
Ford	85	42.29	.250	.159	1.791	.817
Gen.Elec.	79	38.16	.250	.234	2.034	1.016
Gen.Motors	101	52.06	.000	.038	.759	.506
GTE	138	70.05	.000	.111	.684	1.914
Hew.Pack.	92	47.92	.125	.038	.678	.538
IBM	61	31.60	.250	.096	.615	1.222
J&J	88	46.32	.500	.163	.806	1.901
Merck	160	76.19	.125	.254	2.631	1.220
Mobil	99	50.51	.125	.077	.504	1.520
Phil.Morris	48	25.00	.500	.291	2.836	.713
P&G	90	44.78	.250	.068	.808	.799
Sears	114	57.87	.125	.043	.629	.734
UnionPac.	94	46.08	.125	.105	.809	1.258
Xerox	103	53.65	.125	.055	.577	.982

[a]Premium=Prime+Score-Stock
[b]All data are split adjusted
[c]Deleted premiums include: negative premiums(discounts), and matching positive premiums.
[d]Expired, September 1990.
[e]The number of weeks deleted may be more or less than the sum of discounts plus the upper bound shown on Table 6b due to the difficulty of matching premiums and discounts. However, the number of weeks deleted is always greater than twice the number of discounts.

Table 3-6e
Statistics for Premiums Retained in Sample[a,b]
Weekly Data from Trust Initiation to March 29, 1991

Trust	No. of Weeks Retained	Percent of Full Sample	Median	Average	Standard Deviation	t
Amer. Exp.	123	63.40	.875	.816	.507	17.845
Am.HomePr.	126	56.50	1.125	1.206	.828	16.357
AT&T(2)	194	90.23	.750	.915	.658	19.395
Amoco	104	50.00	1.500	1.675	1.075	15.889
Atl.Rich.	101	52.06	1.000	1.068	.874	12.286
Bris.Myers	117	54.67	1.750	2.200	1.690	14.074
Chevron	105	53.03	1.000	1.067	.835	13.094
Coca Cola	46	23.71	1.500	1.940	2.121	6.205
Dow Chem.	141	68.45	2.250	3.343	2.900	13.687
DuPont	114	53.02	1.500	1.686	1.180	15.256
E.Kodak	147	71.78	2.438	2.863	1.953	17.409
Exxon[c]	40	15.27	.000	.631	1.100	3.629
Ford	116	57.71	2.375	2.483	1.321	20.244
GE	128	61.84	2.000	1.990	.987	22.815
GM	93	47.94	1.500	1.769	1.170	14.576
GTE	59	29.95	1.000	1.155	.542	16.362
Hew.Packard	100	52.08	1.000	.934	.611	15.291
IBM	132	68.39	1.500	2.038	1.623	14.422
J&J	102	53.68	2.000	2.127	1.306	16.453
Merck	50	23.81	3.250	3.700	2.315	11.301
Mobil	97	49.49	.875	.870	.641	13.351
Phil Morris	144	75.00	2.813	4.390	3.856	13.661
P&G	111	55.22	1.125	1.200	.968	13.184
Sears	83	42.13	.625	.628	.501	11.426
UnionPac.	110	53.92	1.125	1.071	.600	18.718
Xerox	89	46.35	1.125	1.317	.698	17.800

[a]Premium=Prime+Score-Stock
[b]All premiums are split adjusted.
[c]Expired, September 1990.

Table 3-7
Ex Ante Trading Test of Efficiency
Daily Data from Initiation of Trust to December 29, 1989[a]

Trust	N of Trading Days	N of Trades	Profits Sum	Profits Avg.
Amer. Exp.	625	47	$ 3.000	.064
AHP	741	47	17.850	.380
AT&T(2)	711	39	7.250	.186
Amoco	675	52	25.650	.493
Atlantic Rich.	615		27.750	.841
Bristol Myers[b]				
Chevron	645	48	5.000	.106
Coca Cola	615	29	.375	.013
Dow Chemical	666	41	14.000	.341
DuPont	725	0	0.000	.000
Kodak	640	5	-.375	-.075
Exxon	1029	70	17.500	.250
Ford	640	46	13.625	.296
GE	679	63	18.625	.296
GM	615	4	5.250	1.220
GTE	655	39	3.625	.093
Hewlett Packard	603	55	.125	.002
IBM	621	45	6.750	.150
J&J	555	41	10.750	.262
Merck	689	64	24.500	.383
Mobil	633	53	9.375	.180
Philip Morris	616	21	15.375	.732
Proctor&Gamble	624	51	23.500	.461
Sears	655	40	3.000	.077
Union Pacific	657	45	11.625	.258
Xerox	552	38	3.375	.089

[a] All data are split adjusted.
[b] Bristol Myers is missing because the stock price data could not be retreived from the CRSP tapes.

Table 3-8a

Table 3-8 is in the text of Chapter three

Table 3-9a
Stepwise Regressions for Closed Trusts
(From Week Trust Closed to March 29, 1991)

Trust	N of Wks.	Inter-cept	X/T	$(X/T-1)^2$	Time to Mat	Log of ScVol	Log of PrVol	2-Wk Ret.	R^2
Amer.	144	.516	-.771	.368	-.327	.230	.007	-3.182	.433
Exp.		(13.359)	(-6.862)	(1.098	(-4.761)	(3.865)	(.134)	(-4.336)	(17.45)
Amer.	172	.909	4.941	74.891	-.015	-.193	-.176	-7.052	.280
Home Pr.		(13.467)	(4.796)	(16.543)	(-.184)	(-2.400)	(-2.889)	(-3.514)	(1.69)
AT&T(2)	209	.833	.130	-5.147	.163	.309	.079	-2.680	.204
		(19.371)	(.313)	(-1.087)	(4.109)	(4.925)	(1.247)	(-2.771)	(8.61)
Amoco	157	1.029	-.408	.358	-.461	.016	.019	-10.330	.111
		(10.170)	(-.327)	(.021)	(-2.903)	(.135)	(.209)	(-3.180)	(3.01)
Atl.	150	.475	.932	-9.322	.010	.027	.030	-8.789	.111
Rich.		(6.719)	(1.205)	(-1.175)	(.061)	(.368)	(.520)	(-3.848)	(3.01)
Bristol	172	1.490	1.167	-74.525	-.741	.552	-.068	-7.695	.230
Myers		(11.805)	(.757)	(-5.300)	(-2.809)	(2.935)	(-.414)	(-1.987)	(8.22)
Chevron	151	.517	1.834	-.128	.259	.405	.060	-2.10	.196
		(7.528)	(3.033)	(-5.882)	(1.794)	(4.503)	(.979)	(-1.158)	(5.83)
Coca	146	.037	.999	-2.963	-.102	.084	-.057	- 4.689	.139
Cola		(.632)	(2.917)	(-1.330)	(-.415)	(.869)	(-.819)	(-3.251)	(3.74)
Dow	157	2.738	-5.379	6.105	-2.381	.671	-.246	-17.257	.495
Chem.		(15.542)	(-6.764)	(1.268)	(-8.401)	(2.818)	(-1.210)	(-4.409)	(24.47)
DuPont	171	1.032	-1.298	-32.849	-.399	-.008	.024	-12.660	.226
		(11.251)	(-1.306)	(-2.410)	(-3.700)	(-.058)	(.292)	(-5.156)	(7.99)
Kodak	154	2.175	- .104	-23.352	-.935	.992	-.117	-13.427	.333
		(14.718)	(-.114)	(-2.928)	(-3.070	(6.330)	(-.753)	(-3.836)	(12.23)
Exxon	213	.099	3.171	69.902	.182	-.006	-.036	-5.28	.141
		(1.705)	(2.318)	(2.704)	(3.248)	(-.098)	(-.806)	(-3.140)	(5.63)
Ford	153	1.758	-1.077	-9.079	-1.910	-.149	-.011	-11.010	.319
		(12.588)	(-2.433	(-5.354	(-4.525)	(-.723)	(-.066)	(-3.558)	(11.38)
GE	156	1.430	-2.455	-6.046	.069	-.032	.242	-15.377	.184
		(11.160)	(-2.401)	(-.669)	(.371)	(-.173	(1.457)	(-5.018)	(5.51)

Table 3-9a (continued)

Trust	N of Weeks	Intercept	X/T	$(X/T-1)^2$	Time to Mat.	Log of ScVol	Log of PrVol	2-Wk. Ret.	R^2
GM	147	.887	-1.850	-11.423	-.834	-.165	-.033	-9.521	.404
		(11.250)	(-3.556)	(-3.313)	(-6.434)	(-1.254)	(-.304)	(-5.359)	(15.90)
GTE	149	.301	1.575	- 8.283	-.379	.046	.030	-6.067	.200
		(4.715)	(2.076	(-1.07 0	(-4.042)	(.549)	(.347)	(-3.650)	(5.92)
Hewlett	145	.490	-.486	-.655	.053	.408	.051	-2.338	.297
Packard		(8.865)	(-3.963)	(-2.524)	(.376)	(5.414)	(.797)	(-2.501)	(9.74)
IBM	145	1.35	2.542	-1.164	2.154	.948	-.225	-2.652	.572
		(14.041)	(4.766)	(-.324)	(10.330)	(7.203)	(-1.372)	(-1.065)	(30.74)
J&J	145	1.415	-3.256	9.267	.766	.041	-.003	-12.816	.346
		(13.538)	(-5.835)	(3.362)	(2.492)	(.260)	(-.022)	(-4.628)	(12.17)
Merck	158	.466	6.442	-48.156	-.311	.050	.379	-14.621	.141
		(2.456)	(2.949)	(-2.329)	(-.861)	(.158)	(1.391)	(-2.784)	(4.10)
Mobil	148	.510	-1.260	-4.910	-.059	.165	.063	-5.005	.119
		(9.367)	(-1.543)	(-.404)	(-.737)	(2.425)	(.824)	(-3.043)	(3.15)
Philip	146	4.107	-4.346	-92.385	6.452	-.795	.234	-33.898	.572
Morris		(17.420)	(-2.592)	(-7.626)	(9.153)	(-2.029)	(.846)	(-5.696)	(30.99)
P&G	151	.553	.415	-7.803	-.077	.052	.053	-6.746	.102
		(7.335)	(.878)	(-2.035)	(-.291)	(.482)	(.764)	(-3.272)	(2.75)
Sears	149	.182	-.218	-1.023	-.150	.236	.021	-3.767	.196
		(3.906)	(-1.804)	(-2.614)	(-1.298)	(3.165)	(.393)	(-3.576)	(5.79)
Union	153	.574	-4.189	-12.054	.119	.062	.063	-7.035	.298
Pacific		(10.119)	(-6.045)	(-1.503)	(1.581)	(.800)	(1.434)	(-4.243)	(10.33)
Xerox	147	.515	-.737	-.187	-.413	.223	-.091	-5.467	.389
		(9.724)	(-6.006)	(-.682)	(-3.770)	(2.764)	(-1.504)	(-5.340)	(14.86)

Table 3-9b
Stepwise Regressions for Closed Trusts
(From Week Trust Closed to March 29, 1991)
Positive Premiums

Trust	N of Weeks	Inter-cept	X/T	$(X/T-1)^2$	Time to Mat.	Logof ScVol	Logof PrVol	2 Wk Ret	R^2
American	103	.738	-.644	-.052	-.283	.218	.088	-2.891	.438
Express		(19.162)	(-5.150)	(-.152)	(-3.882)	(3.965)	(1.698)	(-3.835)	(12.49)
Amer.Home	144	1.177	4.398	66.686	-.160	-.144	-.150	-7.072	.329
Products		(18.922)	(4.761)	(4.347)	(-2.021)	(-1.947)	(-2.739)	(-3.784)	(11.01)
ATT(2)	191	.927	-.288	-7.729	.121	.328	.074	-2.524	.224
		(22.973)	(-.733)	(-1.731)	(3.241)	(5.509)	(1.251)	(-2.688)	(8.86)
Amoco	116	1.570	-1.454	3.391	-.139	-.005	.024	-5.160	.041
		(15.554)	(-1.166)	(.203)	(-.901)	(-.04)	(.249)	(-1.538)	(0.77)
Atlantic	102	.912	.745	-13.429	.128	.023	-.101	-5.144	.116
Richfield		(13.08)	(.967)	(-1.600)	(.777)	(.329)	(-1.557)	(-2.414)	(2.08)
Bristol	131	2.106	-2.071	-69.145	-.922	.593	-.017	-5.788	.223
Myers		(15.323	(-1.078)	(-3.817)	(-3.019)	(2.995)	(-.100)	(-1.273)	(5.91)
Chevron	107	.901	.386	9.370	.324	.360	-.014	-.967	.161
		(11.003)	(.568)	(1.284)	(1.923)	(3.630)	(-.193)	(-.469)	(3.19)
Coca	66	.598	.507	4.021	.026	.081	.111	-3.258	.172
Cola		(9.668)	(1.307)	(1.744)	(.092)	(.710)	(1.408)	(-2.237)	(2.04)
Dow Chem.	134	3.125	-4.432	2.806	-2.471	.769	-.469	-19.375	.490
		(16.446)	(-4.594)	(.513)	(-8.301)	(2.897)	(-2.071)	(-4.378)	(20.35)
DuPont	129	1.516	-.030	-55.087	-.510	-.053	.116	-8.115	.310
		(17.456)	(-.040)	(-4.353)	(-4.699)	(-.412)	(1.397)	(-3.429)	(9.15)
E.Kodak	131	2.635	-.572	-15.109	-1.508	1.069	-.283	-13.883	.412
		(18.721)	(-.641)	(-2.007)	(-5.036)	(6.045)	(-1.816)	(-4.168)	(14.50)
Exxon	94	.781	.908	-5.370	- .040	.095	-.083	- 5.364	.086
		(9.564)	(.527)	(-.153)	-(.533)	(.865)	(-1.382)	(-2.223)	(1.36)
Ford	126	2.285	.860	-8.220	-1.510	-.127	-.036	-8.420	.306
		(18.738)	(1.747)	(-5.054)	(-4.033)	(-.737)	(-.249)	(-2.650)	(8.75)
General	131	1.861	-1.252	-4.230	.290	-.090	.243	-12.939	.194
Electric		(16.511)	(-1.338)	(-.495)	(1.757)	(-.568)	(1.689)	(-4.635)	(4.96)

Table 3-9b (continued)

Trust	N of Weeks	Inter-cept	X/T	$(X/T-1)^2$	Time to Mat	Logof ScVol	Log of Pr.Vol.	2Wk Ret.	R^2
General Motors	109	1.344	-1.171	-11.977	-.609	-.258	-.064	-7.926	.316
		(15.893)	(-1.821)	(-2.749)	(-4.165)	(-1.743)	(-.541)	(-3.952)	(7.86)
GTE	78	.833	.790	-21.410	-.540	.045	.103	-4.560	.340
		(11.380)	(.981)	(-2.679)	(-4.809)	(.437)	(.999)	(-2.156)	(6.18)
Hewlett Packard	103	.818	-.336	-.846	-.130	.303	.031	-2.012	.358
		(17.264)	(-2.824)	(-3.709)	(-1.066	(5.038)	(.064)	(-2.231)	(8.93)
IBM	110	1.893	3.419	-7.134	2.185	.894	-.150	-.772	.588
		(18.136)	(5.993)	(-1.839)	(8.149)	(6.365	(-.813)	(-.276)	(24.49)
Johnson& Johnson	119	1.839	-3.461	3.327	.120	.036	.129	-10.100	.367
		(18.824)	(-6.954)	(1.244)	(.398)	(.240)	(.793)	(-3.781)	(10.84)
Merck	93	1.728	-1.242	11.341	-.250	.055	.062	-10.570	.071
		(10.481)	(-.671)	(.662)	(-.760)	(.227)	(.270)	(-2.253)	(1.11)
Mobil	109	.780	-.790	-13.737	.107	.123	.029	- 3.124	.105
		(14.707)	(-1.00)	(-1.214)	(1.396)	(1.792)	(.385)	(-2.055)	(2.00)
Philip Morris	130	4.949	-10.324	-69.287	5.552	-.598	.389	-34.771	.573
		(21.068)	(-6.157)	(-5.469)	(7.785)	(-1.539	(1.456)	(-5.637)	(27.45)
Proctor &Gamble	102	1.068	-.710	-8.438	-.275	-.002	-.048	-2.857	.108
		(15.007)	(-1.623)	(-2.289)	(-1.049)	(-.021)	(-.692)	(-1.446)	(1.92)
Sears	80	.566	-.252	-.886	-.182	.118	-.104	-2.011	.186
		(11.097)	(-1.631)	(-1.989)	(-1.644)	(1.489)	(-1.639)	(-1.572)	(2.78)
Union Pacific	114	.899	-1.645	3.776	-.022	.037	-.055	-3.891	.123
		(17.419)	(-2.376)	(.388)	(-.322)	(.549)	(-1.375)	(-2.633)	(2.50)
Xerox	103	.843	-.514	-.303	-.413	.120	-.045	-3.862	.276
		(15.519)	(-3.141)	(-.714)	(-3.696	(1.349)	(-.796)	(-3.183)	(6.10)

Table 3-10
Results of Stepwise Regressions
Weekly Data (Trust Initiation to Closing Date)

Trust	N of Weeks	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Two Week Return	R^2
American Express	50	.597	-.541	1.397	.587	-1.110	.137
		(8.491)	(-1.713)	(.657)	(1.491)	(-1.772)	(1.70)
American Home Products	51	.137	.200	.293	2.429	-5.068	.250
		(0.000)	(0.000)	(.058)	(3.604)	(-1.267)	(3.67)
AT&T(2)	6	NOT ENOUGH OBSERVATIONS FOR ANALYSIS					
Atlantic Richfield	44	.767	-.198	34.109	1.383	-3.188	.208
		(4.927)	(-.878)	(2.621)	(1.416)	(-.914)	(2.44)
Amoco	51	.454	-2.401	-2.122	.868	-2.424	.091
		(3.349)	(-1.845)	(-.126)	(.904)	(-.648)	(1.13)
Bristol Myers	42	.361	-1.893	-36.229	1.922	-1.094	.110
		(1.856)	(-.836)	(-1.109)	(1.523)	(-.253)	(1.08)
Chevron	47	.774	- .560	.277	2.599	-4.526	.415
		(10.018)	(-1.274)	(.095)	(4.314)	(-2.915)	(7.10)
Coca Cola	48	2.092	-13.177	3.182	2.782	-16.771	.693
		(11.842)	(-8.546)	(.169)	(1.968)	(-4.174)	(23.17)
Dow Chemical	49	1.123	1.022	40.570	.984	-11.026	.340
		(5.651)	(.463)	(2.094)	(1.160)	(-3.923)	(5.41)
DuPont	47	1.138	.643	-81.530	-1.594	-10.777	.173
		(2.794)	(.188)	(-2.225)	(-.724)	(-1.556)	(.101)
E. Kodak	51	1.498	-3.585	21.260	-.746	-8.559	.303
		(7.023)	(-2.680)	(2.093)	(-.510)	(-2.681)	(4.79)
Exxon	49	.672	1.547	-37.971	-.367	-6.148	.114
		(8.398)	(.670)	(-.763)	(-.770)	(-1.90)	(1.35)
Ford	48	.763	- 4.521	37.288	2.790	-1.330	.409
		(5.343)	(-3.515)	(2.947)	(2.949)	(-.579)	(7.09)
General Electric	51	1.020	-1.402	1.469	2.400	-6.100	.131
		(4.585)	(-.991)	(.127)	(1.420)	(-1.883)	(1.63)

Table 3-10 (continued)

Trust	N of Weeks	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Two Week Return	R^2
General Motors	47	.831 (4.261)	-2.700 (-2.097)	17.496 (1.957)	4.745 (3.417)	-7.197 (-2.429)	.377 (6.06)
GTE	48	.809 (15.783)	-1.578 (-2.111)	18.476 (1.564)	1.520 (4.588)	-1.842 (-1.638)	.431 (7.76)
Hewlett Packard	47	.517 (4.773)	-1.011 (-1.136)	10.718 (1.896)	1.253 (2.149)	-1.456 (-1.125)	.208 (2.63)
IBM	48	1.697 (9.455)	- 2.333 (-2.363)	-15.203 (-1.863)	3.897 (2.901)	-2.428 (-.683)	.299 (4.37)
Johnson & Johnson	45	.629 (4.045)	- 4.466 (-2.739)	29.290 (1.857)	.906 (1.046)	-4.153 (-1.524)	.252 (3.20)
Merck	52	2.786 (7.736)	- 6.328 (-2.299)	1.616 (.199)	- 3.014 (-2.120)	-36.959 (- 5.161)	.441 (9.19)
Mobil	48	.356 (4.418)	- 1.504 (-2.006)	18.782 (3.160)	1.246 (2.563)	-7.194 (-4.480)	.482 (9.79)
Philip Morris	46	1.00 (3.983)	5.462 (2.086)	-73.152 (-2.121)	1.275 (.607)	-3.359 (-.717)	.205 (2.52)
Proctor & Gamble	50	1.223 (7.578)	- 3.114 (-1.689)	5.905 (.234)	3.915 (2.866)	-7.217 (-2.145)	.265 (3.88)
Sears	48	.595 (7.277)	- 1.008 (-2.011)	-2.875 (-.444)	.667 (1.114)	- 2.498 (-2.161)	.194 (2.47)
Union Pacific	51	.733 (5.716)	- .109 (- .145)	.351 (.049)	1.229 (1.586)	-2.025 (-1.099)	.078 (0.93)
Xerox	45	1.064 (7.968)	- 2.952 (-3.948)	6.351 (1.052)	.993 (.807)	-5.613 (-2.733)	.394 (6.19)

CHAPTER FOUR

IS IMPLIED VOLATILITY MEAN REVERTING? A STUDY OF CALLS AND SCORES

Introduction

An option's implied standard deviation(ISD)(or implied volatility) represents the market's expectation of the risk of the underlying stock from the option's trading date to its expiration. There has been a substantial amount of theoretical and empirical study of the stochastic properties of implied standard deviation and the effect of a stochastic volatility parameter on the Black-Scholes option pricing model.

Recent empirical studies of ISD have focused on whether the time series properties of the ISD of short term options are consistent with the hypothesis that ISD is mean reverting. With the exception of Stein(1989), the results of these papers have generally supported this hypothesis (See, for example, Wiggins(1989), Merville and Piepta(1989), Poterba and Summers(1986)). In the short run, changes in ISD tend to be white noise, while in the long run, ISD tends to revert to an underlying mean. (Merville and Piepta(1989)). Poterba and Summers showed that shocks to volatility tend to decay quickly, and consequently, have the greatest impact on the ISD of short term options. In contrast, Stein (1989) has found evidence that changes in the volatility of longer term (two month)index options were too high to be consistent with the hypothesis that ISD is mean reverting.

This chapter is an empirical study of ISD. Its purpose is to examine the relationship between the ISD of long term and short term options at a given moment in time. The chapter will focus on examining two aspects of ISD. First, the ISDs of long-term and short-term options will be compared. It will be shown that the slope of the "term structure of ISD" may depend on whether expected returns on the underlying assets are independent or serially correlated. A second focus will be on whether short term options' volatilities are more sensitive to shocks than are long term options' volatilities. In this part of the chapter the hypothesis of mean reversion will be examined. This chapter will contribute to our understanding of how investors formulate their expectations of volatility and will improve our understanding of how long term options should be priced.

Long and short term options written on seventeen firms will be used in this chapter. This is the first time that the volatility of long term options is included in a study of ISDs. The long term options are SCORES (Special Claim on Residual Equity) which are five year European call options written on twenty-six trusts established by the Americus Shareholder Corporation. Scores are traded on the American Stock Exchange, and are considered to be stock for tax and trading purposes. Thus, they can be purchased on margin. Each score has a matching set of short term calls which trade on one of the option exchanges. These calls will be included in the study.

The chapter will be organized as follows: in section 2, there is a brief literature review; in section 3, there is a discussion of possible relationships between the ISD of short and long term options; in section 4 the data and methodology are described; in section 5, empirical results are presented and discussed. In the final section, some conclusions are drawn.

Literature Review

In recent years, there has been a substantial amount of work done related to the implied volatility of options on common stock. In their original model, Black and Scholes(1974) assumed that the asset underlying the option had a constant volatility. Although this assumption was necessary to obtain a closed form solution to their model, it was not intuitively appealing. Moreover, early tests of the Black-Scholes model suggested that the model produced biased values. As Galai(1977) noted, Rubenstein(1981) and MacBeth and Merville((1979)(1981)) found that out-of-the-money options with short maturities were consistently overpriced. However, at-the-money options were overpriced for one period studied but underpriced for the second subperiod. Time to maturity biases were similarly reversed. In addition, it has been found that the Black-Scholes model tended to overprice the options on high variance securities and underprice the options on low variance securities. Some of these biases have been attributed to the assumption of constant volatility, and researchers have tried to address them by adjusting the volatility. In any case, the Black-Scholes model has been found to work best for at the money options. Despite the aforementioned problems, no other model has yet been developed that consistently outperforms the Black-Scholes model. (See Galai (1977) and Smith (1980) for a summary of early papers related to option pricing models and empirical tests of the models).

Some early empirical studies of the Black-Scholes model focused on the characteristics of the volatility parameter. (See for example, Latane and Rendleman (1976), Schmalansee and Trippi(1978)). Latane and Rendleman studied the ISDs of the options of twenty four stocks trading on the Chicago Board of Options Exchange(CBOE) in 1973-1974. One of the main contributions of the paper was the development of a methodology to estimate ISDs by equating the model and market prices and solving numerically for the ISD. Latane and Rendleman also devised a weighting scheme to construct a weighted average of ISD (WISD) for options written on the same asset, trading at the same time. Weights were based on the partial derivative of the call price with respect to changes in the variance of the underlying asset. When the call option price is sensitive to changes in volatility, the partial derivative is relatively large and the variance receives a relatively large weight in the average. They reasoned that investors would carefully formulate estimates of volatility if the option price was sensitive to the estimate. Consequently, those estimates should receive greater weight in the average. Using weekly price data, they compared their estimated WISD's to the actual historical and future standard deviations of the underlying stock returns. In addition, they investigated the stability of the WISDs for individual stocks and the correlation of WISDs across stocks. They found that WISDs were better related to future standard deviations of stock returns, than to past standard deviations, suggesting that they were predictors of future volatility. Also, WISDs were correlated across stocks, suggesting that a systematic component exists in implied standard deviations.

Schmalansee and Trippi(1978) investigated the time series properties of ISDs. Using the methodology of Latane and Rendleman to estimate the ISDs, they used an arithmetic mean ISD rather than a weighted average as the focus of their analysis. Using daily closing prices for a set of six stocks and options, they found, as did Latane and Rendleman, that ISDs tended to vary across time and also tended to be cross correlated across stocks. They also found that some changes in volatility and stock prices were inversely related, while volatility tended to exhibit some variation that was totally unrelated to stock prices. More, recently, Haugen and Torous (1991) confirmed these results and also concluded that volatility is cyclical; periods where market volatility is high tend to be followed by periods in which it is low and vice versa.

Theoretical models of implied volatility have focused on adapting the Black-Scholes model to include a variable or non-constant variance parameter. Several models have been developed where the volatility parameter is non-constant, but not stochastic. In the constant elasticity of variance model, for example, volatility is a function of the price of the underlying asset. (Cox (1980)). Leland(1985) incorporated transactions costs into the Black-Scholes framework and showed that implied volatility can be an increasing function of time to maturity. In his model, the increase in ISD reflects the additional transactions costs that must be incurred to establish a dynamic hedging portfolio over a longer time horizon. Boyle and Vorst (1992), developed a similar model in the discrete time framework of the binomial option pricing model.

Several theoretical models with stochastic volatility parameters have been developed (Hull and White (1987), Johnson and Shanno (1987), Scott (1986), and Wiggins (1987)). A common element of all of these papers, is that the volatility of the underlying asset is added to the Black-Scholes framework as a second stochastic parameter. The volatility has its own variance (risk) which contributes to the risk of the option. Consequently, there are two types of risk that must be hedged in order to establish a zero risk portfolio: the risk that is associated with stock price itself, and the risk that is the result of changes in the variance. The risk of the stock price can be perfectly hedged. However, since the variance of the stock price is not a traded asset, it can not be perfectly hedged unless changes in the variance are perfectly correlated with a traded asset. Consequently, constructing a risk free portfolio (and using a risk-neutral valuation framework) to price an option with stochastic volatility is not possible whenever this risk is priced. In order to circumvent this problem, it is frequently assumed that volatility risk is diversifiable, or that it is uncorrelated with aggregate consumption.

If volatility risk is priced and a no-arbitrage argument cannot be applied, it is necessary to make additional assumptions about investors' risk preferences in order to price the option.(See Wiggins(1987)) Hull and White (1987), solved the Black-Scholes model with a stochastic volatility parameter. In their model, it was assumed that volatility was uncorrelated with the underlying stock price, and consequently, with aggregate consumption. Therefore, volatility risk had no systematic component and was unpriced. They showed that the price of a European call option depended on the average variance of the underlying asset. In their model the expected call price was the Black-

Scholes price using the mean volatility for the period (t,T). Since the option was European, only the mean volatility and not the path of the volatility was relevant. Tests indicated that the Black-Scholes model with a constant volatility parameter tended to have lower option values than the Hull-White model when average variance was low tended to overprice the options when average variance was high. This is also consistent with earlier empirical tests of the Black- Scholes model.

Also, relative to the Hull-White model, the Black-Scholes model tended to underprice at the money options, and overprice options that are deep-in-the money. The latter two effects were magnified when volatility and time to maturity increased. One implication of this is that when the Black-Scholes model is used to estimate ISDs, estimates of the ISDs of long term options will appear to be low. It should be noted that Hull and White did not use a dividend adjustment in their model. Such an adjustment may have affected their results since Whaley (1982) showed that dividend adjustments affect the option prices obtained from the Black-Scholes model.

Johnson and Shanno(1987) included mean reverting stock and volatility parameters in the Black-Scholes framework. In order to construct a zero risk portfolio, they assumed there existed a third asset with the same stochastic term as the variance of the stock. In their paper, they carefully examined the effect on option prices of the correlation between stock prices and volatility. In order to generate comparative statistics for their model, they simulated call prices under different conditions. They found that prices and volatility for out of the money and at the money options are highest when both variables are positively correlated. However, when time to maturity increases to four months, and the correlation between stock price and volatility changes from negative to positive, the price of in (out of) the money options declines (increases). At the money options are insensitive to changes in the sign of the correlation between the two stochastic parameters.

Scott(1987) also examined the effect of a stochastic volatility parameter on European call options, unadjusted for dividends. One focus of his paper was on the use of a random variance model to estimate ISDs. His model was similar to that of Hull and White as he incorporated the intertemporal CAPM into the model in order to examine the risk premiums for stock and volatility risk. He also assumed that the volatility risk was either diversifiable or uncorrelated with aggregate wealth in order to solve the model. To obtain call prices from the model, he used a series of simulations in which he assumed that the log of volatility followed an mean reverting process. As the basis of his simulation he used fifty two days of closing prices for the Digital Equipment Corporation (since it was a non-dividend paying stock). He used both his model and the Black-Scholes model to estimate ISD's by forcing the model price to equal the market price. He found that the ISDs were very sensitive to the correlation between volatility and stock price and that the random variance model provided slightly better daily estimates of ISDs than the Black-Scholes model.

Wiggins (1987) derived option pricing models under two sets of assumptions. He first assumed, similar to Hull and White, and Scott, that the hedged portfolio was uncorrelated with the market, and consequently, if the intertemporal CAPM applied, the option could be priced. However, he also derived a price for volatility risk for investors who exhibit constant relative risk aversion when the underlying asset in the market is market wealth. For investors who are more risk averse than a log utility investor, a positive shift in volatility risk would be followed by a decline in consumption. Consequently, these investors would demand a risk premium for holding any asset whose value is reduced by an increase in risk. The opposite result holds for any investor who is less risk averse than a log utility investor. (Note that the value of a call option is increased by an increase in the risk of the underlying asset.) Assuming log utility, Wiggins showed that the price of volatility risk for individual assets depended on the level of risk in the market, and whether the volatility risk and stock risk are correlated with each other and the market. Consequently, the premium for volatility risk could be positive, negative or zero depending upon the relationships between the three variables. By assuming log utility, that volatility risk and the returns of the underlying asset were negatively correlated, and by placing several constraints on the process followed by volatility (such as variance being instantaneously constant), Wiggins found the Black-Scholes option pricing model under(over)valued in(out of) the money options (relative to at the money options). The effect was less pronounced for longer term (six month) options and when volatility was assumed to follow a mean reverting process.

The theoretical work related to stochastic volatility highlights the problems of assuming that variance is constant. When comparing models with a stochastic volatility to the Black-Scholes model, researchers have found biases in the options prices produced by Black-Scholes. However, a review of these models also indicates that it is difficult to develop a theoretical model with stochastic volatility that can be applied in practice.

With the exception of Stein, (1989),recent empirical studies of implied volatility and/or stock volatility (Poterba and Summers, Merville and Piepta, Wiggins,) have supported the hypothesis that the volatility of short term options follows a stochastic process with a mean reversion component. Poterba and Summers also find that shocks to volatility are not persistent. Wiggins studied options with up to six months to maturity and found that the mean reversion effect increases with time to maturity and increases with volatility risk. He also noted little empirical difference between option prices computed using the Black-Scholes model with constant volatility and a model with stochastic volatility for individual stocks. However, the difference between the two models is much greater when it is applied to index options. There, the model with stochastic volatility produced better results than the Black-Scholes model.

Merville and Piepta (1989) examined the "ex-ante" implied volatility of twenty five stocks and the S&P500 stock futures index over a ten year period.(January,1975-December, 1984). Using Friday closing prices, they applied the methods of Latane and Rendleman to estimate the ISDs and to construct daily WISDs. The primary objective of their paper was to develop and test a model that divided ISD into diffusion and noise components in order to test whether ISD was mean reverting in this period. They found that levels of ISD were related across time and that the autocorrelation was positive and a decreasing function of time. They developed and estimated a discrete time version of a mean reverting diffusion model with white noise. They found that in the short run, variation in volatility tended to be just white noise. However, lengthening the time horizon examined resulted in the detection of diffusion related changes in variance, although the noise component remained the same. Their results supported a model of volatility with a strong mean reversion component.

As part of their paper in which they examined the persistence of volatility shocks, Poterba and Summers examined ISDs computed from both CBOE and Value Line Option Index. Using the Black-Scholes model with a discrete dividend adjustment, they inverted the model to obtain a weekly estimate of ISD. In their analysis of the CBOE series, they found that the ISDs exhibited positive serial correlation, and that the effects of volatility shocks did not persist. In their analysis of the Value Line Series, they found that long term volatility changed less quickly than short term volatility. Both results support the hypothesis of mean reversion.

Stein(1989) modelled the process followed by ISD as an mean reverting AR(1) process. He found that an AR(1) process did describe the movement in the volatility of one and two month options on the S&P100 Index. However, contrary to the findings of others, he has found evidence that changes in the volatility of "longer" term options are too high to be consistent with the hypothesis that implied volatility is mean reverting. However, he applied his model to one and two month index options. Thus the "longer" time to maturity may not have been sufficiently long to detect mean reversion, particularly if there was a great deal of noise in the process followed by the volatility of the index.

Relationship Between Short Term and Long Term ISD

Other researchers have modelled ISD of short term options as a mean reverting process and have found empirical support for the model. Short term ISD tends to revert to a underlying mean. It has also been argued that, if ISD is mean reverting, changes in the ISD of long term options should be lower than changes in short term options whenever the volatility of the underlying asset is "shocked". The intuition behind this argument is that the shocks are frequently transient, and do not reflect changes in the underlying mean of the distribution.

It is argued here that the long term variance can be higher, lower, or equal to the short term variance. If single period variances are constant, the shape of the "term structure of volatility" may depend on whether single period returns are serially correlated. An upward (downward, flat) term structure would result when single period returns are positively (negatively, not) correlated.

The variance for the period (0,T) can be expressed as a function of the underlying short term variances.

$$ {}_0\sigma^2{}_T = \Sigma^T{}_{i=1}\sigma^2 + \Sigma^T{}_{i=1}\Sigma^T{}_{j=1}\sigma_i\sigma_j\rho_{ij} \quad (i \neq j) \qquad (1a) $$

If covariance is stationary, this can be rewritten (dropping subscripts on σ_i and σ_j):

$${}_0\sigma^2{}_T = T\sigma^2 + \sigma^2\Sigma^T{}_{i=1}\Sigma^T{}_{j=1}\rho_{i,j} \qquad (i\neq j) \qquad (1b)$$

Where "T" is the number of short term periods underlying the long term period.

Let $\Sigma^T{}_{i=1}\Sigma^T{}_{i=1}\ \rho_{ij} = T(T - 1)\rho^*$ $\qquad (i\neq j)$

then

$${}_0\sigma^2{}_T = T\sigma^2(1 + (T - 1)\rho^*) \qquad (1c)$$

where ${}_0\sigma^2{}_T$ is the expected T period variance. From (1c) it can be seen that if $\rho_{ij} = +1$ for all i,j, then $\rho^* = +1$ and ${}_0\sigma^2{}_T = T^2\sigma^2$. This is the standard statistical result (${}_0\sigma_T = T\sigma$). From (1c) it can also be seen that if $\rho_{i,j} = 0$ for all i,j then $\rho^* = 0$, and ${}_0\sigma^2{}_T = T\sigma^2$. This is also a standard statistical result (${}_0\sigma_T = \text{SQRT}(T)\sigma$). It should also be noted that $\rho_{ij} = -1$ for all i, j is not statistically possible. Therefore, $\rho^* = -1$ is not statistically possible. However, $\rho^* < 0$ is statistically possible.

Whenever any option pricing model is applied the "T-period" variance is not used as the expected variance in the model. All variances are "annualized". Using the notation here, that means that ${}_0\sigma^2{}_T$ is not put into the model; the appropriate specification is ${}_0\sigma^2{}_T/T$.

Let $(\sigma^2)^* = {}_0\sigma^2{}_T/T$. In that case, (1c) can be rewritten:

$${}_0\sigma^2{}_T/T = (\sigma^2)^* = \sigma^2(1+(T-1)\rho^*) \qquad (1d)$$

or $\quad \sigma^* = \sigma\ (\text{SQRT}(1 + (T-1)\rho^*)) \qquad (1e)$

From (1e) it can be seen that if $\rho_{ij} = +1$ for all i,j, then $\rho^* = +1$ and $\sigma = \sigma$ (SQRT(T)). If this is true, the term structure of volatility will be upward sloping with a declining slope.

From (1e) it can also be seen that if $\rho_{ij} = 0$, for all i,j then $\rho^* = 0$ and $\sigma^* = \sigma$. If this is true, the term structure of volatility will be flat.

Since the lowest value that σ^* can assume is zero, the minimum value for ρ^* is -1/(T-1). When $\rho^* = -1/(T-1)$, the term structure of volatility is undefined. But, for values of ρ^* between -1/(T-1) and 0, the term structure of volatility will be downward sloping.

Taking the logarithms of both sides of (1e):

$$\ln(\sigma^*) = \tfrac{1}{2}\ln(1 + (T-1)\rho^*) + \ln\sigma \qquad (1f)$$

From (1f) it can be seen that when $\rho^* = +1$ then the intercept should equal $\tfrac{1}{2}\ln(T)$, which is greater than zero. If $\rho^* = 0$ then the intercept should equal zero. If $-1/T-1<\rho^*<0$, the intercept will be negative, which is consistent with a downward sloping term structure of volatility.

The slope of (1f) is one, because it is assumed that the one period variance one period from now and T periods from now are equal, i.e. a covariance stationary process. If, a shock should cause ISD to deviate temporarily from its long term mean, the slope of (1f) should be less than one if volatility is mean reverting. Thus, neither an upward or downward sloping term structure of volatility nor a flat term structure would be inconsistent with previous findings that the ISD of short term options follows a mean reverting process.

In a study of return series of stock indices and stock prices, LeBaron (1992) found that returns exhibit positive, negative and no serial correlation at various moments in time. The level of return volatility tended to be inversely related to the degree of serial correlation. When serial correlation is positive and high, volatility tends to be low. It has been previously shown that volatility is cyclical. Moreover, if volatility and returns are correlated across time, one might expect, that when the serial correlation of returns is positive and high that investors would expect future volatility to be rising. Consequently, the term structure of volatility at this time, might be positively sloped. On the other hand, when stock returns exhibit low or negative serial correlation, volatility tends to be high. It is not unreasonable to expect that volatility will decline in the future. As a result the term structure would be declining.

In the next part of this chapter, the slope of the term structure will be examined. Also, the mean reversion hypothesis will be tested. Equation (1f) is the basis for the regression model estimated in that part of the paper.

Data and Methodology

Data

The data for this study consist of score and call option prices for seventeen firms. SCORES(Special Claim on Residual Equity) are five year European call options written on twenty six trusts established by the Americus Shareholder Corporation. The calls included in the study are American options with a maximum of nine months to maturity. Scores and calls differ in several other ways. Scores are traded on the American Stock Exchange, and are considered to be "stocks" for tax and trading purposes. Consequently, scores can be purchased on margin. The payoffs to call owners and score holders also differ. Score holders will receive, at the options' expiration, shares of stock equal in value to Max(S-X,0). Call owners have an "option" of receiving settlement in cash or in shares. These factors will be considered when interpreting the data and results.

The seventeen firms included in the study are: Amoco, Atlantic Richfield Company (ARCO), Bristol Myers, Chevron, Coca Cola, Dow Chemical, Dupont, Eastman Kodak, Ford Motor Company, General Electric, General Motors, Johnson and Johnson, Merck, Mobil, Proctor and Gamble, Sears, and Union Pacific. There are twenty six firms on which scores were written. (see Table 4-1) However, these seventeen were selected because they had a large number of at-the-money

$(.9 \leq S/Xe^{-rt} \leq 1.1)$ scores during the time period studied (April 1987-March 31, 1991). The sample was restricted to at-the-money scores because the Black-Scholes model was used to estimate implied volatilities. Since the Black-Scholes model performs best for at-the-money options, restricting the sample was aimed at reducing biases in the empirical estimates. The time to maturity of the scores ranged from one to five years.(see Table 4-2a) Thus, in aggregate, there are 1,075 observations on scores.

For each trading last day of the week that a score from one of the seventeen firms was at-the-money, prices for the call options trading on the same stock were obtained. For each maturity, the call option that was closest to being in-the-money was included in the study. Last day of the week prices for scores and the underlying stock were obtained from Barrons and matching call option prices were obtained from Barrons and the Wall Street Journal. Quarterly dividends and the ex-dividend dates were obtained from Barrons and from the Daily Stock Price Record for the New York Stock Exchange. Specific information about the maturities of the scores were obtained from the Americus Shareholder Corporation. (Table 4-1) Since implied volatilities were not sensitive to the interest rate used to compute them, the call money rate for the week in which the option was traded was used to proxy the risk free rate.

Estimation of Implied Standard Deviations

The Black-Scholes option pricing model with a discrete dividend adjustment was initially used to compute the ISD of scores and calls.

$$C = (S - \Sigma^{t}_{i=1}\delta_i e^{-rt})N(d_1) - Xe^{-rt}N(d_2)$$

Where $N(d_1) = ((\ln(S - \Sigma^{t}_{i=1}\delta_i e^{-rt})/X) + (r + \frac{1}{2}\sigma^2)t))/\sqrt{\sigma^2 t}$

$N(d_2) = N(d_1) - \sqrt{\sigma^2 t}$

$\Sigma^{t}_{i=1}\delta e^{-rt}$ = the present value of all dividends paid during the life of the option

A no growth model of dividends was used to make the dividend adjustment. It was assumed that the most recent dividend announced by the firm would remain constant and be paid quarterly starting at the next ex-dividend date and at each quarterly interval until the option's maturity. The present value of the dividend stream was found by discounting dividends at the call money rate in effect for that week. For example, if an option had two years to maturity, and the last dividend paid was \$0.50, it was assumed that the firm would pay (approximately) eight dividends of \$0.50 each at ninety day intervals. The present value of each of the dividends was found, summed and subtracted from the daily stock price. The no growth in the dividend option will result in underestimation of the dividend stream in most cases. This will have the most impact on scores with the longest time to maturity. Underestimating the dividend will result in an ISD that is biased downward. The underestimation is relatively small, since the firms in the sample increased the dividends with very small increments during the study. It should be noted, however, that by using this approach, it is implicitly assumed that it is the ex-dividend price of the stock that is log normal. Also, it should be noted that the discrete dividend adjustment may introduce some bias into the estimates of implied volatility. Whaley (1982) developed a call option model for dividend paying stocks which he compared to the Black-Scholes model with a discrete dividend adjustment. When the Black-Scholes model with a discrete dividend adjustment was used to estimate the value of American call options, the model value was consistently lower than the market value of the options. In this paper, the ISD is estimated with the Black-Scholes model, by assuming the market value is correct. Thus, with everything else held equal, when the model value is equated with the market value, the estimate of ISD might be biased upward.

A total of 3,522 observations were included in the final sample. The final sample included a total of 2447 ISDs for calls, 1075 for scores. If the time premium for any option was negative, in the original sample, the option was deleted from the sample. If on any day, all of the calls were eliminated due to negative time premiums, the score was also eliminated from the sample. Less than twenty observations were deleted for this reason.

Although it is possible to exercise American call options before maturity, it is only likely when the dividend payout of the underlying stock is high. It was assumed that the dividend yield of the firm's included in the sample were too low to make early exercise optimal.[1] (see Table 4-2b)

The ISD of each option was obtained by finding the estimate of the standard deviation that equated the model value with the market price of the option. All of the ISDs were annualized measures. It should be noted that error might be introduced into the estimates due to the existence of bid-ask spreads, transactions costs, and non-synchronous prices. It is assumed that, on average, the effect of bid-ask spreads and non-synchronous prices on estimates of ISDs is zero. Thus, it is assumed that price deviations caused by these factors are symmetric around zero. Transactions costs will cause the seller's price to be lower than the transaction price, and the buyer's price to be higher than the transaction price. When the transaction price is used to estimate ISD, the estimate will be too high from the buyer's

[1]It should be noted that scores can not be exercised early to capture a dividend. Although the Americus Trusts permitted investors to retrieve shares by swapping a prime and a score for one share, this is not equivalent to early exercise. In order for a score holder to obtain the dividend paid by the underlying stock, a prime must be acquired and given up. Since prime holders are entitled to the dividend, these dividends are given up in exchange for the dividend on the same stock. Therefore, there is no gain.

perspective and too low from the seller's perspective. The estimate obtained from the recorded price will, consequently, reflect an average rather than the ISD perceived by individual investors. In a previous chapter, it was found that primes and scores sell at a premium to the underlying stock. This has also been documented by Jarrow and O'Hara (1989), and Venkatesh(1991). If the premium can be attributed to the score, this might be reflected in a higher than expected ISD. The ISD will reflect the risk of the underlying asset as well as the volatility of the premium itself.

It should also be noted that any tests performed on the estimates of ISD are joint tests of hypotheses about the slope of the term structure of volatility and whether volatility is mean-reverting, and the Black-Scholes option pricing model. The estimates may also be affected by the type of dividend adjustment made. As was previously noted, Whaley found that when a discrete dividend adjustment was made to the Black-Scholes model, the model price was consistently lower than the market price. This might result in an upward bias in the estimates of ISDs. It is possible that this effect will be increase with time to maturity.

In order to determine how sensitive the empirical results might be to errors in the data and the specification of the dividend adjustment, four sets of ISDs were estimated.

(1) ISDs were computed using the actual market prices for scores and calls, with adjustment made for dividends.

(2) ISDs were for computed using the actual market prices for scores and calls, but without any adjustment for dividends.

(3) Score prices were adjusted for premiums[2] and ISDs were recomputed by substituting the "pseudo" score prices. For calls, actual market prices were used. The dividend adjustment was made in this case.

(4) Score prices were adjusted for premiums but no dividend adjustment was made to either calls or scores.

Empirical Tests

As was shown in the previous section, the term structure of volatility can have a positive, negative, or zero slope. The slope depends on the level and sign of the serial correlation of single period returns. Other researchers(Merville and Piepta, Poterba and Summers) have

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[2]The Americus Shareholder Corporation established twenty-six trusts on which long term calls (SCORES) and covered calls (PRIMES) were written. Primes and Scores trade on the American Stock Exchange. The combined prices of primes and scores tends to be significantly higher than that of the underlying stock. The premium is defined as: premium=prime + score - stock. If it is assumed that the entire premium can be attributed to the score, then score-premium=stock-prime. The "pseudo" score price is equal to stock-prime.

found that the ISD of short term options is mean reverting. Consequently, in this section of the paper two questions about ISD will be empirically examined. The first question is whether the term structure of volatility is upward sloping, downward sloping, or flat. The second question is whether long term ISDs appear to be reverting to an underlying mean. This paper differs from the papers of Merville and Piepta, Poterba and Summers, and Stein because the data analyzed include ISDs for long term options as well as short term options. The relationship between the ISDs of long term and short term options has not yet been examined.

In an effort to answer the first question, the ISD of short term options (calls) and long term options (scores) written on seventeen different stocks will be compared. The difference in the level of the ISDs of options with different maturities, but trading on the same day would provide some indication of the slope of the term structure of volatility. Also, the elasticity of score ISD with respect to changes in call ISD will be estimated from the same model. The elasticity will reflect whether score ISDs are more or less volatile than call ISDs.

Based on (1f), the following model will be estimated:

$$\ln(ISDSC) = a + b\ln(ISDCALL) \quad (2)$$

where ISDSC= score ISD
ISDCALL= the average ISD of all calls trading on the corresponding day

The interpretation of (1f) and (2) will be similar.

The intercept will be an estimate of $\frac{1}{2}\ln(1+(T-1)\rho^{*})$. The sign of the intercept will indicate whether the term structure of volatility exhibits a positive, negative, or zero slope. Since "T" reflects the number of single periods in a longer interval, the sign of the intercept will be determined by the implicit sign of ρ^{*}. Also, the absolute value of the intercept should increase as the length between the maturities of long and short term options increases. The slope estimate in (2) will be a direct estimate of the elasticity of score ISD with respect to call ISD. If there is a single mean ISD at a given moment in time, then, in the long run, it would be expected that ISD would equal that mean. A permanent shift in the underlying mean ISD should affect long term and short term options equally. However, in the short run, transient shocks may cause movement away from the mean. If an option is near maturity, the shock will have little time to decay. Consequently, the shock should have a relatively large effect on the price of an option near maturity. If an option's maturity is far enough in the future, its ISD should better reflect the underlying mean. If this is recognized by investors, shocks to volatility should have little impact on that option's ISD. This would reflect investors' belief that the ISD will remain at its current long run mean. Therefore, if ISD is expected to be mean reverting, and changes in long term options that occur after a shock should be proportionately lower than changes in short term options. Consequently, the elasticity of the score with respect to the call should be less than one.

It is also likely that the difference in the level of ISDs as well as relative changes in the level of ISDs will be a function of the length of the term structure. In order to examine this possibility, a second set of regressions was estimated with a independent variable included to reflect this difference. The ratio of time to maturity of scores to the average time to maturity of calls trading on the same day was estimated and added to the model. 1.0 was subtracted from this ratio so that it would be directly comparable to equation (1f). This is the variable RELTMAT in equation (3). The purpose of including the variable RELTMAT was to isolate the effect of the length of the term structure on the relationship between call and score ISDs. A positive (negative) coefficient for this variable would imply that volatility is expected to increase (decrease) as a function of time.

The second model estimated was:

$$\ln(ISDSC) = a + b(RELTMAT) + b\ln(ISDCALL) \qquad (3)$$

where ISDSC= the implied standard deviation of scores

RELTMAT= maturity(score)/ average maturity(call)

ISDCALL= the average ISD of all calls trading on a the corresponding day

In order to examine carefully the effect of time to maturity on the relationship between call and score ISDs, this model was also estimated by assuming a multiplicative relationship between time to maturity and ISDCALL. The third model estimated was:

$$\ln(ISDSC) = a + b\ln(RELTMAT) + b\ln(ISDCALL) \quad (4)$$

where all variables are the same as those defined above.

Data Analysis

Descriptive Statistics

Descriptive statistics for score ISDs are shown on Tables 4-3a through 4-3d. On Table 4-3a, market prices for scores were used to estimate the ISDs. A discrete dividend adjustment was included in the model. On Table 4-3b, no dividend adjustment was made, although market prices were put into the model. Tables 4-3c and 4-3d are similar to 4-3a and 4-3b, respectively. However, when the ISDs shown on these tables were computed, score prices were adjusted for premiums. (adjusted score= stock-prime). Since all other parameters of the model were held constant when these changes were made, the ISDs on Table 4-3a should be the highest, and those on Table 4-3d should be the lowest. This is the case. The average of the ISDs estimated from using market prices and a discrete dividend adjustment are highest on 3a and lowest on 3c. For example, the average of ISDs on Table 4-3a range from .229 (Atlantic Richfield) to .383 (Sears), with standard deviations of .033 and .043, respectively. When the dividend adjustment is eliminated, the average ISD for Atlantic Richfield dropped to .117, while the average ISD for Sears' scores decline to .280. The standard deviations also declined slightly to .030 and .039, respectively. In contrast, when the score price is adjusted for a premium, the average ISD for Atlantic Richfield drops by .04 to .225, and the average ISD for Sears falls by .031 to .352. The standard deviations for both score ISDs rose slightly. The lowest ISDs are shown on Tables 4-3d. For Atlantic Richfield and Sears these averages are .114 and .254, respectively. These were only slightly lower than those on Table 4-3b.

In general, the dividend adjustment appears to have a greater impact on the estimate of the ISDs than does any premium that may be carried by the score. The dividend adjustment had a much greater effect of score ISDs than on call ISDs. This is not surprising since there are many more dividends to be paid before the score's maturity. The dividend adjustment has the potential of affecting the option's price in two ways. First, it affects it directly through the stock price. Then it affects it by changing the path that the stock price follows. The dividend adjustment might force the stock price to follow a lower path over time. As a result, the expected stock price predicted by the model, might be too low. Since the price of the option is fixed at the market price, and all of the other model variables are input to the model, the impact will be reflected in ISD. The ISD will, consequently, have an upward bias. This is consistent with the findings of Whaley, which were previously noted. This bias could very well increase with the maturity of the option.

Descriptive statistics for the ISD's of calls are shown on Tables 4-4a through 4-4d. On Tables 4-4a and 4-4b, ISD's were computed with and without a discrete dividend adjustment, respectively. On these tables, the average was estimated by first averaging all ISD's of calls trading on a given day. The sample average was computed by averaging each of the daily averages. On Table 4-4a, the average call ISD ranges from .192 (for Atlantic Richfield) to .306(Coca Cola). With the exception of Coca Cola and Merck, all of the average call ISD's are lower than the average score ISD's. The average ISDs shown on Table 4-4b were computed without the inclusion of a dividend in the Black-Scholes model. Without exception, they are lower than those estimated with a dividend adjustment. When the average call ISDs are compared to the average score ISDs for the same firm, all of the calls ISDs are higher (except for GE and Sears). The differences in ISDs will be reexamined in the next section.

Tables 4-4c and 4-4d are comparable to 4-4a and 4-4b, respectively. On these tables ISD's are categorized by time remaining to maturity. (0-1 month, 1-2 months, 2-3 months, and more than three months.) All of the average ISDs fluctuate across maturities. When the average ISD's of expiring options is compared to the ISD's of options with more than three months to maturity,it can be seen the ISD declined for thirteen of the seventeen sets of options. When the dividend adjustment is eliminated, all average ISD's decline. For some of the firms, the change in average ISD's is approximately the same across maturities. However, for twelve of the seventeen sets, the difference between score and call ISDs increases across maturities.

The Term Structure of Implied Volatility

Differences in the Level of Score and Call ISDs

For each of the seventeen sets of scores and calls the difference in the ISD of each call trading on a given day and the ISD of a score trading on the same day was computed. The differences were computed for four different sets of ISDs: (1) ISDs estimated using market prices for scores, and a discrete dividend adjustment for scores and calls (2) ISDs estimated using market prices for scores and no dividend adjustment (3) ISDs estimated using an adjusted price for scores, market prices for calls, and a discrete dividend adjustment (4) ISDs estimated using an adjusted price for scores, market prices for calls, and no dividend adjustment.

These differences are shown on Tables 4-5a and 4-5b. When market prices are used for scores and a discrete dividend adjustment is made, the ISD of scores is significantly higher than the ISD of calls for fifteen of the seventeen trusts (Table 4-5a, Column 1). These results are virtually reversed when the dividend adjustment is eliminated (Table 4-5b, Column 2). This is not surprising given the impact that eliminating the dividend adjustment had on the average ISD. Adjusting the score price for any premiums reflected in the price had a much smaller impact on the differences in score and call ISDs than the dividend adjustment. Adjusting for the premium only affected the market price of the option and did not have any impact on the expected stock price estimated in the model. Consequently, it had some impact on ISD estimates, but not as much as the dividend adjustment. (Table 4-5b) A comparison of Tables 4-5a and 4-5b reveals that eleven of the seventeen differences are still significantly negative, after the premium is subtracted from the score price. Again, these results are virtually reversed when stock prices are not dividend adjusted. Sixteen of the seventeen differences are significantly positive when the dividend adjustment is not made. The differences range from -.49% (not significant) to 9.9%.

Since t-tests are parametric tests and the distribution of ISDs tends to be non-normal, a set of non-parametric tests were performed in order to compare the ISDs of scores and calls. Under the null hypothesis that the ISDs of scores and calls are equal, the proportion of score ISDs greater than (less than) call ISDs was estimated. Assuming the proportions are binomially distributed, a confidence interval was constructed around the proportion of score ISDs that exceeded call ISD's. The results of these tests are shown on Tables 4-6a-4-6d. These results are generally consistent with the t-test of differences. When the difference in the level of ISDs is negative, the proportion of score ISDs greater than call ISDs is higher than fifty percent. When the difference is positive, the proportion is less than fifty percent, with the exceptions of Ford and GE (Table 4-6b).

The average differences shown on Tables 4-5a through 4-5b are computed by subtracting a single score ISD from the ISD of each call trading on a given day. Up to four calls with the same exercise price can be trading on a given day. Therefore, days on which many calls traded are given a disproportionate weight in the sample average. If the ISD's were abnormally small or large on a day in which many calls traded, the results of the tests on Tables 4-5a through 4-5b and 4-6a through 4-6d might be affected.

In order to insure that those results are not driven by outliers, the same tests were applied to the difference of the daily average call ISD and the ISD of the score trading on the same day. The results of these tests are shown on Tables 4-7a through 4-7b, and Tables 4-8a through 4-8d. The outcomes are the same in all cases.

Finally, the difference in the level of score and calls ISDs were computed for different call maturities (0-1 month, 1-2 months, 2-3 months, more than 3 months.) These differences are shown on Tables 4-9a through 4-9d. Call ISDs are generally significantly higher than score ISD's regardless of the maturity of the calls when a discrete dividend adjustment is made. When the score is adjusted for the premium, the differences are smaller, but still generally negative. When a dividend adjustment is not made, the sign of the difference is reversed for every call maturity. This highlights, once again, the sensitivity of the results to dividend adjustments.

Tables 4-9a through 4-9d provide some information about how the term structure of volatility is changing over time. When the differences in score and call ISDs for calls that are expiring options are compared to the differences in call and score ISDs when the calls have more than three months to maturity, the results on 4-9a indicate that score ISDs are higher than call ISDs. However, the difference in call and score ISDs increased for twelve sets of options as the maturity of the call increased. This result is puzzling. The ISDs should as the maturities of scores and calls move closer together if ISD is mean reverting. The results may indicate that the maturities are too far apart for the ISDs to converge, or that there is a great deal of noise in the estimates of ISD.

However, when the same comparisons are made for the differences in ISDs shown on Table 4-9b, it is clear that score and call ISDs tend to decrease as the maturity of the call increases. This is the case for fourteen of the seventeen sets of options. This result was expected.

When the score is adjusted for the premium, the differences between the ISDs of scores and expiring calls and the ISDs of scores and calls with more than three months to maturity declines for seven sets of options and increases for eight sets. Thus, the premium adjustment appears to improve the results.

The results on Table 4-9d are similar to those on 9b. The differences in score and call ISDs decline as their maturities move closer together.

Regressions

Equations 2 and 3 were estimated using OLS. Each model was estimated on all four sets of ISDs. The two regression models are restated below.

The first model estimated:

$$\ln(ISDSC) = a + b\ln(ISDCALL) \quad (2)$$

where ISDSC= implied standard deviation of scores

ISDCALL= the average ISD of calls trading on a given day

The second model estimated:

$$\ln(ISDSC) = a + b(RELTMAT-1) + b(\ln(ISDCALL)) \quad (3)$$

where ISDSC= ISD scores

RELTMAT= score time to maturity/average time to maturity(calls)on a given day

ISDCALL= the average ISD of calls trading on a given day

The estimates of equation 2 are shown on Tables 4-11a-4-11d. The estimates of equation 3 are shown on Tables 4-12a through 4-12d. On the whole, the set of regressions for which market prices are used for scores and calls and the dividend adjustment is made appear to be the best. The R^2 for this set tend to be highest. Alternate estimations of ISD's improve the R^2's for some of the firms but the specification which improves the models' goodness of fit varies by firm. For example, the R^2 for Dow increased from .118 (Table 4-11a) to .334 (Table 4-11c) when the score price was adjusted for a premium. The Americus Trust for Dow tended to sell at a premium. However, the R^2 for Kodak, whose score also tended to sell at a premium was not improved by the adjustment.

There are some points of consistency among the four sets of estimates of equation 2. With few exceptions, intercepts are significantly negative and the slopes are less than one. Based on equation (1f), the negative intercept suggests that the term structure of implied volatility is downward sloping, since the sum of the serial correlation coefficients must be negative. Thus, investors must expect some negative serial correlation in short term returns which is reflected in the term structure of volatility. Moreover, the intercept becomes more negative when the dividend adjustment is eliminated or the score price is adjusted. This suggests that the dividend adjustment and premium introduce some positive serial correlation into the estimate. This is further suggested by the results on Table 4-11d. These intercepts are the most negative for ten of the trusts.

The slope estimate is consistently less than one, regardless of the manner in which ISD is estimated. The elasticity of score ISD with respect to changes in call ISD is positive, but less than one for almost every set of calls and scores. The single exception is Merck. The slope coefficient for Merck is insignificantly different from one and the intercept is not different from zero. This indicates that the ISD for Merck is at its long term average and is stable. Or, it may indicate that holders of scores written on Merck overreact to changes in volatility.

The average time remaining to maturity of all scores and calls in the sample are shown on Table 4-10. For each day included in the sample the time remaining to maturity for scores was divided by the average time to maturity of all calls trading on a given day. The average of this variable, relative time to maturity, is shown on the last column of Table 4-10. The variable indicates the number of times a call of "average" maturity would have to be rolled over in order to replicate a score written on the same stock. Consequently, this variable represents the length of the term structure of volatility.

As would be expected, the addition of RELTMAT slightly improved the overall results, as indicated by R^2. The intercepts remain significantly negative, although the size of the intercept changed. The elasticity of the score ISD with respect to changes in call ISD remains significantly less than almost without exception.

The relationship between the time to maturity variable, ISD, and the intercept can be seen clearly by comparing the two sets of regressions. If the time to maturity variable enters the equation positively, the slope of the ISD variable declines, as does the intercept. If the time to maturity variable enters the equation with a negative sign, the slope of the ISD variable and the intercept are positively affected.

The time to maturity variable (RELTMAT) enters the equation significantly, or near significantly most frequently ($t>|1.25|$) on Table 4-12a. On Table 12a, eight of the coefficients of this variable are significantly (or almost significantly) positive, while six are negative (the rest are insignificantly different from zero). The difference in the signs of the coefficients is puzzling. Since the score ISDs used as inputs into the model are higher than the call ISDs, the positive slope would indicate that the level of score ISDs is positively related to the length of the term structure. When the coefficients of RELTMAT are negative, it indicates that score ISDs decrease as the length of the term structure (as measured by relative time to maturity) increases.

The positive slope would be consistent with results reported earlier, i.e. that score ISDs are higher than call ISDs when market prices are used to compute ISDs and a dividend adjustment is made. When Table 4-12a is compared to Tables 4-5a,4-6a, and 4-7a it appears that the signs of the coefficients of RELTMAT reflect the actual differences in score and call ISDs for eight of the stocks. The sign of the coefficient is positive for Amoco, Chevron, Ford, GE, GM, Merck, Mobil, and Union Pacific. Score ISDs are also higher than call ISDs for these stocks. However the sign of the coefficient is negative for Dow Chemical, DuPont, E.Kodak, Johnson and Johnson, and Sears, even though score ISDs are higher than call ISDs. These results are puzzling. It is possible that the relationship between the length of the term structure and ISD may not be correctly specified. Or, the dividend adjustment, which has been previously shown to have a great impact on the estimate of ISDs may be the source of these findings.

A comparison of Tables 4-12b and 4-5a, 4-6b ,4-7a, and 4-9b suggest that the dividend adjustment may be the source of part of the problem. When no dividend adjustment is included in the model when ISDs are estimated, the sign of the coefficient of RELTMAT and the differences in ISDs appear to have the same interpretation. The sign of the coefficient is most often negative when it is significant or near significant. Call ISDs are generally higher than score ISDs.

When Tables 4-12c and Tables 4-5b, 4-6c, 4-7b and 4-9c are compared, it can be seen that the interpretation of the coefficient of RELTMAT is consistent with previous findings about the differences in ISDs. When the coefficient is significant, it is most frequently positive. When it is positive, score ISDs are higher than call ISDs even after an adjustment is made to the scores for any premium reflected in the price. When the coefficient is negative and significant, as it is for Coca Cola, it can be seen that score ISDs are not higher than call ISDs. However, the coefficient is negative for Sears and this is not consistent with the results on the other tables.

When Table 4-12d is compared to Tables 4-5b, 4-6d, 4-7b, 4-8d, and 4-9d, it can be seen that the coefficient of RELTMAT is not always consistent with the results on the other tables. When the score price is adjusted for any premiums that may be reflected in the price and no dividend adjustment is included in the model used to estimate ISDs, score ISDs are usually significantly less than call ISDs. Consequently, it would be expected that the sign of the coefficient would be negative. It is negative for four of the sets of ISDs. However, it is significantly positive for five of them.

The natural log of the variable RELTMAT was taken and the model was then re-estimated. The results are shown on Tables 4-13a through 4-13d.

One difference between Tables 4-12a through 4-12d and Tables 4-13a through 4-13d is that the intercept terms for E.Kodak, Johnson and Johnson, and Proctor and Gamble are driven to zero, suggesting that the term structure of volatility is flat. However, the estimates of the slope, with the exception of the estimated slope for Merck, remain less than one. There is little change in the slope estimates.

Although the magnitude of the coefficient of the RELTMAT variable declines slightly after the log of the variable is input into the model, with few exceptions the variable enters the model with the same sign as it did before. The level of significance with which the variable entered the equation changed for a few of the models. Some went from insignificantly different from zero to significantly positive or negative. A few others fell to zero. Respecifying the variable in log form did not eliminate the problems previously noted.

Conclusions

It has been previously demonstrated that the ISD of one-six month options is mean reverting. In this chapter, the same result has been found for options with three to five years to maturity.

Investors, at a given moment in time, do expect the ISD of longer term options to be less sensitive to shocks to volatility than the ISD of short term options. Thus, the expectation that ISD is mean reverting is incorporated into option prices. This result was unchanged regardless of how ISD was estimated.

Unfortunately,the slope of the term structure of volatility is not clear from the empirical results of the paper. These results were extremely sensitive to the dividend adjustment. The regressions indicate that investors expect negative serial correlation in returns which is then reflected in a downward sloping term structure of implied volatility. However, some of the differences in implied standard deviations suggest an upward sloping term structure, i.e. score ISDs were significantly higher than call ISDs when a discrete dividend adjustment is added to the Black-Scholes model. An upward sloping term structure of implied volatility would be consistent with the transactions costs models of Leland (1985), and Boyle and Vorst(1992). Also, it should be noted that scores are considered to be stock for tax and trading purposes. Consequently, there may be institutional factors, such as the difference in margin requirements that cause the volatility of the score to be higher than the volatility of the call. Perhaps a study of calls and scores with the same time to maturity would provide some additional insight in this area.

The results of the regressions are most consistent with the results reported when no dividend adjustment was made to the model. Also, when the time to maturity variable was added to the model, the results of the regressions were most consistent with the findings on Tables 4-9b and 4-9c, where again no dividend adjustment was made(4-9b) and the score was adjusted for the premium(4-9c). Some additional work must be done to resolve the inconsistencies that are apparently caused by the dividend adjustment.

Le Baron (1992) found an inverse relationship between serial correlation in returns and implied volatility. If investors expect volatility to rise in the future, it may be that it is low in the present. Consequently, one might expect current returns to exhibit high positive correlation. The reverse would be true in the case of a downward sloping term structure. It might be useful to look at the serial correlation of returns when examining the slope of the term structure of volatility. It might also be useful to examine the times series properties of the relationship between the ISDs of short term and long term options.

Table 4-1a
Description of Trusts

Trust	Termination Claim [a]	Initiation Date	Closing Date	Expiration Date	No of Units[b]
American Exp.[c]	$ 50	07/87	06/88	08/92	7.500[d]
Amer.Home Prod.[c]	45	12/86	11/87	12/91	4.116
AT&T(2)[c]	30	02/87	04/87	02/92	10.000[d]
Amoco	52.50	04/87	03/88	03/92	6.421
Atlantic Rich.	116	07/87	05/88	07/92	2.353
Bristol Myers	55	02/87	01/88	02/92	5.831
Chevron	75	06/87	05/88	07/92	4.427
Coca Cola	28	07/87	06/88	07/92	5.000[d]
Dow Chemical	73.33	04/87	03/88	05/92	4.527
DuPont	36.67	01/87	12/87	03/92	12.030
Eastman Kodak	61.33	05/87	04/88	04/92	3.048
Exxon[c]	60	09/85	08/86	09/90	5.500
Ford	52	05/87	04/88	06/92	7.556
GE	70	04/87	04/88	05/92	14.987
General Motors	53.50	07/87	05/88	06/92	7.808
GTE[c]	22	06/87	05/88	07/92	7.500[d]
Hew. Packard[c]	90	07/87	06/88	07/92	3.879
IBM[c]	210	07/87	06/88	06/92	9.999[d]
Johnson&Johnson	59	08/87	06/88	04/92	9.103
Merck	66.67	03/87	03/88	04/92	9.103
Mobil	60	07/87	06/88	06/92	5.960
Philip Morris[c]	27.50	07/87	06/88	07/92	11.017
Proctor&Gamble	52.50	05/87	04/88	06/92	4.583
Sears	64	06/87	05/88	07/92	5.365
Union Pacific	87	05/87	04/88	04/92	1.681
Xerox[c]	97	07/87	06/88	07/92	1.658

[a] All termination claims are split adjusted.
[b] Expressed in millions of units
[c] These firms are not studied in this essay. Trusts were included
in the sample studied if the score was at the money for more than twenty weeks during the period studied. ($.9 \leq S/Xe^{-rt} \leq 1.1$)
[d] These trusts were fully subscribed.

Table 4-1b
Summary of Selected Tables

Table(s)	Description of Table(s)	Key Results
3a-3d	descriptive data, score ISDs	score ISD is highest when market prices, dividend adjustment are used as model inputs (3a); lowest when score price is adjusted for a premium and no dividend adjustment is made (3d).
4a-4b	descriptive data, call ISDs	average call ISDs are highest when the dividend adjustment is made
4c-4d	descriptive data, call ISDs by time to maturity	results are similar to 4a-4b
5a-5b	four sets of call and score ISDs are compared a t-test is used to test the significance of the differences	When the price of the underlying stock is adjusted for dividends call ISDs are significantly less than score ISDs. When the dividend adjustment is not made, call ISDs are generally significantly greater than score ISDs.
6a-6d	four sets of call and score ISDs are compared a binomial test is used to test the significance of the differences	The results are similar to those on 5a-5b. When the dividend adjustment is made, the proportion of score ISDs greater than call ISDs exceeds 50%; when no dividend adjustment is made, it is less than 50%.
7a-7b 8a-8d	Tables 5a-5b, and 6a-6d are replicated using average call ISDs instead of actual call ISDs	The results are consistent those on 5a-5b, 6a-6d

Table 1b(continued)

Table(s)	**Description of Table(s)**	**Key Results**
9a-9d	differences between score and call ISDs by time to maturity	differences are most negative when market price for score is used and dividend adjustment is made. Differences are most positive when no dividend adjustment is made and score price is adjusted. Differences fluctuate across maturity.
11a-11d	linear regressions: log of score ISD on log of call ISD	intercept is generally negative indicating a downward sloping term structure of ISD; slope is less than one, indicating that investors expect ISD to be mean reverting.
12-12d	linear regressions: log of score ISD on log of call ISD and and relative time to maturity	intercept is generally negative, slope is less than one; the time maturity variable indicates that differences between score and call ISDs is related to the length of the term structure. At times, the sign of the coefficient is not consistent with previous results
13a-13d	linear regressions: log of score ISD on log of call ISD and and log of relative time to maturity	same as for 12a-12d. Restating the variable in logs does not improve the interpretation of the time to maturity variable

Table 4-2a
Time to Maturity (Years) of Scores During Sample Period

Trust	No. of Wks.	Average Mat.	First Observation Date	First Observation Time to Mat.	Last Observation Date	Last Observation Time to Mat.
Amoco	72	3.74	8/14/87	4.627	3/31/89	2.997
Atl.Rich.	64	3.78	10/23/87	4.690	6/30/89	3.004
Bris. My.	53	3.75	10/23/87	4.344	6/24/88	3.675
Chevron	73	2.99	9/11/87	4.806	2/22/91	1.359
Coca Cola	52	4.16	10/16/87	4.747	12/02/88	3.619
Dow Chem.	82	3.27	5/22/87	4.942	7/20/90	1.781
DuPont	72	3.11	11/13/87	4.372	3/29/91	.995
E.Kodak	78	3.36	11/20/87	4.403	10/20/89	2.486
Ford	32	2.73	10/23/87	4.686	8/03/90	1.907
GE	82	2.78	5/01/87	5.027	3/29/91	1.117
GM	87	3.16	2/19/88	4.366	8/03/90	1.907
J&J	69	3.94	10/16/87	4.705	4/07/89	3.230
Merck	21	4.17	4/27/87	4.964	7/15/88	3.747
Mobil	59	4.03	10/16/87	4.705	2/24/89	3.500
P&G	41	4.00	12/04/87	4.571	12/02/88	3.577
Sears	29	3.63	11/27/87	4.634	12/29/89	2.545
Un Pac	109	2.79	1/08/88	4.269	3/15/91	1.083

Table 4-2b
Dividend Yield: Stock

Trust	First Observation		Last Observation	
	Date	Dividend Yield	Date	Dividend Yield
Amoco	8/14/87	4.07	3/31/89	4.62
Atl.Rich.	10/23/87	5.18	6/30/89	4.81
Bris.Myers	10/23/87	4.20	6/24/88	4.19
Chevron	9/11/87	4.40	2/22/91	4.24
Coca Cola	10/16/87	2.96	12/02/88	3.16
Dow Chem.	5/22/87	2.70	7/20/90	4.32
DuPont	11/13/87	4.11	3/29/91	4.48
E.Kodak	11/20/87	3.76	10/20/89	4.43
Ford	10/23/87	5.40	8/03/90	7.55
GE	5/01/87	2.58	3/29/91	2.89
GM	2/19/88	7.22	8/03/90	6.89
J&J	10/16/87	2.12	4/07/89	2.20
Merck	4/27/87	2.29	7/15/88	3.98
Mobil	10/16/87	5.15	2/25/89	5.23
P&G	12/04/87	3.33	12/02/88	3.43
Sears	11/27/87	6.00	12/29/89	5.19
Un.Pacific	1/08/88	3.59	3/15/91	3.38

Table 4-3a
Annual Implied Standard Deviations: Score Market Prices, With Dividend Adjustment

Firm	N	Median	Average	Standard Deviation	Lower Fifth Obs.	Upper Fifth Obs.
Amoco	72	.224	.238	.050	.184	.358
Atl.Rich.	64	.223	.230	.033	.195	.301
Bris. My.	53	.264	.271	.053	.204	.351
Chevron	73	.262	.276	.060	.200	.382
Coca Cola	52	.288	.300	.068	.222	.412
Dow Chem.	82	.296	.316	.064	.247	.441
DuPont	72	.266	.274	.041	.224	.314
E.Kodak	78	.272	.306	.083	.209	.451
Ford	32	.314	.328	.058	.268	.416
GE	82	.287	.301	.052	.243	.403
GM	87	.274	.277	.032	.224	.327
J&J	69	.270	.265	.055	.192	.351
Merck	21	.208	.257	.077	.189	.370
Mobil	59	.244	.265	.058	.190	.270
P&G	41	.250	.236	.031	.191	.270
Sears	29	.380	.383	.043	.340	.423
Un.Pac.	109	.243	.249	.044	.194	.334

Table 4-3b
Annual Implied Standard Deviations: Score Market Prices, Without Dividend Adjustment

Firm	N	Median	Average	Standard Deviation	Lower Fifth Obs.	Upper Fifth Obs.
Amoco	72	.126	.137	.040	.081	.226
Atl. Rich.	64	.116	.117	.030	.077	.175
Bris.My.	53	.166	.164	.051	.105	.239
Chevron	73	.161	.172	.050	.110	.266
Coca Cola	52	.211	.219	.059	.143	.309
Dow Chem.	82	.208	.225	.061	.155	.336
DuPont	72	.166	.168	.045	.107	.236
E.Kodak	78	.179	.206	.080	.109	.355
Ford	32	.180	.186	.047	.132	.247
GE	82	.232	.236	.047	.123	.322
GM	87	.129	.130	.036	.061	.181
J&J	69	.213	.208	.053	.135	.289
Merck	21	.201	.249	.077	.183	.320
Mobil	59	.115	.130	.051	.068	.217
P&G	41	.150	.143	.029	.095	.175
Sears	29	.296	.280	.039	.233	.319
Union Pac.	109	.180	.183	.037	.133	.261

Table 4-3c
Annual Implied Standard Deviation: Score Adjusted Score Price[a]; With Dividend Adjustment

Firm	N	Median	Average	Standard Deviation	Lower Fifth Obs.	Upper Fifth Obs.
Amoco	72	.214	.225	.059	.150	.349
Atl.Rich.[b]	60	.214	.225	.037	.188	.296
Bris.Myers	53	.248	.253	.051	.197	.329
Chevron	73	.253	.253	.056	.187	.333
Coca Cola	53	.264	.270	.043	.191	.342
Dow Chem.	82	.250	.265	.052	.206	.368
DuPont	72	.253	.260	.037	.211	.314
E.Kodak	78	.274	.289	.111	.184	.385
Ford	32	.235	.266	.089	.190	.424
GE	82	.257	.275	.100	.202	.395
GM	87	.256	.258	.032	.210	.325
J&J	69	.261	.257	.059	.182	.349
Merck	21	.259	.305	.074	.252	.360
Mobil	59	.242	.259	.054	.201	.351
P&G	41	.227	.223	.021	.179	.255
Sears	29	.350	.352	.046	.261	.406
UnPac	109	.228	.238	.098	.184	.308

[a]Adjusted Score Price= Stock Price-Prime Price
[b]The number of observations for Atlantic Richfield declined from 64 to 60 because there were four weeks for which the prime did not trade. Therefore the score price could not be adjusted.

Table 4-3d
Annual Implied Standard Deviations: Scores
Adjusted Score Price[a]; Without Dividend Adjustment

Firm	N	Median	Average	Standard Deviation	Lower Fifth Obs	Upper Fifth Obs
Amoco	72	.117	.126	.046	.062	.217
AtlRich[b]	60	.108	.114	.031	.083	.172
Bris.My.	53	.148	.148	.050	.077	.213
Chevron	73	.151	.153	.042	.095	.215
Coca Cola	52	.186	.192	.038	.142	.255
Dow Chem.	82	.163	.178	.050	.120	.275
DuPont	72	.150	.155	.040	.099	.216
E.Kodak	78	.186	.193	.119	.101	.267
Ford	32	.100	.126	.076	.051	.253
GE	82	.197	.211	.099	.133	.307
GM	87	.110	.112	.028	.063	.167
J&J	69	.206	.200	.058	.127	.288
Merck	21	.191	.230	.068	.182	.280
Mobil	59	.111	.126	.051	.076	.208
P&G	41	.133	.131	.028	.089	.163
Sears	29	.261	.254	.037	.213	.288
Un.Pac.	109	.169	.175	.100	.111	.230

[a]Adjusted Score Price= Stock Price -Prime Price
[b]The number of observations for Atlantic Richfield declined from 64 to 60. There were four weeks in which the prime did not trade. Therefore, the score price could not be adjusted.

Table 4-4a
Average Annual Implied Standard Deviations[a]: Calls With Dividend Adjustment

Firm	N	Median	Average	Standard Deviation	Lower Fifth Obs.	Upper Fifth Obs.
Amoco	72	.183	.200	.069	.130	.333
Atl.Rich.	64	.182	.191	.062	.132	.258
Bris.Myers	53	.264	.271	.053	.217	.351
Chevron	73	.192	.211	.075	.141	.336
Coca Cola	52	.252	.306	.165	.194	.538
Dow Chem.	82	.232	.258	.076	.187	.417
DuPont	72	.238	.250	.061	.149	.360
E.Kodak	78	.272	.306	.083	.209	.451
Ford	32	.200	.263	.173	.171	.403
GE	82	.218	.259	.107	.178	.519
GM	87	.210	.220	.044	.169	.332
J&J	69	.219	.247	.086	.164	.413
Merck	21	.274	.278	.040	.245	.321
Mobil	59	.221	.243	.086	.159	.340
P&G	41	.221	.223	.034	.182	.258
Sears	29	.245	.284	.093	.217	.385
Un.Pac.	109	.204	.215	.055	.149	.309

[a]The average ISD is the the average of the daily average ISD. The daily average ISD is the arithmetic mean of the Implied Standard Deviations of all calls trading on a given day.

Table 4-4b
Average Annual Implied Standard Deviations[a]:Calls Without Dividend Adjustment

Firm	N	Median	Average	Standard Deviation	Lower Fifth Obs	Upper Fifth Obs.
Amoco	72	.156	.164	.071	.039	.271
AtlRich	64	.156	.157	.060	.085	.230
Bris.My.	53	.215	.249	.104	.160	.426
Chevron	73	.161	.178	.079	.075	.302
CocaCola	52	.227	.286	.171	.163	.519
Dow Chem.	82	.220	.241	.080	.154	.408
DuPont	72	.214	.222	.068	.144	.328
E.Kodak	78	.223	.237	.081	.157	.401
Ford	32	.168	.223	.177	.121	.385
GE	82	.195	.232	.109	.139	.481
GM	87	.173	.168	.043	.075	.242
J&J	69	.209	.234	.087	.148	.395
Merck	21	.252	.258	.040	.209	.299
Mobil	59	.173	.201	.085	.120	.323
P&G	41	.209	.202	.045	.143	.252
Sears	29	.229	.259	.096	.195	.359
Un.Pac.	109	.195	.203	.055	.134	.301

[a]The average ISD is the average of the daily average ISD. The daily average ISD is the arithmetic mean of the ISDs of all calls trading on a given day.

Table 4-4c
Annual Implied Standard Deviations by Time to Maturity[a]: Calls With Dividend Adjustment

Firm		N	0-1	N	1-2	N	2-3	N	>3[b]
			Time to Maturity (months)						
Amoco	Median	41	.178	47	.184	23	.179	40	.181
	Average		.192		.214		.186		.195
	SD		.074		.086		.036		.067
Atl. Rich.	Median	37	.190	42	.180	12	.181	20	.168
	Average		.207		.191		.206		.168
	SD		.078		.059		.080		.032
Bristol Myers	Median	33	.214	44	.230	14	.243	36	.233
	Average		.256		.268		.258		.260
	SD		.121		.119		.069		.092
Chevron	Median	37	.200	58	.210	22	.211	51	.188
	Average		.209		.215		.230		.195
	SD		.072		.080		.092		.065
Coca Cola	Median	29	.282	37	.257	14	.240	34	.235
	Average		.324		.287		.247		.299
	SD		.191		.122		.055		.136
Dow Chem.	Median	48	.242	64	.237	19	.230	66	.233
	Average		.270		.264		.251		.249
	SD		.122		.083		.064		.064
DuPont	Median	45	.236	56	.237	23	.236	43	.224
	Average		.252		.254		.250		.233
	SD		.065		.059		.047		.057
E.Kodak	Median	49	.256	62	.252	17	.249	41	.239
	Average		.268		.265		.244		.250
	SD		.114		.083		.023		.064
Ford	Median	19	.213	24	.210	6	.208	28	.202
	Average		.301		.240		.232		.239
	SD		.222		.106		.051		.096
GE	Median	50	.236	68	.220	17	.212	66	.216
	Average		.276		.263		.259		.246
	SD		.132		.118		.142		.084
GM	Median	51	.214	61	.216	18	.212	61	.209
	Average		.218		.228		.213		.212
	SD		.059		.043		.041		.033

Table 4-4c(continued)

Firm		N	Time to Maturity (months) 0-1	N	1-2	N	2-3	N	>3
J&J	Median	45	.210	59	.219	19	.218	43	.216
	Average		.253		.249		.269		.222
	SD		.090		.093		.108		.062
Merck	Median	9	.277	14	.272	7	.275	10	.262
	Average		.278		.278		.286		.277
	SD		.037		.042		.045		.044
Mobil	Median	36	.216	44	.227	20	.219	38	.222
	Average		.241		.247		.235		.253
	SD		.109		.100		.067		.091
P&G	Median	26	.212	33	.218	11	.233	26	.218
	Average		.216		.223		.235		.221
	SD		.044		.041		.028		.038
Sears	Median	18	.261	22	.252	7	.235	14	.234
	Average		.295		.273		.267		.276
	SD		.108		.070		.057		.094
Union Pacific	Median	52	.209	65	.203	26	.216	58	.197
	Average		.211		.222		.228		.205
	SD		.056		.058		.055		.058

[a]For each trading day in the sample, all calls were categorized by time to maturity. Therefore, an ISD for each call trading on a given day is included in the sample.
[b]The total number of observations may not match the total number of calls. On some days, more than one call with a maturity of longer than three months was traded. These calls are included as a single observation.

Table 4-4d
Annual Implied Standard Deviations by Time to Maturity[a]:Calls Without Dividend Adjustment

Firm		N	0-1	N	1-2	N	2-3	N	>3 months[b]
			Time to Maturity(Months)						
Amoco	Median	41	.170	47	.165	23	.148	40	.141
	Average		.168		.188		.150		.140
	SD		.072		.081		.040		.074
Atl. Rich	Median	37	.170	42	.153	12	.153	20	.128
	Average		.171		.157		.170		.129
	SD		.072		.058		.084		.038
Bris. Myers	Median	33	.215	44	.218	14	.239	36	.211
	Average		.247		.253		.244		.237
	SD		.118		.119		.063		.092
Chevron	Median	37	.185	58	.188	22	.169	51	.148
	Average		.192		.190		.190		.149
	SD		.068		.081		.094		.075
Coca Cola	Median	29	.243	37	.242	14	.222	34	.216
	Average		.306		.267		.235		.278
	SD		.200		.127		.060		.139
Dow Chem.	Median	48	.241	64	.234	19	.220	66	.196
	Average		.265		.251		.239		.219
	SD		.125		.087		.067		.070
DuPont	Median	45	.212	56	.227	23	.221	43	.196
	Average		.221		.231		.221		.199
	SD		.077		.065		.060		.060
E.Kodak	Median	49	.240	62	.226	17	.213	41	.207
	Average		.255		.246		.210		.216
	SD		.110		.086		.022		.071
Ford	Median	19	.212	24	.193	6	.171	28	.138
	Average		.295		.220		.190		.178
	SD		.211		.118		.049		.113
GE	Median	50	.233	68	.204	17	.200	66	.181
	Average		.262		.241		.234		.208
	SD		.134		.120		.143		.085
GM	Median	51	.178	61	.187	18	.161	61	.149
	Average		.182		.189		.153		.148
	SD		.052		.036		.060		.039

Table 4-4d(continued)

Firm		N	Time to maturity(months) 0-1	N	1-2	N	2-3	N	> 3[b]
J&J	Median	45	.210	59	.203	19	.197	43	.201
	Average		.243		.236		.254		.206
	SD		.088		.094		.109		.064
Merck	Median	9	.249	14	.246	7	.255	10	.245
	Average		.243		.236		.254		.206
	SD		.047		.040		.042		.035
Mobil	Median	36	.181	44	.191	20	.163	38	.168
	Average		.219		.217		.187		.188
	SD		.105		.102		.071		.096
P&G	Median	26	.212	33	.205	11	.219	26	.183
	Average		.210		.204		.218		.181
	SD		.052		.049		.036		.047
Sears	Median	18	.248	22	.236	7	.206	14	.189
	Average		.282		.254		.239		.236
	SD		.108		.075		.056		.096
Union Pac.	Median	52	.206	65	.196	26	.212	58	.176
	Average		.205		.211		.217		.184
	SD		.057		.058		.052		.057

[a]For each trading day in the sample, all calls were categorized by time to maturity. Therefore, an ISD for each call trading on a given day is included in the figures on the Table.

[b]The total number of observations may not match the total number of calls. On some days, more than one call with a maturity of more than three months was traded. These calls are included as a single observation.

Table 4-5a
A Comparison of Annual Implied Standard Deviations[a]
Average of Differences
Calls and Scores
Market Price for Score

Firm	N	Dividend Adjusted ISD(call)-ISD(score)[b] (in percent)	Non-Dividend Adjusted ISD(call)-ISD(score)[b] (in percent)
Amoco	152	-3.90	-2.30
		(-9.620)***	(-5.178)***
Atlantic Richfield	111	-3.67	3.96
		(-8.864)***	(8.898)***
Bristol Myers	127	-9.00	8.10
		(-1.129)ns	(10.507)***
Chevron	174	-6.20	0.70
		(-10.073)***	(1.187)ns
Coca Cola	114	-0.500	5.80
		(-.482)ns	(5.232)***
Dow Chemical	206	-5.94	1.05
		(-10.335)***	(1.916)*
DuPont	176	-2.50	4.70
		(-6.632)***	(9.400)***
E. Kodak	169	-4.80	2.70
		(-7.850)***	(4.425)***
Ford	87	-6.90	1.14
		(-6.210)***	(1.933)*
General Electric	228	-3.99	1.90
		(-6.792)***	(2.266)**
General Motors	196	-5.67	3.90
		(-16.769)***	(10.033)***
Johnson &Johnson	166	-1.80	2.50
		(-4.568)***	(6.203)***
Merck	43	2.90	1.40
		(3.332)***	(1.875)*

Table 4-5a (continued)

		Dividend Adjusted ISD(call)-ISD(score)[b] (in percent)	Non-Dividend Adjusted ISD(call)-ISD(score)[b] (in percent)
Mobil	138	-2.10 (-4.505)***	7.3 (13.385)***
Proctor &Gamble	96	-1.20 (-3.826)***	6.00 (15.699)***
Sears	61	-1.11 (-11.182)***	-3.04 (-2.574)**
Union Pacific	203	-3.31 (-7.329)***	1.80 (4.093)***

[a] The ISD of the score was subtracted from the ISD of each corresponding at the money call trading on the same day. One or two or three or four calls were matched to each score.
[b] t-statistic for the difference of the mean from zero is in parentheses.
*** = difference significantly different from zero at a 1% level of confidence
** = difference significantly different from zero at a 5% level of confidence
* = difference significantly different from zero at a 10% level of confidence
ns = difference not significantly different from zero

Table 4-5b
A Comparison of Annual Implied Standard Deviations[a]
Average of Differences
Calls and Scores
Adjusted Score Price[b]

Firm	N	Dividend Adjusted ISD(call)-ISD(score)[c] (in percent)	Non Dividend Adjusted ISD(call)-ISD(score)[c] (in percent)
Amoco	152	-2.50 (-5.179)***	3.89 (8.564)***
Atlantic Richfield	105[d]	-3.03 (-6.221)***	40.34 (8.954)***
Bristol Myers	127	1.10 (1.531)[ns]	9.90 (13.787)***
Chevron	174	-3.90 (-6.126)***	2.76 (4.424)***
Coca Cola	114	2.38 (2.028)**	8.33 (6.658)***
Dow Chemical	206	-0.75 (-1.557)[ns]	6.07 (11.989)***
DuPont	176	-1.10 (-2.573)**	6.10 (11.995)***
E. Kodak	169	-2.68 (-2.930)***	2.75 (4.425)***
Ford	87	-1.20 (-1.315)[ns]	8.70 (8.309)***
General Electric	228	-3.60 (-10.924)***	1.87 (2.266)**
General Motors	196	-1.73 (-2.174)**	5.89 (15.599)***
Johnson &Johnson	166	-1.10 (-2.574)**	3.20 (7.541)***
Merck	43	-1.90 (-2.271)*	3.30 (4.888)***
Mobil	138	-1.70 (-3.031)***	7.60 (12.625)***

Table 4-5b (continued)

		Dividend Adjusted ISD(call)-ISD(score)[c] (in percent)	Non-Dividend Adjusted ISD(call)-ISD(score)[c] (in percent)
Proctor &Gamble	96	0.05 (.160)ns	7.10 (16.451)***
Sears	61	-8.10 (-7.758)***	-.49 (-.419)ns
Union Pacific	203	-1.81 (-2.902)***	3.14 (4.963)***

[a] The ISD of the score was subtracted from the ISD of each corresponding at the money option trading on the same day. One or two or three or four calls were matched with each score.
[b] Adjusted Score Price = Stock Price - Prime Price
[c] t-statistic for the difference of the mean from zero is in parentheses.
[d] The number of observations for Atlantic Richfield declined. The prime did not trade on four separate occasions. Consequently, the score price could not be adjusted. Therefore, four scores and five call observations were dropped from the sample.

*** = difference significantly different from zero at a 1% level of confidence
** = difference significantly different from zero at a 5% level of confidence
* = difference significantly different from zero at a 10% level of confidence
ns = difference not significantly different from zero

Table 4-6a
Comparison of Annual Implied Standard Deviations
Scores and Calls
Market Price for Score, With Dividend Adjustment

Firm	Total N	ISD(Score)> ISD(Call) N	ISD(Score)> ISD(Call) %	ISD(Score)< ISD(Call) N	ISD(Score)< ISD(Call) %	Confidence Interval[a,b]
Amoco	152	134	88.2	18	11.8	83.1, 93.3
Atl.Rich.	111	95	85.6	16	14.4	79.1, 92.1
Bris.My.	127	91	71.7	36	28.3	63.8, 79.5
Chevron	174	139	79.9	35	20.1	73.8, 85.6
Coca Cola	114	78	68.4	36	31.6	59.9, 76.9
Dow Chem.	206	139	67.5	67	32.5	61.1, 73.9
DuPont	176	128	72.7	48	27.3	66.1, 79.3
E.Kodak	169	129	76.3	40	23.7	69.9, 82.7
Ford	87	74	85.1	13	14.9	77.6, 92.6
GE	228	180	78.9	48	21.1	67.0, 90.8
GM	196	179	91.3	17	8.7	87.3 95.2
J&J	166	119	71.7	47	28.3	64.8, 78.6
Merck	43	13	30.2	30	69.8	16.4, 43.9
Mobil	138	103	74.6	35	25.4	67.3, 81.9
P&G	96	67	69.8	29	30.2	60.6, 79.0
Sears	61	58	95.1	3	4.9	89.9, 100
Un. Pac.	203	151	74.4	52	25.6	69.1, 80.0
Total	2447	1877	76.7	570	23.3	75.0, 78.4

[a] 10% confidence interval: p + or - 1.96*SQRT(p(1-p)/n)
[b] Confidence interval is constructed around the observed proportion of ISD(Scores)> ISD(Calls)

Table 4-6b
Comparison of Annual Implied Standard Deviations
Scores and Calls
Market Price for Score, Without Dividend Adjustment

	Total	ISD(Score) > ISD(Call)		ISD(Score) < ISD(Call)		Confidence
Firm	N	N	%	N	%	Interval[a,b]
Amoco	152	42	27.6	110	72.4	20.5, 34.7
Atl.Rich	111	18	16.2	93	83.8	9.3, 23.1
Bris.My.	127	8	6.3	119	93.7	2.1, 10.5
Chevron	174	84	48.3	90	51.7	40.9, 55.7
CocaCola	114	25	21.9	89	78.1	14.3, 29.5
Dow Chem.	206	96	46.6	110	53.4	39.8, 53.4
DuPont	176	33	18.8	143	81.2	13.0, 24.6
E.Kodak	169	52	30.8	117	69.2	23.8, 37.8
Ford	87	54	62.1	33	37.9	51.9, 72.3
GE	228	152	66.7	76	33.3	60.6, 72.8
GM	196	38	19.4	158	80.6	14.7, 25.1
J&J	166	62	37.3	104	62.7	29.9, 44.6
Merck	43	14	32.6	29	67.4	18.6, 46.6
Mobil	138	7	5.1	131	94.9	1.4, 8.8
P&G	96	7	7.3	89	92.7	2.1, 12.5
Sears	61	40	65.6	21	34.4	53.7, 77.7
Un.Pac.	203	77	37.9	126	62.1	31.2, 44.6
Total	2447	809	33.1	1638	66.9	31.2, 35.0

[a] 10% confidence interval: p + or - 1.96*SQRT (p(1-p)/n)
[b] Confidence interval is constructed around the observed proportion of ISD(Scores) > ISD(Calls)

Table 4-6c
Comparison of Annual Implied Standard Deviations
Scores and Calls
Adjusted Score Price[a], With Dividend Adjustment

Firm	Total N	ISD(Score) > ISD(Call) N	ISD(Score) > ISD(Call) %	ISD(Score) < ISD(Call) N	ISD(Score) < ISD(Call) %	Confidence Interval[b,c]
Amoco	152	112	73.7	40	26.3	66.7, 80.7
Atl.Rich.[d]	105	81	77.1	24	22.9	69.1, 85.1
Bris.Myers	127	69	54.3	58	45.7	44.7, 63.0
Chevron	174	125	71.8	49	28.2	65.1, 78.5
Coca Cola	114	63	55.3	51	44.7	46.2, 64.4
Dow Chem.	206	120	58.3	86	41.7	51.6, 65.0
DuPont	176	111	63.1	65	36.9	56.0, 70.2
E.Kodak	169	116	68.6	53	31.4	61.6, 75.6
Ford	87	60	69.0	27	31.0	57.3, 80.7
GE	228	163	71.5	65	28.5	65.6, 77.4
GM	196	161	82.1	35	17.9	76.7, 87.5
J&J	166	110	66.3	56	33.7	59.1, 73.5
Merck	43	29	67.4	14	32.6	50.3, 84.5
Mobil	138	97	70.3	41	29.7	62.3, 77.9
P&G	96	46	47.9	50	52.1	37.9, 57.9
Sears	61	53	86.9	8	13.1	78.4, 95.4
Union Pac.	203	135	66.5	68	33.5	60.0, 73.0
Total	2441	1651	67.6	790	32.4	65.7, 69.4

[a] Adjusted Score Price = Stock Price - Prime Price
[b] 10% confidence interval: p + or - 1.96*SQRT(p(1-p)/n)
[c] Confidence interval is constructed around the observed proportion of ISD(Scores) > ISD(Calls)
[d] There are fewer observations for Atlantic Richfield. On several occasions, the prime did not trade. Consequently, those scores were not adjusted, and the scores and corresponding calls were dropped from the sample.

Table 4-6d
Comparison of Annual Implied Standard Deviations
Scores and Calls
Adjusted Score Price[a], Without Dividend Adjustment

Firm	Total N	ISD(Score) > ISD(Call) N	ISD(Score) > ISD(Call) %	ISD(Score) < ISD(Call) N	ISD(Score) < ISD(Call) %	Confidence Interval[b,c]
Amoco	152	37	24.3	115	75.7	17.5, 31.1
Atl.Rich.[d]	105	18	17.1	87	82.9	9.9, 24.3
Bris.Myers	127	5	3.9	122	96.1	0.05, 07.3
Chevron	174	66	37.9	108	62.1	30.7, 45.1
Coca Cola	114	17	14.9	97	85.1	9.6, 20.2
Dow Chem.	206	39	18.9	167	81.1	13.6, 24.2
DuPont	176	26	14.8	150	85.2	9.6, 20.0
E.Kodak	169	52	30.8	117	69.2	23.8, 37.8
Ford	87	10	11.5	77	88.5	4.8, 18.2
GE	228	87	38.2	141	61.8	31.9, 44.5
GM	196	18	9.2	178	90.6	5.2, 13.2
J&J	166	51	30.7	115	69.3	23.7, 37.7
Merck	43	10	23.3	33	76.7	10.7, 35.9
Mobil	138	11	8.0	127	92.0	3.5, 12.5
P&G	96	6	6.3	90	93.7	1.4, 11.2
Sears	61	37	60.7	24	39.3	48.4, 72.9
Union Pac	203	44	21.7	159	78.3	16.0, 27.4
Total	2441	554	22.7	1887	77.3	21.0, 24.4

[a] Adjusted Score Price = Stock Price - Prime Price
[b] 10% confidence interval: p + or -1.96*SQRT(p(1-p)/n)
[c] Confidence interval is constructed around the observed proportion of ISD(Scores) > ISD(Calls)
[d] There are fewer observations for Atlantic Richfield. On several occasions, the prime did not trade. Consequently, those scores were not adjusted, and the scores and corresponding calls were dropped from the sample.

Table 4-7a
A Comparison of Average Annual Implied Standard Deviations[a,b]
Calls and Scores
Market Price for Score

Firm	N	Dividend Adjusted ISDAVG(call)-ISD(score) (in percent)[c]	Non Dividend Adjusted ISDAVG(call)-ISD(score) (in percent)
Amoco	72	-3.84 (-6.985)***	2.73 (4.905)***
Atl. Rich.	64	-3.80 (-7.660)***	3.99 (7.517)***
Bristol Myers	53	-6.36 (-0.561)ns	8.45 (7.484)***
Chevron	73	-6.47 (-7.310)***	0.57 (0.664)ns
Coca Cola	52	0.56 (0.289)ns	6.80 (3.335)***
Dow Chemical	82	-5.61 (-6.680)***	1.60 (1.947)*
DuPont	72	-2.43 (-4.306)***	5.38 (7.291)***
E.Kodak	78	-4.48 (-5.332)***	3.06 (3.618)***
Ford	32	-6.59 (-2.706)***	3.76 (1.444)ns
GE	82	-4.27 (-4.422)***	-0.37 (-.354)ns
GM	87	-5.70 (-11.672)***	3.80 (7.082)***
Johnson &Johnson	69	-1.72 (-3.014)***	2.64 (4.574)***
Merck	21	2.14 (1.721)*	0.88 (0.799)ns
Mobil	59	-2.18 (-3.784)***	7.03 (11.277)***

Table 4-7a (continued)

		Dividend Adjusted ISDAVG(call)-ISD(score)[c] (in percent)	Non-Dividend Adjusted ISDAVG(call)-ISD(score)[c] (in percent)
P&G	41	-1.32 (-3.344)***	5.94 (11.322)***
Sears	29	-9.91 (-5.670)***	-2.07 (-1.062)ns
Union Pacific	109	-3.36 (-5.877)***	1.96 (3.432)***

[a]The average implied standard deviation is the daily average ISD for all at the money calls trading on a given day.
[b]The daily implied standard deviation of each score was subtracted from the daily average call ISD.
[c] t-statistic for the difference of the mean from zero is in parentheses.
*** = difference significantly different from zero at a 1% level of confidence
** = difference significantly different from zero at a 5% level of confidence
* = difference significantly different from zero at a 10% level of confidence
ns = difference not significantly different from zero

Table 4-7b
A Comparison of Average Annual Implied Standard Deviations[a,b]
Average of Differences
Calls and Scores
Adjusted Score Price[c]

Firm	N	Dividend Adjusted ISDAVG(call)-ISD(score)[d] (in percent)	Non Dividend Adjusted ISDAVG(call)-ISD(score)[d] (in percent)
Amoco	72	-2.48 (-3.663)***	3.85 (6.112)***
Atlantic[e] Richfield	60	-3.10 (-5.236)***	4.38 (7.552)***
Bristol Myers	53	1.10 (1.080)^{ns}	10.05 (9.565)***
Chevron	73	-4.26 (-4.573)***	2.50 (2.769)***
Coca Cola	52	3.59 (1.670)*	9.50 (4.209)***
Dow Chemical	82	-0.72 (-1.126)*	6.30 (9.689)***
DuPont	72	-0.99 (-1.550)^{ns}	6.77 (9.272)***
E.Kodak	78	-2.80 (-2.092)**	3.07 (3.618)***
Ford	32	-3.60 (-0.168)^{ns}	9.77 (4.340)***
General Electric	82	-1.63 (-1.294)^{ns}	2.13 (1.621)^{ns}
General Motors	87	-3.78 (-8.275)***	5.61 (11.680)***
Johnson &Johnson	69	-0.95 (-1.558)^{ns}	3.37 (5.408)***
Merck	21	-2.69 (-2.193)**	2.78 (2.678)***
Mobil	59	-1.66 (-2.197)**	7.47 (9.962)***

Table 4-7b (continued)

		Dividend Adjusted ISDAVG(call)-ISD(score) (in percent)[d]	Non-Dividend Adjusted ISDAVG(call)-ISD(score) (in percent)
Proctor & Gamble	41	-0.080 (-0.184)^{ns}	7.10 (11.686)***
Sears	29	-6.76 (-3.702)***	0.540 (0.275)^{ns}
Union Pacific	109	-2.25 (-2.342)**	1.96 (3.432)***

[a] The average implied standard deviation is the daily average ISD

[b] The daily implied standard deviation of each score was subtracted from the daily average call ISD.

[c] Adjusted Score Price = Stock Price - Prime Price

[d] The t-statistic for the difference of the mean from zero is in parentheses.

[e] The number of observations for Atlantic Richfield declined. The prime did not trade during four weeks in the sample. Therefore, the score price could not be adjusted.

*** = difference significantly different from zero at a 1% level of confidence

** = difference significantly different from zero at a 5% level of confidence

* = difference significantly different from zero at a 10% level of confidence

ns = difference not significantly different from zero

Table 4-8a
Comparison of Annual Implied Standard Deviations
Scores and Average ISD of Calls
Market Price for Score, With Dividend Adjustment

Firm	Total N	ISD(Score)> ISDAVG(Call) N	%	ISD(Score)< ISDAVG(Call) N	%	Confidence Interval[a,b]
Amoco	72	62	86.1	10	13.9	77.5, 94.7
Atl.Rich.	64	57	89.1	7	10.9	81.5, 96.7
Bris.My.	53	38	71.7	15	28.3	57.4, 86.0
Chevron	73	62	84.9	11	15.1	76.7, 93.1
CocaCola	52	33	63.5	19	36.5	50.4, 76.6
Dow Chem.	82	54	65.9	28	34.1	55.6, 76.2
DuPont	72	51	70.8	21	29.2	60.3, 81.3
E.Kodak	78	60	76.9	18	23.1	67.5, 86.2
Ford	32	27	84.4	5	15.6	71.8, 97.0
GE	82	64	78.0	18	22.0	69.0, 87.0
GM	87	81	93.1	6	6.9	87.8, 98.4
J&J	69	51	73.9	18	26.1	62.4, 85.3
Merck	21	8	38.1	13	61.9	17.3, 58.9
Mobil	59	45	76.3	14	23.7	65.4, 87,2
P&G	41	33	80.5	8	19.5	68.4, 87.2
Sears	29	27	93.1	2	6.9	83.9, 1.00
Un.Pac.	109	82	75.2	27	24.8	67.1, 83.3
Total	1075	835	77.7	240	22.3	75.2, 80.2

[a] 10% confidence interval: p + or - 1.96*SQRT(p(1-p)/n)
[b] Confidence interval is constructed around the observed proportion of ISD(Scores)> ISDAVG(Calls)

Table 4-8b
Comparison of Annual Implied Standard Deviations
Scores and Average ISD of Calls
Market Price for Scores, Without Dividend Adjustment

Firm	Total N	ISD(Score) > ISDAVG(Call) N	%	ISD(Score) < ISDAVG(Call) N	%	Confidence Interval[a,b]
Amoco	72	19	26.4	53	73.6	16.2, 36.6
Atl.Rich.	64	7	10.9	57	89.1	3.3, 18.5
Bris.Myers	53	2	3.8	51	96.2	0.0, 8.9
Chevron	73	36	49.3	37	50.7	37.8, 60.7
CocaCola	52	9	17.3	43	82.7	7.0, 27.6
Dow Chem.	82	31	37.8	51	62.2	27.3, 48.2
DuPont	72	11	15.3	61	84.7	7.0, 23.6
E.Kodak	78	22	28.2	56	71.8	18.2, 38.2
Ford	32	18	56.3	14	43.7	39.1, 73.4
GE	82	55	67.1	27	32.9	56.9, 77.3
GM	87	15	17.2	72	82.8	9.3, 25.1
J&J	69	25	36.2	44	63.8	24.9, 47.5
Merck	21	8	38.1	13	61.9	21.6, 42.0
Mobil	59	0	0	59	100.0	0.0, 0.0
P&G	41	2	4.9	39	95.1	0.0, 11.5
Sears	29	18	62.1	11	37.9	44.4, 79.7
Union Pac.	109	37	33.9	72	66.1	25.0, 42.8
Total	1075	315	29.3	760	70.7	26.6, 32.0

[a] 10% confidence interval: p + or - 1.96*SQRT(p(1-p)/n)
[b] Confidence interval is constructed around the observed proportion of ISD(scores)> ISDAVG(calls)

Table 4-8c
Comparison of Annual Implied Standard Deviations Scores and Average ISD of Calls Adjusted Score Price[a], With Dividend Adjustment

	Total	ISD(Score) > ISDAVG(Call)		ISD(Score) < ISDAVG(Call)		Confidence
	N	N	%	N	%	Interval[b,c]
Amoco	72	53	73.6	19	26.4	63.4, 83.8
Atl.Rich.[d]	60	49	81.7	11	18.3	71.9, 91.4
Bris.Myers	53	29	54.7	24	45.3	47.9, 61.5
Chevron	73	55	75.3	18	24.7	70.2, 80.3
CocaCola	52	27	51.9	25	48.1	33.0, 70.7
Dow Chem.	82	45	54.9	37	45.1	44.1, 65.7
DuPont	72	42	58.3	30	41.7	46.9, 69.7
E.Kodak	78	60	76.9	18	23.1	67.5, 86.2
Ford	32	22	68.8	10	31.2	52.7, 84.8
GE	82	60	73.2	22	26.8	63.6, 82.8
GM	87	73	83.9	14	16.1	76.2, 91.6
J&J	69	46	66.7	23	33.3	55.6, 77.8
Merck	21	15	71.4	6	28.6	52.1, 90.7
Mobil	59	41	69.5	18	30.5	57.7, 81.2
P&G	41	19	46.3	22	53.7	33.6, 59.0
Sears	29	25	86.2	4	13.8	73.6, 98.7
Union Pac	109	74	67.9	35	32.1	59.1, 78.5
Total	1071	735	68.6	336	31.4	65.8, 71.4

[a] Adjusted Score Price = Stock Price - Prime Price
[b] 10% confidence interval: p + or -1.96*SQRT(p(1-p)/n)
[c] Confidence interval is constructed around the observed proportion of ISD(Scores) > ISDAVG(Calls)
[d] There are fewer observations for Atlantic Richfield. On several occasions, the prime did not trade. Consequently, those scores were not adjusted, and the scores and corresponding calls were dropped from the sample.

Table 4-8d
Comparison of Annual Implied Standard Deviations Scores and Average ISD of Calls Adjusted Score Price,[a] Without Dividend Adjustment

Firm	Total N	ISD(Score)> ISDAVG(Call) N	%	ISD(Score)< ISDAVG(Call) N	%	Confidence Interval[b,c]
Amoco	72	20	27.8	52	72.2	17.4, 38.1
Atl.Rich.[d]	60	10	16.7	50	83.3	7.0, 25.8
Bris.Myers	53	1	1.9	52	98.1	0, 5.5
Chevron	73	28	38.4	45	61.6	27.2, 49.6
CocaCola	52	8	15.4	44	84.6	5.6, 25.2
Dow Chem.	82	11	13.4	71	86.6	6.0, 20.8
DuPont	72	7	9.7	65	90.3	2.9, 16.5
E.Kodak	78	22	28.2	56	71.8	18.2, 38.2
Ford	32	4	12.5	28	87.5	1.0, 23.9
GE	82	30	36.6	52	63.4	26.2, 47.0
GM	87	8	9.2	79	90.8	3.1, 15.3
J&J	69	19	27.5	50	72.5	17.0, 38.0
Merck	21	6	28.6	15	71.4	9.3, 47.9
Mobil	59	1	1.7	58	98.3	0.0, 5.0
P&G	41	2	4.9	39	95.1	0.0, 11.5
Sears	29	15	51.7	14	48.3	33.5, 69.9
Union Pac	109	31	28.4	78	71.6	19.9, 36.9
Total	1071	230	21.5	841	78.5	19.0, 24.0

[a] Adjusted Score Price = Stock Price - Prime Price
[b] 10% confidence interval: p + or - 1.96*SQRT(p(1-p)/n)
[c] Confidence interval is constructed around the observed proportion of ISD(Scores)> ISDAVG(Calls)
[d] There are fewer observations for Atlantic Richfield. On several occasions, the prime did not trade. Consequently, those scores were not adjusted, and the scores and corresponding calls were dropped from the sample.

Table 4-9a
Differences in Annual Implied Standard Deviations[a]
Calls and Scores
Market Prices for Scores, With Dividend Adjustment

Firm		Time to Call Maturity (months)							
		N	0-1	N	1-2	N	2-3	N	>3[b]
Amoco	Avg.	(41)	-.046	(47)	-.025	(23)	-.048	(40)	-.042
	t		-5.858		-2.901		-5.567		-6.647
Atl.	Avg.	(37)	-.024	(42)	-.039	(12)	-.039	(20)	-.054
Rich.	t		-2.765		-6.265		-3.560		-9.502
Bristol	Avg.	(33)	-.015	(44)	-.002	(14)	-.023	(36)	-.007
Myers	t		-.819		-.110		-1.526		-.697
Chevron	Avg.	(37)	-.062	(58)	-.057	(22)	-.063	(51)	-.070
	t		-4.052		-5.133		-3.288		-7.364
Coca	Avg.	(29)	.021	(37)	-.010	(14)	-.043	(34)	-.006
Cola	t		.666		-.796		-3.156		-.432
Dow	Avg.	(48)	-.056	(64)	-.052	(19)	-.058	(66)	-.065
Chemical	t		-3.466		-5.691		-3.371		-7.468
DuPont	Avg.	(45)	-.020	(56)	-.014	(23)	-.021	(43)	-.040
	t		-2.707		-2.519		-2.440		-5.215
E.Kodak	Avg.	(49)	-.039	(62)	-.040	(17)	-.031	(41)	-.079
	t		-2.695		-4.436		2.497		-7.529
Ford	Avg.	(19)	-.044	(24)	-.091	(6)	-.092	(28)	-.084
	t		-1.030		-6.674		-4.579		-8.482
GE	Avg.	(50)	-.022	(68)	-.037	(17)	-.030	(66)	-.055
	t		-1.443		-3.148		-1.029		-6.971
GM	Avg.	(51)	-.060	(61)	-.046	(18)	-.059	(61)	-.062
	t		-7.403		-8.641		-6.902		-10.556
J&J	Avg.	(45)	-.011	(59)	-.014	(19)	-.009	(43)	-.035
	t		-1.322		-2.018		-.740		-6.168
Merck	Avg.	(9)	.013	(14)	.025	(7)	.039	(10)	.045
	t		.514		1.579		4.444		2.433
Mobil	Avg.	(36)	-.026	(44)	-.021	(20)	-.02	(38)	-.018
	t		-2.046		-2.443		-2.266		-2.974

Table 4-9a (continued)

Firm		Time to Call Maturity (in months) N	0-1	N	1-2	N	2-3	N	>3[b]
P&G	Avg.	(26)	-.016	(33)	-.010	(11)	.002	(26)	-.014
	t		-2.837		-2.064		.139		-2.741
Sears	Avg.	(18)	-.089	(22)	-.116	(7)	-.142	(14)	-.117
	t		-3.383		-10.197		-8.387		-6.311
Union Pacific	Avg.	(52)	-.039	(65)	-.025	(26)	-.025	(58)	-.040
	t		-3.972		-3.044		-2.254		-5.270

[a]Differences shown are ISD(call)-ISD(score)
[b]The number of observations may not equal the total of calls. If on any given day more than one call had greater than three months to maturity, it was recorded as one observation.

Table 4-9b
Differences in Annual Implied Standard Deviations[a]
Calls and Scores
Market Price for Scores, Without Dividend Adjustment

Firm		N	0-1	N	1-2	N	2-3	N	>3[b]
Amoco	Avg	(41)	.031	(47)	.050	(23)	.016	(40)	.004
	t		4.182		6.084		2.643		.552
Atl. Rich	Avg.	(37)	.053	(42)	.041	(12)	.040	(20)	.014
	t		5.960		6.196		2.638		2.189
Bris. Myers	Avg.	(33)	.083	(44)	.089	(14)	.070	(36)	.076
	t		4.699		5.984		3.267		7.501
Chevron	Avg.	(37)	.022	(58)	.020	(22)	.007	(51)	-.016
	t		1.672		1.908		.364		-1.541
Coca Cola	Avg.	(29)	.086	(37)	.051	(14)	.025	(34)	.055
	t		2.528		3.419		1.604		3.585
Dow Chem	Avg.	(48)	.029	(64)	.024	(19)	.015	(66)	-.006
	t		1.788		2.566		.734		-.637
DuPont	Avg.	(45)	.054	(56)	.068	(23)	.054	(43)	.029
	t		5.743		9.959		3.922		3.148
E.Kodak	Avg.	(49)	.047	(62)	.040	(17)	.031	(41)	-.016
	t		3.423		4.347		2.848		-1.545
Ford	Avg.	(19)	.094	(24)	.031	(6)	.001	(28)	-.005
	t		2.216		1.814		.035		-.364
GE	Avg.	(50)	.028	(68)	.007	(17)	.010	(66)	-.028
	t		1.794		.586		.309		-3.291
GM	Avg.	(51)	.050	(61)	.063	(18)	.027	(61)	.018
	t		6.784		12.301		1.950		2.625
J&J	Avg	(45)	.035	(59)	.029	(19)	.035	(43)	.005
	t		4.448		3.897		2.804		.902
Merck	Avg.	(9)	.0002	(14)	.014	(7)	.028	(10)	.024
	t		.011		.889		3.411		1.576
Mobil	Avg.	(36)	.086	(44)	.084	(20)	.062	(38)	.053
	t		6.687		8.496		6.317		6.286

Table 4-9b (continued)

Firm		Time to Call Maturity(months) N	0-1	N	1-2	N	2-3	N	>3[b]
P&G	Avg.	(26)	.071	(33)	.064	(11)	.073	(26)	.040
	t		9.970		10.022		6.311		6.028
Sears	Avg.	(18)	.005	(22)	-.031	(7)	-.065	(14)	-.058
	t		.170		-2.045		-2.489		-2.520
Union Pacific	Avg / t	(52)	.021 / 2.150	(65)	.026 / 3.218	(26)	.028 / 2.372	(58)	.004 / .536

[a]Differences shown are ISD(call)-ISD(score)
[b]The number of observations may not equal the total of calls. If on any given day more than one call had greater than three months to maturity, it was recorded as one observation.

Table 4-9c
Differences in Annual Implied Standard Deviations[a]
Calls and Scores
Adjusted Score Price;[b] With Dividend Adjustment

Firm		Time to Call Maturity(months)							
		N	0-1	N	1-2	N	2-3	N	>3[c]
Amoco	Avg	(41)	-.032	(47)	-.010	(23)	-.035	(40)	-.029
	t		-3.319		-1.036		-3.093		-3.592
Atl. Rich.	Avg	(37)	-.019	(42)	-.032	(12)	-.033	(20)	-.044
	t		-1.873		-4.450		-2.863		-5.025
Bristol Myers	Avg	(33)	.010	(44)	.016	(14)	.014	(36)	.004
	t		.665		1.149		1.013		.344
Chevron	Avg	(37)	-.036	(58)	-.034	(22)	-.042	(51)	-.046
	t		-2.395		-2.950		-2.212		-4.432
Coca Cola	Avg	(29)	.050	(37)	.017	(14)	-.027	(34)	.029
	t		1.486		1.032		-2.582		1.559
Dow Chemical	Avg	(48)	-.003	(64)	-.003	(19)	-.001	(66)	-.015
	t		-.178		-.355		-.085		-2.452
Dupont	Avg	(45)	-.007	(56)	-.002	(23)	-.006	(43)	-.026
	t		-.848		-.223		-.698		-2.716
E.Kodak	Avg	(49)	-.031	(62)	-.004	(17)	-.017	(41)	-.052
	t		-1.367		-1.152		-1.850		-2.306
Ford	Avg	(19)	.013	(24)	-.025	(6)	-.027	(28)	-.014
	t		.354		-2.032		-1.125		-2.254
General Electric	Avg	(50)	-.006	(68)	-.013	(17)	-.006	(66)	-.006
	t		-.289		-.837		-.209		-.408
General Motors	Avg	(51)	-.040	(61)	-.030	(18)	-.037	(61)	-.040
	t		-5.747		-5.134		-3.065		-7.018
Johnson& Johnson	Avg	(45)	-.005	(59)	-.007	(19)	-.001	(43)	-.027
	t		-.555		-.861		-.114		-4.294
Merck	Avg	(9)	-.035	(14)	-.021	(7)	-.011	(10)	-.004
	t		-1.562		-1.306		-1.582		-.186
Mobil	Avg.	(36)	-.023	(44)	-.017	(20)	-.017	(38)	-.011
	t		-1.586		-1.698		-1.392		-1.457

Table 4-9c (continued)

Firm		Time to Call Maturity (in months)							
		N	0-1	N	1-2	N	2-3	N	>3[c]
Proctor &Gamble	Avg	(26)	-.004	(33)	.002	(11)	.017	(26)	-.003
	t		-.659		.308		1.419		-.490
Sears	Avg	(18)	-.064	(22)	-.085	(7)	-.108	(14)	-.082
	t		-2.364		-7.090		-8.129		-3.692
Union Pacific	Avg	(52)	-.015	(65)	-.018	(26)	-.009	(58)	-.023
	t		-1.541		-1.170		-.812		2.887

[a]Differences shown are ISD(call)-ISD(score)
[b]Adjusted Score Price= Stock Price - Prime Price
[c]The number of observations may not equal the total of calls. If on any given day more than one call had greater than three months to maturity, it was recorded as one observation.
[d] The number of observations for Atlantic Richfield declined. The prime did not trade during four (non-consecutive) weeks in the sample. Therefore, the score price could not be adjusted.

Table 4-9d
Differences in Annual Implied Standard Deviations
Calls and Scores
Adjusted Score Prices, Without Dividend Adjustment

Firm		Time to Call Maturity (months)							
		N	0-1	N	1-2	N	2-3	N	>3[c]
Amoco	Avg.	(41)	.042	(47)	.062	(23)	.027	(40)	.015
	t		5.352		6.856		3.312		1.885
Atlantic Richfield	Avg	(37)	.055	(42)	.044	(12)	.045	(19)	.021
	t		5.734		5.968		3.049		2.405
Bristol Myers	Avg.	(33)	.106	(44)	.105	(14)	.102	(36)	.086
	t		6.633		7.481		7.652		7.893
Chevron	Avg.	(37)	.044	(58)	.040	(22)	.025	(51)	.005
	t		3.628		3.597		1.239		.489
Coca Cola	Avg.	(29)	.111	(37)	.076	(14)	.039	(34)	.086
	t		3.121		4.108		3.060		4.289
Dow Chemical	Avg.	(48)	.079	(64)	.071	(19)	.068	(66)	.041
	t		5.332		8.978		5.102		6.516
DuPont	Avg.	(45)	.067	(56)	.081	(23)	.068	(43)	.043
	t		6.751		11.026		5.934		4.123
E.Kodak	Avg.	(49)	.047	(62)	.040	(17)	.031	(41)	-.016
	t		3.423		4.347		2.848		-1.545
Ford	Avg.	(19)	.147	(24)	.094	(6)	.058	(28)	.062
	t		3.946		6.192		3.601		5.983
GE	Avg.	(50)	.044	(68)	.030	(17)	.033	(66)	-.006
	t		1.992		1.881		1.104		-.408
GM	Avg.	(51)	.068	(61)	.078	(18)	.049	(61)	.039
	t		9.675		14.992		2.996		6.287
J&J	Avg.	(45)	.041	(59)	.036	(19)	.042	(43)	.013
	t		5.172		4.608		3.128		1.953
Merck	Avg.	(9)	.020	(14)	.034	(7)	.044	(10)	.041
	t		1.279		2.384		7.781		2.494
Mobil	Avg.	(36)	.089	(44)	.087	(20)	.064	(38)	.059
	t		6.241		7.934		5.333		6.120

Table 4-9d (continued)

Firm		Time to Call Maturity (in months)							
		N	0-1	N	1-2	N	2-3	N	>3[c]
P&G	Avg.	(26)	.082	(33)	.075	(11)	.086	(26)	.051
	t		10.126		10.107		7.456		6.412
Sears	Avg.	(18)	.025	(22)	-.005	(7)	-.036	(14)	-.029
	t		.897		-.318		-1.673		-1.164
Union Pacific	Avg. t	(52)	.043 4.436	(65)	.031 1.903	(26)	.043 3.734	(58)	.019 2.438

[a]Differences shown are ISD(call)-ISD(score)
[b]Adjusted Score Price= Stock Price - Prime Price
[c]The number of observations may not equal the total of calls. If on any given day more than one call had greater than three months to maturity, it was recorded as one observation.
[d] The number of observations for Atlantic Richfield declined. The prime did not trade during four (non-consecutive) weeks in the sample. Therefore, the score price could not be adjusted.

Table 4-10
Average Time to Maturity (in years)[a]
Scores and Calls

Firm	N	Calls	Score	Relative Maturities[b]
Amoco	72	.176 (.063)	3.752 (.432)	22.763 (8.682)
Atlantic Richfield	64	.146 (.079)	3.776 (.429)	32.343 (18.188)
Bristol Myers	53	.175 (.037)	3.753 (.429)	21.491 (18.188)
Chevron	73	.193 (.053)	2.988 (.928)	16.075 (7.687)
Coca Cola	52	.180 (.051)	4.159 (.326)	24.715 (12.550)
Dow Chemical	82	.203 (.062)	3.266 (.943)	16.876 (7.303)
DuPont	72	.182 (.060)	3.114 (1.156)	19.253 (11.800)
E.Kodak	78	.164 (.063)	3.363 (.509)	22.661 (10.158)
Ford	32	.253 (.097)	2.729 (1.036)	12.902 (11.596)
GE	82	.224 (.074)	2.778 (1.136)	13.565 (8.826)
GM	87	.208 (.097)	3.162 (.791)	19.470 (11.856)
J&J	69	.168 (.038)	3.944 (.437)	23.805 (7.239)
Merck	21	.203 (.127)	4.171 (.348)	26.835 (14.762)
Mobil	59	.181 (.043)	4.027 (.367)	23.222 (5.081)

Table 4-10(continued)

Firm	N	Call	Score	Relative Maturity
P&G	41	.173	4.002	24.300
		(.037)	(.250)	(5.675)
Sears	29	.167	3.626	26.990
		(.070)	(.848)	(16.020)
Union Pac.	109	.176	2.789	19.456
		(.071)	(.907)	(13.568)

[a]Standard Deviations in parentheses

[b] For each day in the sample the time to maturity of the score was divided by the average time to maturity of all calls trading on the same day.

Table 4-11a
Linear Regression: Log of Score ISD on Log of Call ISD
Market Price for Score, With Dividend Adjustment

Firm	N	Intercept	LN(ISDAVG)[a,b]	R^2[c]
Amoco	72	-.805 (-9.570)	.389 (-12.330)	.468 (61.670)
Atlantic Richfield	64	-.853 (-13.530)	.371 (-17.073)	.621 (41.270)
Bristol Myers	53	-.824 (-10.370)	.359 (-11.513)	.451 (41.810)
Chevron	73	-.949 (-8.180)	.225 (-10.953)	.125 (10.100)
Coca Cola	52	-.753 (-9.900)	.371 (-11.067)	.468 (42.260)
Dow Chemical	82	-.809 (-7.220)	.261 (-9.344)	.118 (10.890)
DuPont	72	-.725 (-8.100)	.411 (-9.415)	.381 (43.160)
E. Kodak	78	-.467 (-4.020)	.533 (-5.529)	.344 (39.800)
Ford	32	-.707 (-10.570)	.288 -16.193)	.589 (42.92)
General Electric	82	-.854 (-12.300)	.258 (-13.590)	.260 (28.830)
General Motors	87	-1.062 (-10.570)	.149 (-13.373)	.058 (5.260)
Johnson &Johnson	69	-.517 (-8.580)	.576 (-14.160)	.749 (200.570)
Merck	21	.387 (.870)	1.387 (1.127)	.462 (16.310)
Mobil	59	-.517 (-7.410)	.569 (-12.210)	.723 (148.980)

Table 4-11a (continued)

Firm	N	Intercept	Ln(ISDAVG)[a,b]	$R^{2,c}$
Proctor &Gamble	41	-.475 (-2.980)	.647 (-3.366)	.494 (38.080)
Sears	29	-.845 (-8.610)	.092 (-11.950)	.055 (1.560)
Union Pacific	109	-1.145 (- 8.940)	.170 (-10.351)	.040 (4.470)

[a] ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LNISDAVG is the natural log of ISDAVG.
[b] t-statistic in parentheses is the statistic for the test of whether the coefficient of LNISDAVG is less than one. All other t-statistics test whether the parameter is different from zero.
[c] F-statistic in parentheses.

Table 4-11b
Linear Regression: Log of Score ISD on Log of Call ISD Market Prices for Score, Without Dividend Adjustment

Firm	N	Intercept	LN(ISDAVG)[a,b]	$R^{2,c}$
Amoco	72	-1.264 (-13.840)	.399 (-13.005)	.515 (74.430)
Atlantic Richfield	64	-1.310 (-10.790)	.451 (-8.844)	.459 (52.680)
Bristol Myers	53	-1.013 (-8.050)	.571 (-5.124)	.477 (46.550)
Chevron	73	-1.367 (-10.790)	.237 (-11.302)	.148 (12.300)
Coca Cola	52	-1.055 (-11.280)	.367 (-9.711)	.388 (31.730)
Dow Chemical	82	-1.020 (-6.730)	.348 (-6.445	.129 (11.830)
DuPont	72	-1.252 (-7.670)	.367 (-6.137)	.153 (12.700)
E.Kodak	78	- .832 (-4.980)	.547 (-4.149)	.248 (25.130)
Ford	32	-1.155 (-15.400)	.328 (-16.329)	.679 (63.570)
General Electric	82	-1.126 (-13.030)	.220 (-14.288)	.168 (16.210)
General Motors	87	-1.968 (-9.650)	.064 (-8.483)	.004 (.340)
Johnson &Johnson	69	-.612 (-8.240)	.657 (-7.172)	.737 (188.180)
Merck	21	.637 (1.600)	1.516 (1.777)	.589 (27.270)
Mobil	59	-.676 (-4.860)	.855 (-1.794)	.663 (111.990)

Table 4-11b(continued)

Firm	N	Intercept	LN(ISDAVG)[a,b]	$R^{2,c}$
P&G	41	-.931 (-5.040)	.639 (-3.209)	.453 (32.260)
Sears	29	-1.291 (-9.760)	-.005 (-12.060)	.00001 (0)
Union Pacific	109	-1.506 (-8.330)	.192 (-7.112)	.026 (2.870)

[a]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[b]t-statistic in parentheses is the statistic for the test of whether the coefficient of LN(ISDAVG) is less than one. All other t-statistics test whether the parameter is different from zero.
[c] F-Statistic in parentheses.

Table 4-11c
Linear Regression: Log of Score ISD on Log of Call ISD Adjusted Score Price,[a] With Dividend Adjustment

Firm	N	Intercept	LN(ISDAVG)[b,c]	$R^{2,d}$
Amoco	72	-.864 (-6.630)	.379 (-7.853)	.277 (26.770)
Atlantic Richfield	60[e]	-.959 (-10.030)	.324 (-12.038)	.364 (33.260)
Bristol Myers	53	-.784 (-9.520)	.437 (-9.791)	.531 (57.800)
Chevron	73	-1.174 (-6.800)	.143 (-8.210)	.025 (1.86)
Coca Cola	52	-1.073 (-16.290)	.196 (-16.244)	.239 (15.71)
Dow Chemical	82	-.776 (-8.490)	.409 (-9.147)	.334 (40.080)
DuPont	72	-.948 (-9.950)	.290 (-10.650)	.213 (18.940)
E.Kodak	78	-.481 (-4.020)	.533 (-5.564)	.344 (39.800)
Ford	32	-.621 (-5.240)	.514 (-6.259)	.593 (43.760)
GE	82	-.700 (-7.390)	.444 (-8.490)	.365 (45.93)
GM	87	-1.059 (-10.600)	.198 (.003)	.100 (9.420)
J&J	69	-.499 (-6.480)	.612 (-7.449)	.673 (138.170)
Merck	21	.182 (.440)	1.080 (.252)	.380 (11.650)
Mobil	59	-.666 (-6.710)	.482 (-7.813)	.481 (52.78)

Table 4-11c (continued)

Firm	N	Intercept	LN(ISDAVG)[b]	$R^{2,c}$
P&G	41	-.705 (-3.900)	.530 (-3.946)	.337 (19.82)
Sears	29	-.973 (-8.200)	.061 (-10.621)	.017 (.470)
Union Pacific	109	-1.158 (-6.580)	.207 (-7.202)	.031 (3.52)

[a]Adjusted Score Price= Stock Price -Prime Price
[b]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[c]t-statistic in parentheses is the statistic for the test of whether the coefficient of LN(ISDAVG) is less than one. All other t-statistics test whether the parameter is different from zero.
[d] F-Statistic in parentheses.
[e] The number of observations for Atlantic Richfield declined. There were four occasions on which the prime did not trade. Therefore, the score price was not adjusted. Those observations were eliminated from the sample.

Table 4-11d
Linear Regression: Log of Score ISD on Log of Call ISD Adjusted Score Price[a] Without Dividend Adjustment

Firm	N	Intercept	LN(ISDAVG)[b,c]	$R^{2,d}$
Amoco	72	-1.286 (-8.660)	.448 (-7.343)	.337 (35.550)
Atlantic Richfield	60[e]	-1.349 (-9.890)	.446 (-7.912)	.412 (40.620)
Bristol Myers	53	-.936 (-4.980)	.714 (-2.279)	.388 (32.340)
Chevron	73	-1.704 (-10.660)	.121 (-8.852)	.027 (2.000)
Coca Cola	52	-1.419 (-17.890)	.184 (-14.812)	.183 (11.160)
Dow Chemical	82	-.994 (-8.290)	.522 (-5.970)	.347 (42.480)
Dupont	72	-1.283 (-8.470)	.401 (-6.274)	.201 (17.610)
E.Kodak	78	-.832 (-4.980)	.547 (-4.149)	.248 (25.130)
Ford	32	-.940 (-5.060)	.768 (-2.278)	.655 (56.860)
GE	82	-.901 (-7.910)	.462 (-7.488)	.341 (41.340)
GM	87	-1.970 (-9.660)	.063 (-8.478)	.004 (.330)
J&J	69	-.596 (-6.190)	.697 (-4.877)	.652 (125.81)
Merck	21	.335 (.518)	1.354 (.957)	.413 (13.370)
Mobil	59	-.915 (-4.930)	.737 (-2.437)	.450 (46.680)

Table 4-11d (continued)

Firm	N	Intercept	LN(ISDAVG)[b,c]	$R^{2,d}$
P&G	41	-1.212 (-5.510)	.519 (-3.577)	.277 (14.930)
Sears	29	-1.435 (-10.630)	-.037 (-11.211)	.006 (.1600)
Union Pacific	109	-1.527 (-8.350)	.172 (-7.509)	.022 (2.42)

[a] Adjusted Score Price = Stock Price - Prime Price
[b]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LNISDAVG is the natural long of ISDAVG.
[c]t-statistic in parentheses is the statistic for the test of whether the coefficient of LNISDAVG is less than one.
[d] F-Statistic in parentheses.
[e] The number of observations for Atlantic Richfield declined.There were four occasions on which the prime did not trade. Therefore, the score price was not adjusted. Those observations were eliminated from the sample.

Table 4-12a
Linear Regression: Log of Score ISD on Log of Call ISD and Relative Time to Maturity Market Price for Score; With Dividend Adjustment

Firm	N	Intercept	RELTMAT[a]	LN(ISDAVG)[b,c]	R^{2d}
Amoco	72	-.909 (-7.540)	.003 (1.260)	.366 (-11.450)	.461 (9.490)
Atlantic Richfield	64	-.847 (-11.660)	.000 (-.170)	.372 (-16.392)	.621 (49.930)
Bristol Myers	53	-.862 (-6.810)	.001 (.390)	.351 (-10.891)	.452 (20.630)
Chevron	73	-1.226 (-11.060)	.014 (5.400)	.189 (-13.474)	.382 (21.610)
Coca Cola	52	-.476 (-4.130)	-.006 (-3.040)	.473 (-8.423)	.544 (29.260)
Dow Chemical	82	-.619 (-4.070)	-.005 (-1.650)	.339 (-7.663)	.164 (7.720)
DuPont	72	-.639 (-6.490)	-.002 (-1.930)	.440 (-8.820)	.413 (24.28)
E. Kodak	78	-.193 (1.490)	-.009 (-4.110)	.592 (-5.224)	.464 (32.510)
Ford	32	-.900 (-7.760)	.005 (1.990)	.198 (-13.000)	.638 (25.560)
GE	82	-.911 (-10.380)	.003 (1.650)	.244 (-14.531)	.310 (17.740)
GM	87	-1.266 (-11.260)	.004 (3.380)	.108 (-13.462)	.208 (11.010)
J&J	69	-.398 (-4.050)	-.003 (-1.52	.608 (-8.594)	.758 (103.380)
Merck	21	.258 (.530)	.004 (1.330)	1.370 (1.040)	.512 (9.460)
Mobil	59	-.731 (-8.380)	.009 (3.580)	.559 (-10.382)	.775 (96.28)

Table 4-12a (continued)

Firm	N	Intercept	RELTMAT	Ln(ISDAVG)	R[a,d]
P&G	41	-.418	-.001	.663	.497
		(-2.070)	(-.460)	(-3.014)	(18.76)
Sears	29	-.613	-.004	.189	.359
		(-5.800)	(-3.510)	(-11.928)	(7.27)
Union Pacific	109	-1.212	.002	.155	.059
		(-8.960)	(1.470)	(-10.522)	(3.34)

[a] For each trading day the time remaining to maturity of the score was divided by the average time remaining to maturity of all calls trading on that day. RELTMAT is this number minus one.

[b] ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG)is the natural log of ISDAVG.

[c] t-statistic in parentheses is the statistic for the test of whether the coefficient of LNISDAVG is less than one. All other t-statistics test whether the parameter is different from zero.

[d] F-statistic in parentheses.

Table 4-12b
Linear Regression: Log of Score ISD on Log of Call ISD and Relative Time to Maturity Market Price for Score; Without Dividend Adjustment

Firm	N	Intercept	RELTMAT[a]	LN(ISDAVG)[b,c]	$R^{2,d}$
Amoco	72	-1.249 (-8.310)	-.0003 (-.130)	.402 (-11.261)	.515 (36.70)
Atlantic Richfield	64	-1.242 (-8.660)	-.001 (-.890)	.466 (-8.273)	.466 (26.250)
Bristol Myers	53	-1.055 (-5.280)	.001 (.270)	.565 (-4.820)	.478 (22.890)
Chevron	73	-1.628 (-12.290)	.014 (3.980)	.221 (-12.654)	.305 (15.370)
Coca Cola	52	-.875 (-6.120)	-.004 (-1.650)	.421 (-8.045)	.420 (17.780)
Dow Chemical	82	-.559 (-2.520)	-.013 (-2.760)	.515 (-4.238)	.206 (10.220)
DuPont	72	-.968 (-5.220)	-.008 (-2.830)	.452 (-5.334)	.241 (10.98)
E. Kodak	78	-.397 (-2.170)	-.014 (-4.220)	.621 (-3.778)	.393 (24.23)
Ford	32	-1.119 (-8.250)	-.001 (-.320)	.341 (-11.247)	.680 (30.880)
GE	82	-1.149 (-10.150)	.001 (.320)	.212 (-13.121)	.169 (8.060)
GM	87	-1.801 (-7.690)	-.004 (-1.430)	.111 (-7.769)	.027 (1.190)
J&J	69	-.522 (-4.330)	-.002 (-.940)	.678 (-6.055)	.741 (94.38)
Merck	21	.369 (.910)	.005 (1.800)	1.420 (1.505)	.652 (16.880)
Mobil	59	-.858 (-3.840)	.006 (1.040)	.832 (-2.007)	.669 (56.61)

Table 4-12b (continued)

Firm	N	Intercept	RELTMAT[a]	LN(ISDAVG)[b,c]	R^2[d]
P&G	41	-.745	-.004	.345	.464
		(-2.640)	(-.860)	(-10.404)	(16.430)
Sears	29	-.888	-.007	.149	.528
		(-7.470)	(-5.400)	(-12.051)	(14.570)
Union Pacific	110	-1.520	.0003	.131	.025
		(-11.140)	(.210)	(-10.988)	(1.380)

[a] For each trading day the time remaining to maturity of the score was divided by the average time remaining to maturity of all calls trading on that day. RELTMAT is this number minus one.
[b] ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[c] t-statistic in parentheses is the statistic for the test of whether the coefficient of LNISDAVG is less than one. All other t-statistics test whether the parameter is different from zero.
[d] F-statistic in parentheses.

Table 4-12c
Linear Regression: Log of Score ISD on Log of Call ISD and Relative Time to Maturity Adjusted Score Price [a]; With Dividend Adjustment

Firm	N	Intercept	RELTMAT[b]	LN(ISDAVG)[c,d]	R^{2e}
Amoco	72	-1.045 (-5.870)	.005 (1.480)	.354 (-7.902)	.299 (14.710)
Atlantic Richfield	60[f]	-.988 (-9.020)	.0004 (.560)	.316 (-11.753)	.368 (16.580)
Bristol Myers	53	-.752 (-5.730)	-.001 (-.310)	.444 (-8.911)	.532 (28.440)
Chevron	73	-1.527 (-8.790)	.017 (4.390)	.098 (-9.572)	.236 (10.790)
Coca Cola	52	-.959 (-8.990)	-.002 (-1.350)	.237 (-13.200)	.266 (8.900)
Dow Chemical	82	-1.000 (-8.150)	.006 (2.630)	.327 (-9.652)	.387 (24.970)
DuPont	72	-.922 (-8.590)	-.001 (-.540)	.299 (-10.152)	.216 (9.520)
E. Kodak	78	-.660 (-4.500)	-.003 (-1.200)	.398 (-6.791)	.213 (10.170)
Ford	32	-1.170 (-6.450)	.014 (3.630)	.257 (-7.719)	.720 (37.360)
GE	82	-.677 (-5.650)	-.001 (-.320)	.452 (-7.723)	.366 (22.760)
GM	87	-1.266 (-11.260)	.004 (3.380)	.108 (-13.462)	.208 (11.010)
J&J	69	-.383 (-3.020)	-.003 (-1.150)	.644 (-6.047)	.680 (70.090)
Merck	21	-.052 (-.120)	.005 (1.580)	1.002 (.006)	.455 (7.530)
Mobil	59	-1.026 (- 8.670)	.015 (4.430)	.466 (-9.247)	.616 (44.860)

Table 4-12c (continued)

Firm	N	Intercept	RELTMAT[b]	LN(ISDAVG)[c,d]	$R^{2,e}$
P&G	41	-.635	-.002	.551	.341
		(-2.760)	(-.500)	(-3.528)	(9.850)
Sears	29	-1.129	-.005	.080	.297
		(-7.600)	(-3.280)	(-6.973)	(5.500)
Union Pacific	110	-1.486	-.001	.197	.027
		(-7.710)	(-.320)	(-6.973)	(1.470)

[a]Adjusted Score Price= Stock Price-Prime Price
[b]For each trading day the time remaining to maturity of the score was divided by the average time remaining to maturity of all calls trading on that day. RELTMAT is this number minus one.
[c]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LNISDAVG is the natural log of ISDAVG.
[d]t-statistic in parentheses is the statistic for the test of whether the coefficient of LNISDAVG is less than one. All other t-statistics test whether the parameter is different from zero.
[e]F-statistic in parentheses.
[f]The number of observations for Atlantic Richfield declined. The prime did not trade during four (non-consecutive) weeks in the sample. Therefore, the score price could not be adjusted.

Table 4-12d
Linear Regression: Log of Score ISD on
Log of Call ISD and Relative Time to Maturity
Adjusted Score Price;[a] Without Dividend Adjustment

Firm	N	Intercept	RELTMAT[b]	LN(ISDAVG)[c,d]	R^2[e]
Amoco	72	-1.393 (-5.720)	.003 (.560)	.425 (-6.670)	.340 (17.76)
Atlantic Richfield	60[f]	-1.295 (-8.020)	-.001 (-.630)	.629 (-1.695)	.416 (20.300)
Bristol Myers	53	-.899 (-3.010)	-.001 (-.160)	.721 (-2.070)	.388 (15.880)
Chevron	73	-2.075 (-12.810)	.020 (4.640)	.098 (-11.965)	.256 (12.040)
Coca Cola	52	-1.376 (-11.080)	-.001 (-.450)	.197 (-12.840)	.186 (5.590)
Dow Chemical	82	-1.145 (-6.290)	.004 (1.100)	.467 (-5.661)	.357 (21.900)
DuPont	72	-1.059 (-6.070)	-.006 (-2.360)	.468 (-5.491)	.261 (12.170)
E. Kodak	78	-.926 (-4.790)	-.007 (-1.860)	.430 (-5.395)	.193 (8.950)
Ford	32	-1.345 (-4.150)	.012 (1.510)	.619 (-2.727)	.680 (30.78)
GE	82	-.748 (-5.100)	- .005 (-1.620)	.514 (-6.231)	.362 (22.40)
GM	87	-2.166 (-10.530)	.004 (1.480)	.073 (-9.270)	.042 (1.830)
J&J	69	-.515 (-3.280)	-.002 (-.660)	.716 (-4.101)	.655 (62.590)
Merck	21	.046 (.090)	.006 (1.490)	1.252 (.690)	.477 (8.230)
Mobil	59	-1.454 (-5.070)	.019 (2.400)	.669 (-3.082)	.502 (28.180)

Table 4-12d (continued)

Firm	N	Intercept	RELTMAT[b]	LN(ISDAVG)[c,d]	$R^{2,e}$
P&G	41	-1.068	-.004	.556	.283
		(-3.150)	(-.570)	(-2.947)	(7.490)
Sears	29	-.834	-.002	.119	.094
		(-5.610)	(-1.490)	(-9.254)	(1.360)
Union Pacific	109	-1.450	-.001	.181	.024
		(-7.490)	(-.390)	(-7.240)	(1.28)

[a]Adjusted Score Price= Stock Price-Prime Price
[b]For each trading day the time remaining to maturity of the score was divided by the average time remaining to maturity of all calls trading on that day. RELTMAT is this number minus one.
[c]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[d]t-statistic in parentheses is the statistic for the test of whether the coefficient of LNISDAVG is less than one. All other t-statistics test whether the parameter is different from zero.
[e]F-statistic in parentheses.
[f]The number of observations for Atlantic Richfield declined. The prime did not trade during four (non-consecutive) weeks in the sample. Therefore, the score price could not be adjusted.

Table 4-13a
Linear Regression: Log of Score ISD on Log of Relative Time to Maturity and Log of Call ISD Market Prices for Scores, With Dividend Adjustment

Firm	N	Intercept	LN(RELTMAT)[a]	LN(ISDAVG)[b,c]	R^{2}[d]
Amoco	72	-1.003 (-4.700)	.052 (1.020)	.367 (-11.177)	.457 (28.99)
Atlantic Richfield	64	-.820 (-8.950)	-.008 (-.400)	.375 (-16.200)	.622 (50.11)
Bristol Myers	53	-.989 (-3.540)	.049 (.061)	.348 (-11.110)	.455 (20.84)
Chevron	73	-1.492 (-11.540)	.201 (6.140)	.217 (-13.675)	.431 (26.49)
Coca Cola	52	-.344 (-1.250)	-.112 (-1.540)	.415 (-9.261)	.483 (22.89)
Dow Chemical	82	-.558 (-2.890)	-.060 (-1.480)	.329 (-7.852)	.158 (7.42)
DuPont	72	-.510 (-4.980)	-.059 (-3.560)	.449 (-9.363)	.477 (31.51)
E. Kodak	78	.284 (1.490)	-.231 (-4.830)	.581 (-5.589)	.499 (37.39)
Ford	32	-1.205 (-9.990)	.131 (4.570)	.151 (-18.835)	.761 (46.11)
GE	82	-.993 (-10.040)	.051 (2.380)	.242 (-7.088)	.334 (19.82)
GM	87	-.924 (-6.670)	-.030 (-1.440)	.187 (-11.651)	.081 (3.70)
Johnson &Johnson	69	-.221 (-1.080)	-.079 (-1.500)	.609 (-8.494)	.758 (103.30)
Merck	21	.241 (.420)	.066 (.730)	1.428 (1.172)	.480 (8.30)
Mobil	59	-1.062 (-5.750)	.174 (3.150)	.562 (-10.093)	.765 (91.12)

Table 4-13a (continued)

Firm	N	Intercept	LN(RELTMAT)[a]	LN(ISDAVG)[b,c]	R^2[d]
P&G	41	-.356	.030	.663	.496
		(-1.120)	(.430)	(-3.004)	(18.74)
Sears	29	-.526	-.078	.153	.216
		(-3.190)	(-2.310)	(-11.515)	(3.58)
Union Pacific	109	-1.434	.082	.129	.087
		(-8.120)	(2.330)	(-10.803)	(5.04)

[a]For each trading day the time to maturity of the score was divided by the average time to maturity of all calls trading on that day. RELTMAT is this number minus one. LN(RELTMAT) is the natural log of this number.
[b]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[c] t-statistic in parentheses is the statistic for the test of whether the coefficient of LN(ISDAVG) is less than one. All other t-statistics test whether the parameter is different from zero.
[d] F-statistic in parentheses.

Table 4-13b
Linear Regression: Log of Score ISD on
Log of Relative Time to Maturity and Log of Call ISD
Market Prices for Scores, Without Dividend Adjustment

Firm	N	Intercept	LN(RELTMAT)[a]	LN(ISDAVG)[b,c]	R^2[d]
Amoco	72	-1.099	-.043	.416	.518
		(-3.710)	(-.590)	(-10.550)	(37.04)
Atlantic Richfield	64	-1.076	.056	.476	.473
		(-4.900)	(-1.270)	(-8.080)	(27.42)
Bristol Myers	53	-1.231	.065	.559	.480
		(-2.790)	(.520)	(-4.950)	(23.07)
Chevron	73	-1.922	.213	.242	.337
		(-11.490)	(4.480)	(-12.620)	(17.83)
Coca Cola	52	- .879	-.050	.381	.392
		(-2.560)	(-.530)	(-8.770)	(15.78)
Dow Chemical	82	-.335	-.167	.506	.205
		(-1.160)	(-2.760)	(-4.370)	(10.21)
DuPont	72	-.593	-.180	.478	.363
		(-2.980)	(-4.760)	(-5.610)	(19.64)
E.Kodak	78	.361	-.364	.610	.432
		(1.280)	(-4.930)	(-4.050)	(28.56)
Ford	32	-1.324	.047	.291	.688
		(-6.430)	(.088)	(-12.160)	(31.94)
GE	82	-1.192	.020	.208	.173
		(-9.170)	(.680)	(-13.740)	(8.28)
GM	87	-1.378	-.142	.177	.077
		(-4.560)	(-2.590)	(-7.160)	(3.53)
Johnson &Johnson	69	-.400	-.058	.677	.740
		(-1.560)	(-.860)	(-6.030)	(94.10)
Merck	21	.494	.083	1.474	.614
		(.318)	(1.080)	(1.806)	(14.35)
Mobil	59	-1.065	.117	.837	.667
		(-2.310)	(.880)	(-1.957)	(56.17)

Table 4-13b (continued)

Firm	N	Intercept	LN(RELTMAT)[a]	LN(ISDAVG)[b,c]	R^2[d]
P&G	41	-.529	-.105	.684	.462
		(-1.020)	(-.083)	(-2.520)	(16.34)
Sears	29	-.612	-.167	.112	.424
		(-3.290)	(-4.380)	(-11.650)	(9.59)
Union Pacific	109	-1.602	.021	.106	.024
		(-8.450)	(.570)	(-10.964)	(1.31)

[a]For each trading day the time to maturity of the score was divided by the average time to maturity of all calls trading on that day. RELTMAT is this number minus one. LN(RELTMAT) is the natural log of this number.
[b]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[c]t-statistic in parentheses is the statistic for the test of whether the coefficient of LN(ISDAVG) is less than one. All other t-statistics test whether the parameter is different from zero.
[d] F-statistic in parentheses.

Table 4-13c
Linear Regression: Log of Score ISD on
Log of Relative Time to Maturity and Log of Call ISD
Adjusted Score Price[a], With Dividend Adjustment

Firm	N	Intercept	LN(RELTMAT)[b]	LN(ISDAVG)[c,d]	R^{2e}
Amoco	72	-1.218 (-3.860)	.093 (1.230)	.355 (-7.703)	.292 (14.24)
Atlantic Richfield	60[f]	-1.062 (-6.700)	.024 (.820)	.311 (-11.764)	.372 (16.87)
Bristol Myers	53	-.675 (-2.320)	.032 (-.390)	.445 (-9.092)	.533 (28.50)
Chevron	73	-1.820 (-8.660)	.239 (4.490)	.135 (-9.291)	.244 (11.28)
Coca Cola	52	-1.080 (-4.410)	.002 (.030)	.195 (-14.366)	.239 (7.70)
Dow Chemical	82	-1.181 (-7.750)	.103 (3.230)	.317 (-10.126)	.411 (27.62)
DuPont	72	-.850 (-7.270)	-.027 (-1.430)	.308 (-10.268)	.235 (10.63)
E.Kodak	78	-.476 (-2.150)	-.084 (-1.510)	.396 (-6.909)	.222 (10.69)
Ford	32	-1.617 (-8.510)	.262 (5.810)	.241 (-10.613)	.812 (62.61)
GE	82	-.729 (-5.300)	.009 (.290)	.438 (-8.173)	.365 (22.74)
GM	87	-1.346 (-10.210)	.062 (3.140)	.120 (-13.273)	.194 (10.15)
Johnson &Johnson	69	-.208 (-.780)	-.078 (-1.150)	.645 (-5.977)	.680 (70.08)
Merck	21	-.114 (-.023)	.081 (1.020)	1.052 (.163)	.414 (6.35)
Mobil	59	-1.614 (-6.420)	.303 (4.030)	.470 (-8.987)	.597 (41.56)

Table 4-13c (continued)

Firm	N	Intercept	LN(RELTMAT)[b]	LN(ISDAVG)[c,d]	R^2[e]
P&G	41	-.585	-.031	.546	.339
		(-1.620)	(-.390)	(-3.550)	(9.77)
Sears	29	-.888	-.021	.077	.025
		(-4.070)	(-.470)	(-9.590)	(.340)
Union Pacific	109	-1.373	.062	.177	.046
		(-5.570)	(1.250)	(-7.300)	(2.56)

[a] Adjusted Score Price = Stock Price - Prime Price

[b]For each trading day the time to maturity of the score was divided by the average time to maturity of all calls trading on that day. RELTMAT is this number minus one. LN(RELTMAT) is the natural log of this number.

[c]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.

[d]t-statistic in parentheses is the statistic for the test of whether the coefficient of LN(ISDAVG) is less than one. All other t-statistics test whether the parameter is different from zero.

[e] F-statistic in parentheses.

[f]The number of observations for Atlantic Richfield declined. The prime did not trade during four (non-consecutive) weeks in the sample. Therefore, the score price could not be adjusted.

Table 4-13d
Linear Regression: Log of Score ISD on Log of Relative Time to Maturity and Log of Call ISD Adjusted Score Price[a], Without Dividend Adjustment

Firm	N	Intercept	LN(RELTMAT)[b]	LN(ISDAVG)[c,d]	R^2[e]
Amoco	72	-1.374 (-2.850)	.023 (.190)	.439 (-6.211)	.337 (17.55)
Atlantic[f] Richfield	60	-1.243 (-4.880)	-.025 (-.490)	.456 (-7.396)	.414 (20.17)
Bristol Myers	53	-.824 (-1.240)	-.033 (-.180)	.721 (-2.093)	.388 (15.88)
Chevron	73	-2.461 (-11.950)	.291 (4.96)	.127 (-11.823)	.281 (13.66)
Coca Cola	52	-1.624 (-5.600)	.058 (.740)	.168 (-13.966)	.191 (5.80)
Dow Chemical	82	-1.810 (-7.750)	.103 (3.230)	.317 (-10.126)	.411 (27.62)
DuPont	72	-.772 (-4.000)	-.139 (-3.790)	.487 (-5.678)	.339 (17.69)
E.Kodak	78	-.557 (-1.820)	-.174 (-2.180)	.426 (-5.511)	.206 (9.72)
Ford	32	-2.009 (-4.270)	.295 (2.440)	.537 (-3.466)	.713 (36.10)
GE	82	- .757 (-4.440)	-.043 (-1.130)	.488 (-6.799)	.351 (15.05)
GM	87	-2.205 (-8.030)	.046 (.920)	.080 (-8.740)	.027 (1.15)
Johnson &Johnson	69	-.406 (-1.220)	-.052 (-.590)	.715 (-4.090)	.654 (62.47)
Merck	21	-.010 (-.020)	.090 (.910)	1.300 (0.805)	.439 (7.04)
Mobil	59	-2.168 (-3.640)	.377 (2.200)	.680 (-2.979)	.494 (27.35)

Table 4-13d (continued)

Firm	N	Intercept	LN(RELTMAT)[b]	LN(ISDAVG)[c,d]	R^{2e}
P&G	41	-.960	-.066	.547	.280
		(-1.540)	(-.430)	(-3.006)	(7.400)
Sears	29	-.999	-.107	.037	.172
		(-4.390)	(-2.290)	(-10.411)	(2.70)
Union Pacific	109	-1.463	.017	.183	.023
		(-5.460)	(-.330)	(-7.054)	(1.25)

[a] Adjusted Score Price = Stock Price - Prime Price
[b]For each trading day the time to maturity of the score was divided by the average time to maturity of all calls trading on that day. RELTMAT is this number minus one. LN(RELTMAT) is the natural log of this number.
[c]ISDAVG is the arithmetic mean of the ISD of all calls trading on a given day. LN(ISDAVG) is the natural log of ISDAVG.
[d]t-statistic in parentheses is the statistic for the test of whether the coefficient of LN(ISDAVG) is less than one. All other t-statistics test whether the parameter is different from zero.
[e] F-statistic in parentheses.
[f]The number of observations for Atlantic Richfield declined. The prime did not trade during four (non-consecutive) weeks in the sample. Therefore, the score price could not be adjusted.

CHAPTER FIVE

THREE ADDITIONAL FINANCIAL INNOVATIONS

Introduction

It has been hypothesized that true financial innovations either complete the market or reduce transactions costs (Van Horne(1985)). VanHorne, and Silber(1975) offer several possible stimuli for financial innovation: tax changes, regulatory changes, economic factors, such as high inflation rates, volatile interest rates, changes in investors' attitudes towards risk, and declining growth in the total sources of funds available to corporations. VanHorne also suggested that academic work on asset pricing and derivative assets might stimulate financial innovation.

In previous chapters in this dissertation, an intermediary innovation related to equity introduced during the 1980's was analyzed. Primes and scores are equity derivatives which commanded a premium in the market. The division of the cash flows generated by a common stock resulted in the creation of value, as was demonstrated in Chapter three.

During the late 1980's and early 1990's several other financial innovations were also introduced which are equity derivatives. These met with varying degrees of success. The purpose of this chapter is to discuss three types of equity innovations: Unbundled Stock Units (USUs), Preferred Equity Redemption Cumulative Stock (PERCS), and SuperShares. Of the three, supershares are the most recent innovation, and in fact, have not yet begun to trade. Another recent financial innovation is the LEAP (Long-term Equity Appreciation) which is a two year call option. This will not be considered here. The focus here will be on instruments offered by corporations: PERCs and USU's and on Super Shares, an instrument that is very similar to primes and scores.

In this chapter, the structure of each of the three instruments will be discussed. A second focus will be on whether the instrument is a financial innovation, i.e., whether the instrument creates additional value for investors or issuers. An attempt will be made to identify the source of any additional value (or lack of additional value).

Each of the three innovations will be separately discussed in the next three sections of this chapter.

Unbundled Stock Units

In the late 1980's, Unbundled Stock Units were going to be offered by American Express, Dow Chemical, Pfizer, and Sara Lee.[1] Ultimately, all of the offers never went beyon the "red-herring" and the USUs were never issued. However, they provide an interesting example of an attempt at financial innovation.

Unbundled Stock Units (USUs) were designed to offer additional flexibility to investors in the issuer's common stock. The prospectus for Pfizer stated:

> " The exchange offer will enable owners of Shares to choose between the various investment attributes of common stock ownership represented by the securities included in a USU. Holders may thereby focus their investment in the Company on those aspects of ownership most consistent with their investment objectives."

Thus, the instrument was designed to appeal to investors with different tastes, or beliefs.

The offer proposed that shares of common stock be exchanged for USUs, although not necessarily on a one-to-one basis.[2] The prospectus does not state the terms of the offer nor does it describe how the terms will be established. USUs

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[1]All of the issues were going to be underwritten by Shearson, a subsidiary of American Express.

[2]The exchange of shares for USUs was to have taxable consequences. Gains on the exchange would be recognized, but losses would not be recognized. Also, any gain on the exchange would be treated as a dividend unless the holder reduced his/her ownership in the company.

were then divisible into three components: a bond, which would provide fixed income and a predictable capital gain; Incremental Dividend Preferred (IDP), which would provide some cash income and no capital gain, and an Equity Appreciation Certificate (EAC). Almost all of the income from the EAC would be from capital gains. In addition, the EAC and IDP could be combined into an Equity Stock Unit (ESU). Bonds, IDPs, EACs, and ESUs were to be traded on the New York Stock Exchange. The USUs were to have a thirty year maturity although under certain conditions (liquidation or merger) the maturity could be accelerated. The issuer was to assume all of the costs associated with the exchange of shares for USUs. It also should be noted that shareholders tendering their shares in exchange for USUs would lose their voting rights.

Each of the three components of the USU will be described below. Each of the descriptions is based on the prospectus for Pfizer's USUs.

Bonds

Owners of the bond component were to receive an amount equal to the issuer's current common dividend as a quarterly interest payment throughout the bond's thirty year life. For holders of Pfizer's bond, the quarterly interest would have been $0.50. At maturity, bondholders would receive the bond's principal, in cash. For Pfizer the principal was expected to be approximately $150. The effective coupon rate of the bond was 1.3%, which is very low. Thus, the bond was an original issue deep discount bond. This deep discount was expected, according to the prospectus.

The quarterly interest payments and payment of the principal were to be contractual obligations of the firm. Although the initial interest payment was equal to the dividend paid to common stockholders, the payment would not vary with the common dividend. For Pfizer bondholders, it would remain at $0.50 whether the dividend to common stockholders increased or decreased.

Interest was to be paid from the issuer's before-tax income thereby creating a tax shield at the corporate level. Moreover, if the issuer defaulted on the bond or if the company liquidated, bondholders would be considered to be a creditor and not an owner. Thus, the stockholder gains in liquidation priority by having swapped shares for USUs and having retained the bond portion.

At the time the prospectus was prepared, the market price of Pfizer's common stock was approximately $56. If the cash flows associated with the bond component are discounted(quarterly) at an annual rate of 8%, the bond component would be worth $36.61. This is approximately 65% of the value of the stock price.

Under certain conditions, the bond could be redeemed for cash or shares. These conditions will be discussed in a later section.

Incremental Dividend Preferred

IDPs entitled the holder to a proportionate share of an increase in common's cash dividends above the amount promised to the bondholders. Pfizer's IDP holders would be entitled to any dividend in excess of $0.50. If the dividend to common stock holders increased to $0.60, then IDP holders would be entitled to $0.10. In addition, the IDPs had a face value of $2.50, to which the holders would be entitled in the case of liquidation or cash redemption.

Also, IDP holders were entitled to share, proportionately, with EAC holders, any special dividends or property distributions made to common stockholders. The proportion was equal to the relative market value of IDPs and EACs at the time of the distribution. The purpose of this appears to be to limit the conflict of interest between common stockholders and IDP holders which would arise if common stockholders paid themselves special dividends instead of increasing regular dividends.

IDPs could be perpetual. However, under certain conditions the IDPs could be converted into cash or shares. The cash conversion could occur, at the option of the issuer, after the maturity of the EAC and bond. The conversion price would be $2.50, plus accrued dividends. The conditions under which they may be converted into cash will be discussed below.

If the IDP is assumed to be perpetual, and the required rate of return on Pfizer's common stock is assumed to be .10 and the dividend was expected to grow at 2.5% annually, the value of an IDP can be approximated using a constant dividend growth model. In this case, the value of the IDP would be approximately $0.68. Thus, the IDP would have a very small value relative to the firm's common stock. Its value would be higher if a distribution other than the dividend was expected, or if it was expected to be called.

Equity Appreciation Certificate

EACs were to be equivalent to warrants written on the issuer's common stock. Like the bonds, EAC's had a thirty year maturity. The exercise price of the EAC was equal to the principal of the bond plus an IDP or a cash payment equal to the face value of one IDP. For Pfizer, in addition to the exercise price of $150, one IDP or $2.50 had to be tendered if the EAC was exercised. Thus, the exercise price was $152.50. Pfizer's stock price would have had to increase by approximately 175% over thirty years for the EAC to expire in-the-money.

Prior to maturity, EAC holders were entitled to a proportionate share of any special dividends or property distributions made to common stockholders. The proportion depended on the relative values of EACs and IDPs. This provision seems designed to protect the EAC holder against potential wealth transfers that might otherwise be attempted by the common stockholders. However, the EACs were not dividend protected.

Under certain conditions, the maturity of EACs could be accelerated, or EACs could be redeemed early for shares. These conditions are discussed below.

If the EAC were held to maturity each EAC would entitle the holder to one share if exercised.

Issuer Options

The maturity of bonds, IDPs, and EACs could have been accelerated (made earlier in time) if the issuer planned to liquidate; participate in a merger in which the issuer is not the surviving firm or if the IDP was assigned voting rights as a result of an amendment to the issuer. If this occurred, the exercise price of the EAC (and principal of the bond) would be adjusted. (exercise price =($EAC/($EAC + $IDP))* $BOND)
The firm also retains the option to revoke either the IDP or EAC in that case (but not both).

Additional options available to the company and/or USU holders are described below.

At a time determined by the issuer, bonds may be redeemed, in whole or in part, by the issuer. The redemption price would be 100% of the face value plus accrued interest. In addition, if the issuer wanted to redeem EACs and IDPs early, it had to first make an offer to bondholders that would enable them to swap their bonds for common stock. The number of shares per bond would be 102% of the average of the following ratio for a specified period: (market value of the bond/market value of the stock).

Once all of the bonds tendered were accepted and exchanged, then the company could accept and convert EACs and IDPs into shares. However, the entire issue had to be converted at this time. The number of shares per EAC was to be equal to the 102% of the average (for a specified period) of the following ratio:

($EAC+$IDP)/($STOCK) * ($EAC)/($EAC+$IDP)

This can be reduced to: $EAC/$STOCK.

IDP holders would receive a fraction of a share equal to 102% multiplied by the average (for a specified period) of the following ratio:

($EAC+$IDP)/($STOCK) * ($IDP)/($EAC+$IDP)

This can be reduced to $IDP/$STOCK.

Any bonds not tendered and converted into shares if the company were to make an offer of this nature can be redeemed for cash eighteen months after the conversion offer. It was not clear from the prospectus if the conversion was to be mandatory.

Comparison of USUs and Primes and Scores

USUs, like primes and scores partition the cash flows created by common stock. However, USUs were issued directly by the underlying firm, while primes and scores were issued by a financial intermediary. Consequently, USUs are not independent of the issuer.

USUs have three component pieces: a bond, an IDP and an EAC. The combination of a bond plus IDP is equivalent to a prime, whereas the EAC is comparable to a score. Whereas the payoffs to prime and score holders are made in shares, or fractions of shares, of the three USU components, only the EAC holder receives payment in shares. Thus, if the EAC expires out-of-the-money, there will be no shares issued when USUs mature. If the EAC expires in the money, share holders will receive one share in exhange for the exercise price. Score holders receive Max ((S-X)/S, 0) shares.

USUs have a number of disadvantages when compared to primes and scores. First, the component pieces can not be recombined so that the common stock can be redeemed before the USUs mature. This feature would permit the USUs to sell at a discount to the shares. Second, investors swapping shares for USUs forfeit their voting rights. Prime holders retain the voting rights associated with the underlying common.

The bond component of the USU is an original issue deep-discount bond. Therefore investors are obligated to pay income tax on the bond's implied interest from purchase until maturity as well as on any cash payments received. Thus, swapping shares for USUs increases the tax liability of the investor. However, the bond holder gains a higher priority in the case of firm liquidation.

Unbundled Stock Units and the Creation of Value

In chapter three, it was shown that dividing the cash flows of common stock could create value even if the market is efficient. In this section, the question of whether "unbundling" the cash flows of common stock would have created value for investors, or corporations, will be considered.

USUs would have created an immediate advantage for the issuer. Interest would be paid from pre-tax income, generating a new tax shield for the firm. Consequently, the value of the firm would rise, as would the value of the common stock and the USUs. However, the conversion of stock into bonds would create an immediate tax disadvantage for investors. The bond created by the swap of shares for USUs would be an original issue deep discount bond. As such, the implied interest on the bond would be taxable. This is a new tax liability for investors. Consequently, only tax exempt investors would have any interest in the bond portion of the USU.

It is very possible, that due to the additional tax liability associated with the bond component, as well as investors inability to redeem shares before maturity, that the USUs would have sold at a discount to the underlying common stock.

However, due to some of the similarities to primes and scores, the potential for premiums exists. For example, the EAC, as a thirty year warrant, might offer a unique investment opportunity, and help to complete the market. Also, if the volatility of the underlying common increased above its average, it is possible that the EAC, similar to the score, would sell at a premium. Tax-exempt investors who are pessimistic about the value of the underlying common, might be willing to swap their shares for the bond and IDP components and pay a premium for them.

It appears that the issuer had the greatest potential for gain from the swap of shares for USUs, since the creation of a tax shield was certain. The USUs, from the firm's perspective, was similar to a debt for equity swap.

USU's, like primes and scores, were designed to offer additional flexibility to investors. As such, they were an attempt to add to market completeness. However, the design of the USUs, particularly with regard to the bond component, resulted in a tax benefit for those investors retaining their shares and a tax liability for those investors willing to swap shares for USUs (with the exception of tax exempt investors). clearly would be valuable for the issuer.

USUs were never issued, presumably due to a disagreement with the Securities Exchange Commission (SEC) regarding how the issuer's earnings per share(EPS) would be reported. The

SEC required that EPS be reported on a fully diluted basis from the date of issue. However, it seems that their faulty design made them unattractive to investors.

Preferred Equity Redemption Cumulative Stock

PERCs were issued by thirteen corporations in the early 1990's. These firms were: Aon, Boise-Cascade, Broad Industry, Consolidated Freightway, General Motors (two separate series were issued), K-Mart, Olin, RJ Reynolds, Sears, Tandy, Tenneco, Texas Instruments, and Westinghouse. Although PERCs are an equity derivative, they were, according to some of the financial press, issued in place of new corporate debt.

PERCs are similar to primes: both are covered calls. However, PERC holders appear to receive a higher dividend than common stockholders. PERC holders and prime holders receive a final payoff in shares or in fractions of shares, although it is possible for GM's PERC holders to receive a final payoff in cash.

The structure of PERCS is described below using one of General Motors' PERCs for an example. After PERCs are described, they will be compared to primes.

General Motors' PERC was issued at $41.375 per share which was the price of GM's common stock at the time of the issue. Investors in PERCs were entitled to receive $3.31 annually in dividends throughout the PERC's three year life. The dividends are cumulative and receive a higher priority than dividends to common, but not to preferred equity. At the time the PERCs were issued, GM's common stockholders were receiving an annual dividend of $1.60. Therefore, PERC holders were to receive an additional $1.71 in dividends annually. The extra dividend was apparently intended to compensate PERC holders for writing a three year American call to the issuer.

If the call is exercised by the issuer, PERC holders will receive a fraction of a share of common equal in value to the option's exercise price, plus any accumulated dividends. Thus, if GM's common stock price rises to $60 per share and the exercise price of the call is $54.08, PERC holders will receive .901 shares ($54.08/$60.00) at exercise. If the call is not exercised (expires out-of-the-money), at maturity, each PERC will be converted into a share of common stock. In either case, new shares must be issued when the PERC holders receive their payoff.

The exercise price of the call written by PERC holders is reduced daily (up to sixty days before the PERC's expiration), by an amount equal to the extra daily dividend paid to PERC holders. In the case of GM, the initial exercise price of the call was $58.92. It will be reduced daily by $.004759 ($1.71/360), until it reaches a minimum of $54.08. If the dividend to common stock holders remains constant,this adjustment effectively eliminates the extra dividend paid to PERC holders.

The position held by PERC holders can be expressed as a covered call plus an extra dividend:

$$(T_p - S_p) + (D_p - D_{cs})$$

where T = the underlying common stock, and the subscript "p" indicates the position is held by PERC holders.

S_p = the short position in the call (or score)

D_p = the annual dividend to PERC holders

D_{cs} = the annual dividend to common stockholders

S_p is equal to T_p - X, where X is the exercise price of the call. "X" is decreased daily by $((D_p - D_{cs})/360)$ which is the daily dividend differential. This amount of the adjustment to the exercise price is fixed, although the dividend to common stockholders may change.

Let X^* = the adjusted exercise price, and D^* = the accumulated dividend differential. On any given day, a PERC holders' position is equal to:

$$T_p - (T_p - (X^* - (D_p - D_{cs})/360)) + (D_p - D_{cs})/360 + D^* \quad (1a)$$

If D_{cs} is constant, then the adjustment to the exercise price is equal to the extra dividend already paid to PERC holders, plus any extra dividends accumulated. Therefore, $D^* + X^* = X$, the initial exercise price. Thus, the exercise price of the call is perfectly adjusted for the extra dividend. In that case, equation (1) can be rewritten as:

$$T_p - (T_p - X) \text{ or } T_p - S_p \quad (1b)$$

which is an ordinary covered call. In this case, the PERC is exactly like a prime.

In order for the expected dividend differential to offset the adjustment to the exercise price when investors value PERCS, the present value of the two differences must be equal. This will be true when the dividend to common stockholders is not expected to change, and when the risk of the dividend differential and the exercise price adjustment are equal. Since the adjustment to the exercise price is certain, the dividend differential must be risk-free to equate the two present values. Therefore, if PERC holders believe the dividend to the common stockholders is risky, then the present value of the dividend differential will be greater than the present value of the adjustment to the exercise price.

If the dividend differential and the adjustment to the exercise price offset one another, the PERC should sell at a discount to the underlying stock. If it does not, the investor is not compensated for writing a call. However, if the dividend to common stockholders is risky, the PERC offers a premium above the value of a covered call. Thus, it appears that the value of the PERC depends on whether the dividend paid to PERC holders is safer than the dividend paid to common stockholders. Also, the PERCS' value will be adversely affected if the dividend paid to common is unexpectedly increased. Issuing (and selling)PERCS at the same price as the underlying common,(as GM attempted) would be potentially beneficial for the issuer, who might have superior information about the future level and stability of the dividend to common stockholders.

Comparison of PERCS and Primes

PERCs are similar to primes: they are equivalent to a covered call on the issuers' common stock. Like prime holders, investors in PERCs receive cash dividends throughout the investment's life. Investors in both instruments receive a final payoff in shares, or in fractions of shares.

However, in a number of ways, PERCS and primes are distinct. PERC holders receive dividends that are higher than those paid to common stockholders; prime holders receive the same dividend as common stockholders. The dividends to PERC holders are fixed, cumulative, and receive a higher priority than dividends to common stockholders. In contrast, if common stockholders do not receive a dividend, neither do prime holders.

As was previously discussed, PERCS may increase in value if the risk of the dividend paid to common stockholders increases. They may decrease in value if the risk of the common dividend decreases and/or the level of the dividend increases. If the dividends to common stock and to PERC holders are risk-free, the PERC is a covered call and is exactly like a prime.

Consequently, PERCS may sell for a higher price, a lower price, or the same price as equivalent primes. It appears that some of the extra "value" offered by PERCS is in the form of a relatively safe dividend payment. If the dividend to common stock holders is riskier than the dividend to PERC holders, the PERC may have a higher value than an otherwise equivalent prime. If the dividend differential becomes smaller than the adjustment to the exercise price (because the dividend paid to common increases), PERCS may sell for less than the equivalent prime.

Prime holders have written a European call to score holders. Primes are written on shares already outstanding, and are independent of the firm that issued the underlying stock. PERCS' calls are not written independently of the underlying firm. PERC holders have written an American call to the common stockholders of the issuer. Consequently, the owner of the underlying stock also owns a "score" written on that stock. In the case of PERCS, the "score" owner controls the value of the call.

Thus, the interests of the PERC holders and those of the common stockholders may conflict. PERC holders currently are not protected against wealth transfers by common stockholders, and, they do not have voting rights. For example, the common stockholders could adversely affect the value of PERCS via unexpected dividend increases. If the PERC is in-the-money, its value may be adversely affected by increases in the risk of the underlying stock. This would increase the value of the call, and would reduce the expected fraction of common shares paid to PERC holders (although it would not affect the cash value of the payoff).

PERCS and the Creation of Value

PERCS appear to create value for the issuer, rather than for the investor. The value of the PERC can be affected by the actions of the issuer, because the issuer controls the value of the call written to PERC holders as well as the dividend paid to common stockholders. In addition, the issuer, as an "insider" may have superior information about the level and risk of the dividend paid to common stockholders. Consequently, the issuer may be able to value PERCS with greater accuracy than other investors.

PERCS were issued at underlying firm's common stock price. The premium offered to investors in the form of an "extra" dividend can, in some circumstances, be offset by the declining exercise price of the call embedded in the PERC. In that case, the call has a zero cost for the issuer.

Investors may buy PERCS if they believe the dividend stream paid to PERC holders is less risky than the one offered to common stockholders. They may also be pessimistic about the prospects of the issuer, at least in the short run. In that case, the PERC provides an opportunity to acquire the share <u>and</u> a higher dividend yield (than the one paid to common) at the cost of a common share. Even if the dividend of the common stock and the PERC are perceived to be risk-free, PERCS may offer a relatively inexpensive method of establishing a three year call in the underlying stock.

Thus, PERCS may also create value for investors. However, the issuer, retains some control over the value of the PERC, and may be able to transfer wealth to itself.

PERCS have declined in popularity. Additional covenants which protect investors may be needed in order to re-establish their popularity.

Super Trust Trust

The Super Trust Trust is a mutual fund established by the SuperShares Services Corporation in 1992. The fund has not yet begun to trade, but it began to accept subscriptions in May, 1992 (according to the New York Times, May 19, 1992).[3] The Super Trust Trust will consist of two separate subtrusts: the "Index Trust for Index Shares" and the "U.S. Treasury Money Market Trust for U.S. Treasury Money Shares". The trusts are designed to appeal to institutions as well as individual investors. The structure of the Index Trust only will be described in detail in this section since its structure is very similar to that of the Americus Trusts.

<u>Index Fund for Index Shares</u>

The Index Fund will be an open ended mutual fund whose purpose is to replicate the risk and return of the S&P 500 Index. The fund will issue shares of common stock which will be traded on the American Stock Exchange. The initial net

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[3]Two billion dollars of subscriptions must be made before trading will begin.

asset value of the fund share will be set at $100.

Index Trust Super Unit

Shares in the fund can be deposited, at the owner's discretion, into a unit trust, the "Index Trust Super Unit". The index trust super unit has a maturity of three years, although the index fund itself will not expire.[4] Depositing shares in the Super Unit will not be a taxable event if the index shares are deposited immediately after they are acquired. There is, however, a deposit fee[5] which will be divided between the dealer manager and the soliciting dealer. The super unit will trade on the American Stock Exchange.

The superunit can be divided into two components, both are referred to as Super Shares. There will be two types of Super Shares: Priority Super Shares and Appreciation Super Shares. Each of the Super Shares will trade on the Chicago Board Option's Exchange. Dividing the super unit into supershares will have no tax consequence. However, there will be a fee for separating the super unit into shares.[6] The

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[4]The issuer plans to establish new super unit trusts with different maturities in the future.

[5]The deposit fee has a maximum of 1.11% of the net asset value of the shares exchanged (for the first $500,000 tendered), and a minimum of .015% of the value of the shares if more than $500,000,000 is tendered.

[6]The fee is a decreasing function of the amount tendered. It has a maximum of 1.5% of the Net Asset Value of the Super Units submitted and a minimum of .15% of the value of the Super Units, if more than $500,000,000 worth of units are tendered.

separation fee declines monthly throughout the three year life of the trust. The fee is divided evenly between the dealer manager and the soliciting dealer. Shares can be deposited in the unit trust at any time unless the value of the share exceeds the termination date amount ($125).

Owners of Priority Super Shares will receive all dividends and realized capital gains paid to the Index Trust Super Unit. Any distributions which are "dividends" are taxed as dividends. Any distributions which are "capital gains" are taxed as capital gains. Income is not taxable at the fund level as long as it is immediately distributed. At maturity, Priority Super Share holders receive the net asset value of the unit trust less any payment to the Appreciation Super Share holders. In other words, they receive a payoff equal to the net asset value of the share, or the termination date amount, ($125), whichever is less. The Priority Super Share is a covered call on the Index fund. The holders of Appreciation Super Shares are not entitled to any income from the trust until its maturity. At that time, they are entitled to receive any capital appreciation above the Termination Date Amount, which is $125. If any realized capital gains distributions are made to the Priority Super Share holders, the termination date amount will be reduced by the amount of the distribution. The Appreciation Super Share is a European call option on the Index Fund.

All payments made at the termination of the unit trust will be made in shares (including fractional shares) from the Index fund. However, at the discretion of the fund, payments can be made in cash or a combination of cash and shares.

If, at any time during the life of the Index Trust Super Unit, investors want to exchange super units for shares in the super trust they may do so. However, it is necessary to combine the complementary supershares in order to redeem the super units. If super units are exchanged for shares in the trust, the minimum value of shares that can be redeemed is $3,000,000. If superunits are redeemed for cash, there is a cash redemption fee of .125% that is payable to the fund. Again, this is to reimburse the fund for broker's fees.

Acquisition of Shares in the Index Fund

Shares in the Index fund can be acquired in two ways. (1) For cash. If shares are purchased for cash, a transactions fee of .125% of the purchase must be paid to the fund. The purpose of this fee is to reimburse the fund for brokerage fees that will be incurred to purchase additional shares for the portfolio. (2) With shares. Investors may purchase shares in the Index fund with portfolios of common stocks. However, there are a number of restrictions on the shares that are tendered, since any portfolio tendered must meet the objectives of the fund. The minimum size of a portfolio that will meet the fund's objectives was estimated to be three million dollars. In addition, exchanging securities for shares in the Index fund will be a taxable event. The difference between the investor's taxable basis and the value of the shares will be a taxable gain or loss.

The Super Fund enables institutions with large portfolios to divide the payoffs into dividend plus realized capital gains and unrealized capital gains components without establishing their own intermediary.

Super Unit Index Trusts and the Creation of Value

The structure of the Super Unit Index funds is almost identical to the structure of the Americus Trusts. The priority super share is similar to a prime, and the appreciation super share is like a score. The only difference is the realized capital gains distributions that may be made by the Super Trust.

It was shown in Chapter three that the division of units of the Americus Trusts into primes and scores created value for investors. Clearly, this was recognized by the designers of Super Shares. A separation fee will be levied when Super Units are divided into Super Shares. Presumably, the purpose of this is to transfer some of the premium to the financial intermediary responsible for dividing the units and to the fund itself. The dealer-manager and soliciting dealer will equally share the separation fee. The maximum fee is 1.5% of the net asset value of the Super Units. The premiums on primes and scores did, at times, greatly exceed 1.5% of the underlying stock price. Thus, it is likely that investors could also share in a premium. It should be noted again that discounts are ruled out by the structure of the trust. Any premiums in excess of the separation fee would be received by investors splitting their shares.

First, the Super Shares are an attempt to offer a new asset to the market. Investors may be willing to pay a premium for a super share because they value highly the unique payoff it offers. Also, like scores and primes, super shares are long term calls and covered calls. While these positions may be created synthetically, it is expensive to do so. Purchasing super shares will help to reduce transactions costs incurred by investors. Also, super shares offer financial institutions the opportunity to sell the income of their funds in two components, while avoiding the establishment of their own financial intermediary. Thus, supershares may reduce transactions costs in two ways.

In order to further examine the source of potential premiums, reconsider the argument from chapter three with regard to the impact of heterogeneous expectations on prime and score prices:

Let S_p - C_p represent the position of the Priority Super Share holder.

Let C_a represent the position of the Appreciation Super Share holder

Let S_t represent the net asset value of one share in the Index Trust

If value additivity holds:

$(S_p - C_p) + C_a - S_t = 0$

Rearranging terms:

$(S_p - S_t) + (C_a - C_p) = 0$

If a premium or discount arose,

$(S_p - S_t) + (C_a - C_p) > 0$ or < 0

A premium might arise if, for example, the holders of Appreciation Super Shares were more optimistic about the value of the underlying index fund than owners of the Priority Super Shares. Investors in the former group might be willing to pay more for the call than investors in the latter group. Also, if holders of the Appreciation Super Share expected the volatility of the Index Fund (which replicates the risk and return of the S&P 500) to increase above its average, they might be willing to pay a premium for the call, since they expect its value to rise.

Super Shares, like primes and scores, appear to qualify as a financial innovation. They appear to offer a unique set of payoffs to investors, as well as reduce transactions costs. Any premium will be shared by investors and the financial intermediaries that established and administer the fund.

Conclusions

In this chapter, three attempts at issuing equity innovations were described: USUs, PERCS, and Super Shares. Two of them, PERCs and Super Shares appear to be true financial innovations. USUs suffer from a design flaw.

Super Shares offer potential value to both issuers and investors by dividing the cash flows created by a mutual fund in a manner that can not be easily duplicated. Moreover, the division of the cash flows is structured so that each component can appeal to investors with different beliefs about the value of the underlying share in the mutual fund, or to investors with different tastes. However, the issuers levied fees that would enable them to participate in any premium associated with the division of the unit into two components. However, some of the potential value was left for investors.

PERCs also appeared to be a financial innovation because they enabled the issuers to establish a long term covered call on the issuer's stock. However, the call was sold to the issuer, who retained the ability to manipulate its value. The "extra" value of a PERC appears to depend on whether or not the investor believes the dividend offered to the PERC holder is safer than the one to be paid to common stockholders. Although PERCs may be fairly priced in an efficient market, the opportunity for wealth transfers from PERC holders to common stock holders may have eroded their popularity.

APPENDIX A
Correlation Matrices

Each table in the Appendix shows the correlation of the independent variables in the regression model with the premium. Descriptive statistics for each of the variables also are shown. Tables are organized alphabetically by trust. Matrices for open trusts are presented first.

The first two letters in each variable name is the ticker symbol assigned to the trusts by the American Stock Exchange. The remaining letters identify the variables.

The variables are defined below:

__R : premium (premium = prime + score - stock)

__PVXDT: present value of the termination claim divided by the stock price (X/T)

__PVXT1: $(X/T-1)^2$

__TMAT: time remaining to maturity

__2WKRET: two week return of the underlying stock

__SCVLN: logarithm of the weekly volume of score trading

__PRVLN: logarithm of the weekly volume of prime trading

Table A-1
Correlation Matrix: American Express
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
XPR	50	0.59250000	0.49086684	29.62500000	-0.37500000	1.87500000
XPPVXDT	50	1.27527755	0.22717048	63.76387762	0.86319237	1.57246446
XPPVXT1	50	0.12635203	0.09200107	6.31760144	6.579754123E-06	0.32771555
XPTMAT	50	4.58653846	0.28033423	229.32692308	4.11538462	5.05769231
XP2WKRET	48	0.00543033	0.08068946	-0.26065574	-0.25357143	0.12595420

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	XPR	XPPVXDT	XPPVXT1	XPTMAT	XP2WKRET
XPR	1.00000	-0.23869	-0.18626	0.33173	-0.19955
	0.0000	0.0951	0.1953	0.0186	0.1739
	50	50	50	50	48
			0.93287	-0.71620	-0.15349
			0.0001	0.0001	0.2976
			50	50	48
				-0.58928	-0.18787
				0.0001	0.2010
				50	48
					-0.14179
					0.3364
					48

Table A-2
Correlation Matrix: American Home Products
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
HPR	51	0.29411765	1.17068984	15.00000000	-3.87500000	2.37500000
HPPVXDT	51	0.75641480	0.07749284	38.57715497	0.67027814	0.96265901
HPPVXT1	51	0.06522114	0.02948042	3.32627815	0.00139435	0.10871650
HPTMAT	51	4.50000000	0.28588594	229.50000000	4.01923077	4.98076923
HP2WKRET	49	-0.00466866	0.04434631	-0.22876441	-0.15229885	0.07234727

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	HPR	HPPVXDT	HPPVXT1	HPTMAT	HP2WKRET
HPR	1.00000 0.0000 51	-0.07380 0.6068 51	0.00427 0.9763 51	0.44862 0.0010 51	-0.03710 0.8002 49
			-0.98265 0.0001 51	-0.56769 0.0001 51	-0.45029 0.0012 49
				0.51219 0.0001 51	0.49577 0.0003 49
					0.44010 0.0016 49

Table A-3
Correlation Matrix: AT&T(2)
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
ATR	6	1.37500000	1.23995968	8.25000000	0.37500000	3.75000000
ATPVXDT	6	0.88270475	0.05581453	5.29622851	0.83695208	0.98849389
ATPVXT1	6	0.01635423	0.00968220	0.09812536	0.00013239	0.02658463
ATTMAT	6	4.93269231	0.03597747	29.59615385	4.88461538	4.98076923
AT2WKRET	4	0.06257482	0.05670237	0.25029928	0.02673797	0.14723926

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	ATR	ATPVXDT	ATPVXT1	ATTMAT	AT2WKRET
ATR	1.00000	0.92820	-0.84798	0.70051	0.25836
	0.0000	0.0075	0.0329	0.1211	0.7416
	6	6	6	6	4
			-0.97365	0.87418	0.56070
			0.0010	0.0228	0.4393
			6	6	4
				-0.95196	-0.55986
				0.0034	0.4401
				6	4
					0.77768
					0.2223
					4

Table A-4
Correlation Matrix: Amoco
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
AOR	52	[illegible]9278846	0.98779732	25.62500000	-3.25000000	2.37500000
AOPVXDT	52	[illegible]5013458	0.10538767	49.40699838	0.80837903	1.16585981
AOPVXT1	52	0.01337953	0.01081844	0.69573576	2.199863628E-07	0.03671860
AOTMAT	52	4.49038462	0.29143764	233.50000000	4.00000000	4.98076923
AO2WKRET	50	-0.00366069	0.04283266	-0.18303450	-0.11111111	0.07496013

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	AOR	AOPVXDT	AOPVXT1	AOTMAT	AO2WKRET
AOR	1.00000 0.0000 52	-0.30012 0.0306 52	0.21144 0.1324 52	0.33409 0.0155 52	-0.10230 0.4796 50
			-0.66835 0.0001 52	-0.81378 0.0001 52	-0.15812 0.2728 50
				0.76295 0.0001 52	0.20760 0.1480 50
					-0.07328 0.6130 50

Table A-5
Correlation Matrix: Atlantic Richfield
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
RFR	44	0.77272727	1.06246502	34.00000000	-1.37500000	4.00000000
RFPVXDT	44	0.99179710	0.12672008	43.63907246	0.79534143	1.21556671
RFPVXT1	44	0.01576031	0.01294080	0.69345372	0.00004329	0.04646901
RFTMAT	44	4.56730769	0.24702370	200.96153846	4.15384615	4.98076923
RF2WKRET	42	-0.00363618	0.05415886	-0.15271966	-0.14285714	0.09953344

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	RFR	RFPVXDT	RFPVXT1	RFTMAT	RF2WKRET
RFR	1.00000	-0.03092	0.40430	0.37488	-0.26087
	0.0000	0.8421	0.0065	0.0122	0.0952
	44	44	44	44	42
			-0.24274	-0.53771	-0.06196
			0.1124	0.0002	0.6967
			44	44	42
				0.66915	-0.08275
				0.0001	0.6024
				44	42
					-0.39406
					0.0098
					42

Table A-6
Correlation Matrix: Bristol Myers
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
BYR	42	0.43750000	1.28613917	18.37500000	-3.00000000	2.75000000
BYPVXDT	42	0.79289826	0.08566982	33.30172688	0.67445781	0.98683756
BYPVXT1	42	0.05005570	0.02730519	2.10233956	0.00017325	0.10597772
BYTMAT	42	4.58653846	0.23592008	192.63461538	4.19230769	4.98076923
BY2WKRET	40	-0.00980571	0.05355551	-0.39222833	-0.20657277	0.08374384

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	BYR	BYPVXDT	BYPVXT1	BYTMAT	BY2WKRET
BYR	1.00000	-0.16913	0.13541	0.36163	-0.07234
	0.0000	0.2843	0.3926	0.0186	0.6573
	42	42	42	42	40
			-0.97645	-0.72109	-0.38875
			0.0001	0.0001	0.0132
			42	42	40
				0.70143	0.45786
				0.0001	0.0030
				42	40
					0.21431
					0.1842
					40

Table A-7
Correlation Matrix: Chevron
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
CVR	47	0.78989362	0.64537779	37.12500000	-0.50000000	2.12500000
CVPVXDT	47	1.07726627	0.18178021	50.63151459	0.77679643	1.38135020
CVPVXT1	47	0.03831106	0.03454229	1.80061969	0.00037763	0.14542797
CVTMAT	47	4.75000000	0.26367902	223.25000000	4.30769231	5.19230769
CV2WKRET	45	-0.00792427	0.06021184	-0.35659223	-0.16625917	0.11647727

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	CVR	CVPVXDT	CVPVXT1	CVTMAT	CV2WKRET
CVR	1.00000	-0.19240	-0.09726	0.40136	-0.57612
	0.0000	0.1951	0.5154	0.0052	0.0001
	47	47	47	47	45
			0.64013	-0.68074	-0.02688
			0.0001	0.0001	0.8609
			47	47	45
				-0.01243	-0.06520
				0.9339	0.6705
				47	45
					-0.29918
					0.0459
					45

Table A-8
Correlation Matrix: Coca Cola
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
KKR	48	1.97916667	2.01842137	95.00000000	-0.25000000	6.75000000
KKPVXDT	48	0.96028635	0.11787714	46.09374500	0.74767215	1.10735340
KKPVXT1	48	0.01518271	0.02140534	0.72877030	0.00007984	0.06366934
KKTMAT	48	4.52884615	0.26923077	217.38461538	4.07692308	4.98076923
KK2WKRET	46	-0.00764441	0.04758538	-0.35164276	-0.13368984	0.09655172

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	KKR	KKPVXDT	KKPVXT1	KKTMAT	KK2WKRET
KKR	1.00000 0.0000 48	-0.69477 0.0001 48	0.63968 0.0001 48	0.65478 0.0001 48	-0.36926 0.0116 46
			-0.90062 0.0001 48	-0.86961 0.0001 48	-0.03929 0.7954 46
				0.71602 0.0001 48	0.03149 0.8354 46
					-0.14134 0.3488 46

Table A-9
Correlation Matrix: Dow Chemical
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
DOR	49	1.09948980	1.56769544	53.87500000	-1.50000000	7.50000000
DOPVXDT	49	0.88432971	0.08874048	43.33215568	0.67614462	1.05868834
DOPVXT1	49	0.02109378	0.02488057	1.03359510	0.00001807	0.10488230
DOTMAT	49	4.55769231	0.27478250	223.32692308	4.09615385	5.01923077
DO2WKRET	47	0.00423351	0.08479832	0.19897515	-0.29826733	0.22837370

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	DOR	DOPVXDT	DOPVXT1	DOTMAT	DO2WKRET
DOR	1.00000	0.05825	0.06125	0.03360	-0.54592
	0.0000	0.6909	0.6759	0.8187	0.0001
	49	49	49	49	47
			-0.91100	-0.38540	-0.40984
			0.0001	0.0062	0.0042
			49	49	47
				0.26148	0.25304
				0.0696	0.0861
				49	47
					0.04538
					0.7620
					47

Table A-10
Correlation Matrix: DuPont
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
DPR	47	1.14361702	2.79921121	53.75000000	-4.87500000	16.37500000
DPPVXDT	47	0.71010235	0.11705293	33.37481066	0.59807233	1.01607681
DPPVXT1	47	0.09745051	0.05158065	4.58017419	0.00025846	0.16154585
DPTMAT	47	4.69230769	0.26367902	220.53846154	4.25000000	5.13461538
DP2WKRET	45	0.00599405	0.07401306	-0.26973239	-0.20361991	0.20681265

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	DPR	DPPVXDT	DPPVXT1	DPTMAT	DP2WKRET
DPR	1.00000	0.02838	-0.10367	0.05423	-0.32676
	0.0000	0.8498	0.4880	0.7173	0.0285
	47	47	47	47	45
			-0.97468	-0.52002	-0.38348
			0.0001	0.0002	0.0093
			47	47	45
				0.40981	0.44066
				0.0042	0.0025
				47	45
					0.36232
					0.0144
					45

Table A-11
Correlation Matrix: E. Kodak
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
KDR	51	1.44240196	1.74682047	73.56250000	-2.12500000	7.25000000
KDPVXDT	51	0.83036361	0.15791545	42.34854404	0.61311121	1.10742857
KDPVXT1	51	0.05322483	0.04972212	2.71446623	5.290939526E-06	0.14968293
KDTMAT	51	4.46153846	0.28588594	227.53846154	3.98076923	4.94230769
KD2WKRET	49	-0.00873806	0.07022895	-0.42816482	-0.17929293	0.15625000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	KDR	KDPVXDT	KDPVXT1	KDTMAT	KD2WKRET
KDR	1.00000	-0.30987	0.39939	0.09694	-0.20718
	0.0000	0.0269	0.0037	0.4986	0.1532
	51	51	51	51	49
			-0.90643	-0.79176	-0.28174
			0.0001	0.0001	0.0499
			51	51	49
				0.60680	0.28546
				0.0001	0.0468
				51	49
					0.20845
					0.1506
					49

Table A-12
Correlation Matrix: Exxon
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
XNR	49	0.69132653	0.54908900	33.87500000	-0.75000000	1.62500000
XNPVXDT	49	0.75265710	0.03697093	36.88019795	0.66260662	0.82951904
XNPVXT1	49	0.06251746	0.01853935	3.06335575	0.02906376	0.11383429
XNTMAT	49	4.55769231	0.27478250	223.32692308	4.09615385	5.01923077
XN2WKRET	47	0.01053586	0.02863459	0.49518532	-0.05787037	0.07851240

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	XNR	XNPVXDT	XNPVXT1	XNTMAT	XN2WKRET
XNR	1.00000 0.0000 49	0.15140 0.2991 49	-0.15839 0.2770 49	0.09526 0.5150 49	-0.31591 0.0305 47
			-0.99622 0.0001 49	0.73213 0.0001 49	-0.42256 0.0031 47
				-0.75133 0.0001 49	0.41918 0.0034 47
					-0.13290 0.3732 47

Table A-13
Correlation Matrix: Ford
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
FCR	48	0.80208333	1.25022161	38.50000000	-1.37500000	3.25000000
FCPVXDT	48	0.80876994	0.10968440	38.82095714	0.64891979	0.98937294
FCPVXT1	48	0.04834896	0.04211783	2.32075026	0.00011293	0.12325731
FCTMAT	48	4.60576923	0.26923077	221.07692308	4.15384615	5.05769231
FC2WKRET	46	0.00162379	0.06530158	0.07469421	-0.21899736	0.11458333

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	FCR	FCPVXDT	FCPVXT1	FCTMAT	FC2WKRET
FCR	1.00000	-0.41400	0.46055	0.67921	-0.09548
	0.0000	0.0034	0.0010	0.0001	0.5279
	48	48	48	48	46
			-0.97474	-0.59838	-0.19605
			0.0001	0.0001	0.1916
			48	48	46
				0.68368	0.16859
				0.0001	0.2627
				48	46
					-0.05934
					0.6953
					46

Table A-14
Correlation Matrix: General Electric
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
GNR	50	0.99750000	1.54244580	49.87500000	-6.5000000C	2.75000000
GNPVXDT	50	0.98266023	0.15575503	49.13301160	0.74147389	1.26405262
GNPVXT1	50	0.02407510	0.01985138	1.20375517	0.00050501	0.06972378
GNTMAT	50	4.52884615	0.28033423	226.44230769	4.05769231	5.00000000
GN2WKRET	48	-0.00698438	0.06352281	-0.33525039	-0.19957082	0.14687500

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	GNR	GNPVXDT	GNPVXT1	GNTMAT	GN2WKRET
GNR	1.00000 0.0000 50	-0.13480 0.3506 50	0.05966 0.6807 50	0.19475 0.1753 50	-0.23543 0.1072 48
			-0.20547 0.1523 50	-0.80116 0.0001 50	-0.27156 0.0619 48
				-0.14638 0.3104 50	0.06355 0.6678 48
					0.18629 0.2049 48

Table A-15
Correlation Matrix: General Motors
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
GMR	47	0.78723404	1.56144854	37.00000000	-2.50000000	7.87500000
GMPVXDT	47	1.05097547	0.15462390	49.39584721	0.78606993	1.31691082
GMPVXT1	47	0.02599836	0.02433951	1.22192278	0.00001480	0.10043247
GMTMAT	47	4.50000000	0.26367902	211.50000000	4.05769231	4.94230769
GM2WKRET	45	-0.00257710	0.06987737	-0.11596965	-0.22818792	0.15610510

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	GMR	GMPVXDT	GMPVXT1	GMTMAT	GM2WKRET
GMR	1.00000	-0.23612	0.10094	0.49691	-0.40393
	0.0000	0.1101	0.4996	0.0004	0.0059
	47	47	47	47	45
			0.47035	-0.43578	-0.12233
			0.0009	0.0022	0.4234
			47	47	45
				0.40921	-0.15108
				0.0043	0.3218
				47	45
					-0.18559
					0.2222
					45

Table A-16
Correlation Matrix: GTE
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
LDR	48	0.80468750	0.43676325	38.62500000	-0.12500000	1.75000000
LDPVXDT	48	0.80137105	0.06823638	38.46581057	0.67024277	0.90588051
LDPVXT1	48	0.04401266	0.02906430	2.11260759	0.00885848	0.10873983
LDTMAT	48	4.58653846	0.26923077	220.15384615	4.13461538	5.03846154
LD2WKRET	46	-0.00304168	0.05004219	-0.13991742	-0.12426036	0.10963455

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	LDR	LDPVXDT	LDPVXT1	LDTMAT	LD2WKRET
LDR	1.00000	-0.23991	0.26603	0.49301	-0.22905
	0.0000	0.1005	0.0676	0.0004	0.1257
	48	48	48	48	46
			-0.98869	-0.77772	-0.31860
			0.0001	0.0001	0.0309
			48	48	46
				0.74480	0.31867
				0.0001	0.0309
				48	46
					0.10315
					0.4951
					46

Table A-17
Correlation Matrix: Hewlett Packard
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
HLR	47	0.54787234	0.80654304	25.75000000	-1.25000000	2.37500000
HLPVXDT	47	1.06875843	0.12228888	50.23164624	0.81506295	1.34426668
HLPVXT1	47	0.01936411	0.02740859	0.91011313	3.741614885E-07	0.11851955
HLTMAT	47	4.51923077	0.26367902	212.40384615	4.07692308	4.96153846
HL2WKRET	45	-0.00175810	0.09351743	-0.07911436	-0.32330827	0.24043716

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	HLR	HLPVXDT	HLPVXT1	HLTMAT	HL2WKRET
HLR	1.00000 0.0000 47	-0.18173 0.2215 47	0.03765 0.8016 47	0.49267 0.0004 47	-0.12966 0.3959 45
			0.72258 0.0001 47	-0.29464 0.0444 47	-0.38389 0.0092 45
				0.18836 0.2048 47	-0.41463 0.0046 45
					0.00687 0.9643 45

Table A-18
Correlation Matrix: IBM
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
BZR	48	1.63281250	1.36039298	78.37500000	-0.87500000	6.37500000
BZPVXDT	48	1.18506788	0.18994271	56.88325826	0.82545067	1.41185395
BZPVXT1	48	0.06957672	0.04575754	3.33968267	0.00038876	0.16962367
BZTMAT	48	4.47115385	0.26923077	214.61538462	4.01923077	4.92307692
BZ2WKRET	46	-0.01232075	0.05607353	-0.56675472	-0.18066158	0.08853575

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	BZR	BZPVXDT	BZPVXT1	BZTMAT	BZ2WKRET
BZR	1.00000	-0.25054	-0.34102	0.42333	-0.26657
	0.0000	0.0859	0.0177	0.0027	0.0733
	48	48	48	48	46
			0.88015	-0.85653	0.03476
			0.0001	0.0001	0.8186
			48	48	46
				-0.82207	0.07033
				0.0001	0.6423
				48	46
					-0.25530
					0.0868
					46

Table A-19
Correlation Matrix: Johnson and Johnson
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
JNR	45	0.58333333	1.09913447	26.25000000	-1.37500000	3.12500000
JNPVXDT	45	1.01514580	0.10663346	45.68156102	0.77749026	1.16919646
JNPVXT1	45	0.01134741	0.01328592	0.51063340	0.00007499	0.04951058
JNTMAT	45	4.44230769	0.25257549	199.90384615	4.01923077	4.86538462
JN2WKRET	43	-0.00964609	0.06541904	-0.41478184	-0.20302648	0.11403509

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	JNR	JNPVXDT	JNPVXT1	JNTMAT	JN2WKRET
JNR	1.00000	-0.34022	0.36846	0.35561	-0.28744
	0.0000	0.0222	0.0128	0.0165	0.0616
	45	45	45	45	43
			-0.62514	-0.71617	-0.08117
			0.0001	0.0001	0.6049
			45	45	43
				0.48149	-0.19194
				0.0008	0.2176
				45	43
					-0.25219
					0.1028
					43

Table A-20
Correlation Matrix: Merck
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
MKR	53	2.87594340	3.39124283	152.42500000	-3.00000000	11.92500000
MKPVXDT	53	0.80726043	0.13472116	42.78480280	0.08942888	0.94756264
MKPVXT1	53	0.05495588	0.11452207	2.91266183	0.00274968	0.82913976
MKTMAT	53	4.50000000	0.29698933	238.50000000	4.00000000	5.00000000
MK2WKRET	51	0.00171876	0.05642004	0.08765686	-0.18500000	0.09815951

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	MKR	MKPVXDT	MKPVXT1	MKTMAT	MK2WKRET
MKR	1.00000	-0.25083	0.23930	-0.21259	-0.56308
	0.0000	0.0700	0.0844	0.1264	0.0001
	53	53	53	53	51
			-0.91701	-0.11353	0.06345
			0.0001	0.4183	0.6582
			53	53	51
				-0.02838	-0.19686
				0.8401	0.1662
				53	51
					0.14438
					0.3121
					51

Table A-21
Correlation Matrix: Mobil
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
MBR	49	0.34693878	0.72090497	17.00000000	-1.12500000	2.50000000
MBPVXDT	49	0.94109400	0.11139416	46.11360584	0.75878420	1.18024871
MBPVXT1	49	0.01562534	0.01799200	0.76564160	0.00001409	0.05818506
MBTMAT	49	4.51923077	0.27478250	221.44230769	4.05769231	4.98076923
MB2WKRET	47	-0.00500758	0.05334000	-0.23535607	-0.14962594	0.09169054

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	MBR	MBPVXDT	MBPVXT1	MBTMAT	MB2WKRET
MBR	1.00000 0.0000 49	-0.21406 0.1397 49	0.40187 0.0042 49	0.49147 0.0003 49	-0.56672 0.0001 47
			-0.64207 0.0001 49	-0.45574 0.0010 49	-0.09865 0.5095 47
				0.79837 0.0001 49	-0.01498 0.9204 47
					-0.20553 0.1658 47

Table A-22
Correlation Matrix: Philip Morris
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
HMR	46	1.01086957	1.74300708	46.50000000	-6.75000000	4.00000000
HMPVXDT	46	0.81833542	0.09561818	37.64342911	0.60720073	0.94551850
HMPVXT1	46	0.04194610	0.04418246	1.92952060	0.00296823	0.15429126
HMTMAT	46	4.56730769	0.25812726	210.09615385	4.13461538	5.00000000
HM2WKRET	44	-0.00501352	0.05663723	-0.22059502	-0.17500000	0.12201258

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	HMR	HMPVXDT	HMPVXT1	HMTMAT	HM2WKRET
HMR	1.00000	0.29574	-0.34722	-0.08703	-0.20719
	0.0000	0.0460	0.0181	0.5652	0.1772
	46	46	46	46	44
			-0.98519	-0.81381	-0.21861
			0.0001	0.0001	0.1540
			46	46	44
				0.74529	0.22879
				0.0001	0.1352
				46	44
					0.06220
					0.6884
					44

Table A-23
Correlation Matrix: Proctor and Gamble
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
OGR	50	1.14250000	1.21795925	57.12500000	-1.25000000	3.50000000
OGPVXDT	50	0.82731882	0.08642442	41.36594079	0.69647302	0.98510244
OGPVXT1	50	0.03713859	0.02936727	1.85692939	0.00022194	0.09212863
OGTMAT	50	4.54807692	0.28033423	227.40384615	4.07692308	5.01923077
OG2WKRET	48	-0.00409783	0.05183849	-0.19669591	-0.15681234	0.12179487

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

OGR	OGPVXDT	OGPVXT1	OGTMAT	OG2WKRET
1.00000	-0.19283	0.20743	0.28284	-0.27505
0.0000	0.1797	0.1483	0.0466	0.0585
50	50	50	50	48
	1.00000	-0.97583	-0.86420	-0.30560
	0.0000	0.0001	0.0001	0.0347
	50	50	50	48
		1.00000	0.81010	0.30614
		0.0000	0.0001	0.0343
		50	50	48
			1.00000	0.17487
			0.0000	0.2345
			50	48
				1.00000
				0.0000
				48

Table A-24
Correlation Matrix: Sears
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
RSR	48	0.62500000	0.61345724	30.00000000	-2.25000000	1.87500000
RSPVXDT	48	0.77482640	0.16751540	37.19166722	0.51311307	0.99421141
RSPVXT1	48	0.07817995	0.09092527	3.75263749	0.00003351	0.23705889
RSTMAT	48	4.56730769	0.26923077	219.23076923	4.11538462	5.01923077
RS2WKRET	46	-0.01487025	0.07293947	-0.68403129	-0.24739583	0.14049587

COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	RSR	RSPVXDT	RSPVXT1	RSTMAT	RS2WKRET
RSR	1.00000	-0.33947	0.32852	0.39824	-0.31422
	0.0000	0.0182	0.0226	0.0051	0.0334
	48	48	48	48	46
			-0.99055	-0.85572	-0.05673
			0.0001	0.0001	0.7081
			48	48	46
				0.83990	0.06225
				0.0001	0.6811
				48	46
					-0.05996
					0.6922
					46

Table A-25
Correlation Matrix: Union Pacific
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
UPR	51	0.78431373	0.93276418	40.00000000	-2.12500000	2.37500000
UPPVXDT	51	0.93668952	0.17261724	47.77116575	0.71324770	1.23422230
UPPVXT1	51	0.03322068	0.02597529	1.69425465	3.039294614E-07	0.08222688
UPTMAT	51	4.44230769	0.28588594	226.55769231	3.96153846	4.92307692
UP2WKRET	49	-0.00334233	0.07494490	-0.16377427	-0.29054054	0.11206897

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	UPR	UPPVXDT	UPPVXT1	UPTMAT	UP2WKRET
UPR	1.00000	-0.07532	0.06531	0.24519	-0.21728
	0.0000	0.5994	0.6489	0.0829	0.1337
		51	51	51	49
			-0.73664	-0.69966	-0.13587
			0.0001	0.0001	0.3519
			51	51	49
				0.77613	0.01002
				0.0001	0.9455
				51	49
					-0.14017
					0.3367
					49

Table A-26
Correlation Matrix: Xerox
Trust Initiation to Closing

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
XXR	45	1.05000000	1.04867340	47.25000000	-0.62500000	4.25000000
XXPVXDT	45	1.12522461	0.18426862	50.63510755	0.78383835	1.33996231
XXPVXT1	45	0.04888158	0.02910221	2.19967090	0.00928758	0.11557437
XXTMAT	45	4.51923077	0.25257549	203.36538462	4.09615385	4.94230769
XX2WKRET	43	-0.01464408	0.07198787	-0.62969549	-0.26298157	0.13546798

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	XXR	XXPVXDT	XXPVXT1	XXTMAT	XX2WKRET
XXR	1.00000 0.0000 45	-0.49907 0.0005 45	-0.22573 0.1360 45	0.43996 0.0025 45	-0.27483 0.0745 43
			0.65694 0.0001 45	-0.86762 0.0001 45	-0.15687 0.3151 43
				-0.75460 0.0001 45	-0.09708 0.5357 43
					-0.03934 0.8022 43

Table A-27
Correlation Matrix: American Express
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
XPR	144	0.51559028	0.60218694	74.24500000	-0.50000000	2.37500000
XPPVXDT	144	1.37826888	0.34483014	198.47071845	0.97476082	2.26923170
XPPVXT1	144	0.26116942	0.40567528	37.60839661	2.4957956446E-06	1.61094912
XPTMAT	144	2.72115385	0.80217899	391.84615385	1.34615385	4.09615385
XP2WKRET	144	0.00217279	0.05444049	0.31288115	-0.14545455	0.20245399
XPSCVLN	144	6.80101258	0.84940678	979.34581136	4.15888308	9.18748108
XPPRVLN	144	5.57116747	0.97442927	802.24811546	2.83321334	7.93701749

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 144

	XPR	XPPVXDT	XPPVXT1	XPTMAT	XP2WKRET	XPSCVLN	XPPRVLN
XPR	1.00000	-0.44138	-0.40299	0.10092	-0.16768	0.44837	0.22128
	0.0000	0.0001	0.0001	0.2287	0.0446	0.0001	0.0077
			0.95860	-0.71143	-0.11556	-0.13685	0.00932
			0.0001	0.0001	0.1678	0.1019	0.9117
				-0.67419	-0.10333	-0.09157	-0.02493
				0.0001	0.2178	0.2750	0.7668
					0.01698	-0.33001	-0.21691
					0.8399	0.0001	0.0090
						0.14645	-0.05869
						0.0799	0.4847
							0.58416
							0.0001

Table A-28
Correlation Matrix: American Home Products
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
HPR	172	0.88880814	1.02253935	152.87500000	-1.50000000	5.50000000
HPPVXDT	172	0.79391859	0.06639124	136.55399774	0.67929719	0.93528062
HPPVXT1	172	0.04685172	0.02683855	8.05849537	0.00418860	0.10285029
HPTMAT	172	2.35576923	0.95762022	405.19230769	0.71153846	4.00000000
HP2WKRET	172	0.00680292	0.03643829	1.17010273	-0.11280488	0.15346535
HPSCVLN	172	5.56468154	1.04627492	957.12522534	2.19722458	8.40793621
HPPRVLN	172	4.07806313	1.18878061	701.42685813	0.00000000	6.88141130

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 172

	HPR	HPPVXDT	HPPVXT1	HPTMAT	HP2WKRET	HPSCVLN	HPPRVLN
HPR	1.00000	0.27378	-0.22510	0.19199	-0.35352	-0.25802	-0.28218
	0.0000	0.0003	0.0030	0.0116	0.0001	0.0006	0.0002
			-0.98835	0.47721	-0.20249	-0.45890	-0.12341
			0.0001	0.0001	0.0077	0.0001	0.1068
				-0.43518	0.18416	0.44839	0.10707
				0.0001	0.0156	0.0001	0.1621
					0.03185	-0.55091	-0.22954
					0.6783	0.0001	0.0025
						0.21910	0.12793
						0.0039	0.0944
							0.34480
							0.0001

Table A-29
Correlation Matrix: AT&T(2)
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
ATR	209	0.83193780	0.68438961	173.87500000	-1.87500000	4.62500000
ATPVXDT	209	0.72312622	0.10308772	151.13338083	0.52296943	0.91525293
ATPVXT1	209	0.08723532	0.05967679	18.23218160	0.00718207	0.22755816
ATTMAT	209	2.86538462	1.16302439	598.86538462	0.86538462	4.86538462
AT2WKRET	209	0.00419985	0.04574304	0.87776865	-0.12087912	0.12682927
ATSCVLN	209	7.85640448	0.91479657	1641.98853528	5.48893773	9.66154337
ATPRVLN	209	6.49807124	0.84276531	1358.09688847	3.91202301	8.54597499

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 209

	ATR	ATPVXDT	ATPVXT1	ATTMAT	AT2WKRET	ATSCVLN	ATPRVLN
ATR	1.00000	0.01965	-0.02979	0.26592	-0.11090	0.06816	0.08988
	0.0000	0.7776	0.6685	0.0001	0.1099	0.3268	0.1956
			-0.98838	0.08813	-0.17198	-0.29696	0.01020
			0.0001	0.2045	0.0128	0.0001	0.8835
				-0.14195	0.17141	0.32487	0.00396
				0.0403	0.0131	0.0001	0.9546
					0.09480	-0.61661	-0.39970
					0.1721	0.0001	0.0001
						0.06447	-0.02491
						0.3537	0.7203
							0.56331
							0.0001

Table A-30
Correlation Matrix: Amoco
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
AOR	157	1.02945860	1.31901923	161.62500000	-2.00000000	5.50000000
AOPVXDT	157	0.90636558	0.08132185	142.29939535	0.76040108	1.09740910
AOPVXT1	157	0.01533853	0.01446221	2.40814873	1.018605353E-07	0.05740764
AOTMAT	157	2.48076923	0.87434817	389.48076923	0.98076923	3.98076923
AO2WKRET	157	0.00514232	0.03401791	0.80734467	-0.07657658	0.08500000
AOSCVLN	157	5.60256082	0.96464237	879.60204898	2.99573227	8.23761155
AOPRVLN	157	3.48690576	1.30034538	547.44420481	0.00000000	6.08335981

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 157

	AOR	AOPVXDT	AOPVXT1	AOTMAT	AO2WKRET	AOSCVLN	AOPRVLN
AOR	1.00000	-0.02514	0.02356	-0.17959	-0.26655	0.06113	0.11490
	0.0000	0.7546	0.7696	0.0244	0.0007	0.4470	0.1519
			-0.91002	0.65511	-0.20820	-0.44867	-0.26990
			0.0001	0.0001	0.0089	0.0001	0.0006
				-0.51748	0.20366	0.37332	0.21490
				0.0001	0.0105	0.0001	0.0069
					0.03210	-0.44389	-0.49427
					0.6898	0.0001	0.0001
						0.26599	0.01378
						0.0008	0.8640
							0.36166
							0.0001

Table A-31
Correlation Matrix: Atlantic Richfield
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
RFR	151	0.47764901	0.90312952	72.12500000	-1.62500000	5.25000000
RFPVXDT	151	0.87860505	0.09172333	132.66936327	0.69911738	1.06801105
RFPVXT1	151	0.02309419	0.02193076	3.48722206	3.354247166E-06	0.09053035
RFTMAT	151	2.69230769	0.84103932	406.53846154	1.25000000	4.13461538
RF2WKRET	151	0.00579046	0.03275133	0.87435890	-0.07779886	0.09483667
RFSCVLN	151	5.24573975	1.17571908	792.10670215	0.00000000	7.76684054
RFPRVLN	151	3.42186169	1.57123532	516.70111579	0.00000000	7.11395611

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 151

	RFR	RFPVXDT	RFPVXT1	RFTMAT	RF2WKRET	RFSCVLN	RFPRVLN
RFR	1.00000	0.09465	-0.12405	0.08403	-0.30328	-0.02407	-0.00395
	0.0000	0.2477	0.1291	0.3050	0.0002	0.7693	0.9616
			-0.91315	0.86850	-0.20480	-0.56721	-0.53918
			0.0001	0.0001	0.0117	0.0001	0.0001
				-0.79065	0.18471	0.49280	0.46193
				0.0001	0.0232	0.0001	0.0001
					-0.06140	-0.46673	-0.50179
					0.4539	0.0001	0.0001
						0.17454	0.10313
						0.0321	0.2076
							0.55008
							0.0001

Table A-32
Correlation Matrix: Bristol Myers
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
BYR	172	1.49055233	1.85370503	256.37500000	-1.50000000	7.75000000
BYPVXDT	172	0.85368988	0.08215179	146.83465926	0.65196268	1.04153399
BYPVXT1	172	0.02811633	0.02676413	4.83600891	1.806039555E-07	0.12112997
BYTMAT	172	2.52884615	0.95762022	434.96153846	0.88461538	4.17307692
BY2WKRET	172	0.00829243	0.03648690	1.42629817	-0.08716707	0.14398422
BYSCVLN	172	6.70321569	1.36926859	1152.95309816	3.52636052	9.00109973
BYPRVLN	172	5.29293326	1.29785998	910.38452132	1.09861229	8.10651452

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 172

	BYR	BYPVXDT	BYPVXT1	BYTMAT	BY2WKRET	BYSCVLN	BYPRVLN
BYR	1.00000	0.05173	-0.17052	-0.05530	-0.18488	0.14641	0.04967
	0.0000	0.5003	0.0253	0.4712	0.0152	0.0553	0.5176
			-0.94170	0.86539	-0.30189	-0.81038	-0.60793
			0.0001	0.0001	0.0001	0.0001	0.0001
				-0.81129	0.28305	0.73449	0.61214
				0.0001	0.0002	0.0001	0.0001
					-0.10159	-0.85588	-0.67737
					0.1848	0.0001	0.0001
						0.17693	0.10739
						0.0202	0 1608
							0.77771
							0.0001

Table A-33
Correlation Matrix: Chevron
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
CVR	151	0.56539735	0.89661800	85.37500000	-1.12500000	4.50000000
CVPVXDT	151	0.96373381	0.11082189	145.52380545	0.78731512	1.20207421
CVPVXT1	151	0.01351539	0.01147846	2.04082424	8.926503703E-07	0.04523486
CVTMAT	151	2.84615385	0.84103932	429.76923077	1.40384615	4.28846154
CV2WKRET	151	0.00707772	0.03942313	1.06873607	-0.09725686	0.11864407
CVSCVLN	151	6.35185767	1.11283412	959.13050880	3.21887582	8.96316024
CVPRVLN	151	4.88113443	1.41068943	737.05129919	0.00000000	7.87929149

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 151

	CVR	CVPVXDT	CVPVXT1	CVTMAT	CV2WKRET	CVSCVLN	CVPRVLN
CVR	1.00000	0.22668	-0.02901	0.26297	-0.05510	0.07357	0.01450
	0.0000	0.0051	0.7237	0.0011	0.5016	0.3693	0.8598
			-0.12084	0.83325	-0.21149	-0.72963	-0.64871
			0.1394	0.0001	0.0091	0.0001	0.0001
				-0.13236	0.04305	0.18129	0.17498
				0.1052	0.5997	0.0259	0.0316
					-0.03069	-0.55417	-0.49801
					0.7084	0.0001	0.0001
						0.25752	0.20211
						0.0014	0.0128
							0.69032
							0.0001

Table A-34
Correlation Matrix: Coca Cola
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
KKR	146	0.03681507	0.74207999	5.37500000	-2.75000000	4.50000000
KKPVXDT	146	0.68394377	0.17047962	99.85579007	0.46121969	1.07566377
KKPVXT1	146	0.12875578	0.08917763	18.79834364	0.00021601	0.29028423
KKTMAT	146	2.66346154	0.81328194	388.86538462	1.26923077	4.05769231
KK2WKRET	146	0.01528396	0.04382553	2.23145866	-0.10857143	0.13226453
KKSCVLN	146	6.24492297	0.76946459	911.75875370	4.18965474	8.32917544
KKPRVLN	146	4.90323181	0.93995579	715.87184390	2.35137526	7.10824414

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 146

	KKR	KKPVXDT	KKPVXT1	KKTMAT	KK2WKRET	KKSCVLN	KKPRVLN
KKR	1.00000	0.22955	-0.25020	0.22727	-0.25938	-0.00601	-0.01488
	0.0000	0.0053	0.0023	0.0058	0.0016	0.9426	0.8585
			-0.95576	0.93081	-0.09815	-0.38443	0.03370
			0.0001	0.0001	0.2385	0.0001	0.6863
				-0.95455	0.09876	0.25901	-0.07488
				0.0001	0.2356	0.0016	0.3690
					-0.00363	-0.18553	0.12327
					0.9653	0.0250	0.1383
						0.28100	0.15342
						0.0006	0.0645
							0.40534
							0.0001

Table A-35
Correlation Matrix: Dow Chemical
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
DOR	157	2.73845541	3.04524691	429.93750000	-2.43750000	10.50000000
DOPVXDT	157	1.01975672	0.22155829	160.10180543	0.80405005	1.61873652
DOPVXT1	157	0.04916574	0.08243720	7.71902108	0.00001002	0.38283488
DOTMAT	157	2.57692308	0.87434817	404.57692308	1.07692308	4.07692308
DO2WKRET	157	-0.00078707	0.04809574	-0.12357012	-0.17473684	0.09448819
DOSCVLN	157	6.26172359	0.90661742	983.09060312	4.12713439	8.93537707
DOPRVLN	157	4.34099060	1.22450001	681.53552466	0.00000000	7.02227373

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 157

	DOR	DOPVXDT	DOPVXT1	DOTMAT	DO2WKRET	DOSCVLN	DOPRVLN
DOR	1.00000	-0.39265	-0.31880	-0.06786	-0.12612	0.37712	0.29575
	0.0000	0.0001	0.0001	0.3984	0.1155	0.0001	0.0002
			0.89538	-0.69252	-0.16621	0.09168	-0.01772
			0.0001	0.0001	0.0375	0.2535	0.8256
				-0.57170	-0.06332	0.11324	-0.01552
				0.0001	0.4308	0.1579	0.8470
					0.08262	-0.45653	-0.37603
					0.3036	0.0001	0.0001
						-0.03745	-0.13875
						0.6414	0.0831
							0.67010
							0.0001

Table A-36
Correlation Matrix: DuPont
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
DPR	171	1.03216959	1.33940568	176.50100000	-2.25000000	5.25000000
DPPVXDT	171	0.85500964	0.09254174	146.20664785	0.70898882	1.01572976
DPPVXT1	171	0.02953610	0.02755994	5.05067276	3.097334451E-07	0.08468751
DPTMAT	171	[illegible].59615385	0.95206875	443.94230769	0.96153846	4.23076923
DP2WKRET	171	0.00431933	0.03989499	0.73860510	-0.09576613	0.09187279
DPSCVLN	171	6.26005471	0.82338572	1070.46935473	4.36944785	8.26873183
DPPRVLN	171	4.31317601	1.21409821	737.55309808	0.00000000	7.20117088

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 171

	DPR	DPPVXDT	DPPVXT1	DPTMAT	DP2WKRET	DPSCVLN	DPPRVLN
DPR	1.00000	-0.08972	0.04644	-0.30870	-0.34360	0.02887	0.10018
	0.0000	0.2432	0.5464	0.0001	0.0001	0.7078	0.1923
			-0.96955	0.30535	-0.21048	-0.58300	-0.07457
			0.0001	0.0001	0.0057	0.0001	0.3324
				-0.21653	0.17456	0.57307	0.03678
				0.0044	0.0224	0.0001	0.6329
					0.06920	-0.11520	-0.25484
					0.3684	0.1335	0.0008
						0.24558	0.05296
						0.0012	0.4915
							0.28723
							0.0001

Table A-37
Correlation Matrix: E.Kodak
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
KDR	154	2.17523377	2.20112631	334.98600000	-3.00000000	7.62500000
KDPVXDT	154	1.12930752	0.16174290	173.91335841	0.89634307	1.53891008
KDPVXT1	154	0.04271132	0.05107123	6.57754404	1.186536060E-07	0.29042408
KDTMAT	154	2.49038462	0.85769374	383.51923077	1.01923077	3.96153846
KD2WKRET	154	0.00160042	0.04375718	0.24646519	-0.10937500	0.12068966
KDSCVLN	154	6.33524916	1.14301797	975.62837122	0.00000000	9.26775986
KDPRVLN	154	4.76884156	1.13986512	734.40160099	0.69314718	7.82604401

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 154

	KDR	KDPVXDT	KDPVXT1	KDTMAT	KD2WKRET	KDSCVLN	KDPRVLN
KDR	1.00000	-0.00767	-0.07894	-0.10758	-0.20983	0.46880	0.17310
	0.0000	0.9248	0.3305	0.1842	0.0090	0.0001	0.0318
			0.93139	-0.82297	-0.15188	0.24917	0.12484
			0.0001	0.0001	0.0601	0.0018	0.1229
				-0.77301	-0.15773	0.20456	0.11310
				0.0001	0.0507	0.0109	0.1626
					0.01956	-0.48561	-0.35449
					0.8097	0.0001	0.0001
						0.04713	0.10195
						0.5616	0.2083
							0.49118
							0.0001

Table A-38
Correlation Matrix: Exxon
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
XNR	213	0.09929577	0.90373281	21.15000000	-3.25000000	4.50000000
XNPVXDT	213	0.57761327	0.04267129	123.03162730	0.46535827	0.66366575
XNPVXT1	213	0.18022284	0.03683401	38.38746430	0.11312073	0.28584178
XNTMAT	213	2.03846154	1.18523024	434.19230769	0.00000000	4.07692308
XN2WKRET	213	0.00507022	0.03604199	1.07995771	-0.12060302	0.10344828
XNSCVLN	213	6.13795335	1.06271769	1307.38406328	0.00000000	9.02292587
XNPRVLN	213	4.49359609	1.59383114	957.13596778	0.00000000	9.01675562

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 213

	XNR	XNPVXDT	XNPVXT1	XNTMAT	XN2WKRET	XNSCVLN	XNPRVLN
XNR	1.00000	0.14973	-0.13874	0.21717	-0.22367	0.07323	0.07324
	0.0000	0.0289	0.0431	0.0014	0.0010	0.2874	0.2873
			-0.99812	-0.25370	-0.17458	-0.23828	-0.13515
			0.0001	0.0002	0.0107	0.0005	0.0488
				0.27818	0.17169	0.24664	0.14793
				0.0001	0.0121	0.0003	0.0309
					0.07288	0.49227	0.53950
					0.2897	0.0001	0.0001
						0.20458	0.14827
						0.0027	0.0305
							0.45021
							0.0001

Table A-39
Correlation Matrix: Ford
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
FCR	153	1.71895425	2.03749198	263.00000000	-10.25000000	9.25000000
FCPVXDT	153	0.96225035	0.31439500	147.22430292	0.67421929	1.79407280
FCPVXT1	153	0.09962321	0.13393018	15.24235167	0.00006681	0.63055161
FCTMAT	153	2.67307692	0.85214227	408.98076923	1.21153846	4.13461538
FC2WKRET	153	-0.00330396	0.04671229	-0.50550645	-0.14342629	0.18095238
FCSCVLN	153	5.82248500	0.72782333	890.84020493	3.13549422	7.44337107
FCPRVLN	153	4.63049528	1.03485020	708.46577834	0.00000000	7.68040656

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 153

	FCR	FCPVXDT	FCPVXT1	FCTMAT	FC2WKRET	FCSCVLN	FCPRVLN
FCR	1.00000 0.0000	-0.16624 0.0400	-0.35557 0.0001	-0.11862 0.1442	-0.23617 0.0033	0.07627 0.3487	0.04171 0.6087
			0.79012 0.0001	-0.84051 0.0001	-0.12112 0.1358	0.18731 0.0204	0.15945 0.0490
				-0.43166 0.0001	-0.02564 0.7531	0.02681 0.7422	0.03714 0.6486
					0.11410 0.1602	-0.33361 0.0001	-0.24412 0.0024
						0.08631 0.2888	-0.09119 0.2623
							0.56698 0.0001

Table A-40
Correlation Matrix: General Electric
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
GNR	156	1.43028846	1.73775905	223.12500000	-7.00000000	10.00000000
GNPVXDT	156	1.02869551	0.12571631	160.47650031	0.79375640	1.29081202
GNPVXT1	156	0.01652671	0.01734167	2.57816698	4.460886233E-07	0.08457163
GNTMAT	156	2.52884615	0.86879669	394.50000000	1.03846154	4.01923077
GN2WKRET	156	0.00730514	0.04378223	1.13960222	-0.12928760	0.12827225
GNSCVLN	156	6.75089055	1.04622395	1053.13892533	3.97029191	8.94780609
GNPRVLN	156	5.36880561	1.41991384	837.53367455	1.79175947	7.95120716

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 156

	GNR	GNPVXDT	GNPVXT1	GNTMAT	GN2WKRET	GNSCVLN	GNPRVLN
GNR	1.00000	-0.17762	-0.14216	-0.09030	-0.32024	0.08433	0.14170
	0.0000	0.0265	0.0767	0.2623	0.0001	0.2953	0.0776
			0.57172	0.57864	-0.19051	-0.58291	-0.57516
			0.0001	0.0001	0.0172	0.0001	0.0001
				0.48502	-0.18089	-0.36996	-0.31640
				0.0001	0.0238	0.0001	0.0001
					0.00838	-0.72183	-0.76623
					0.9173	0.0001	0.0001
						0.08158	0.00138
						0.3113	0.9863
							0.76909
							0.0001

Table A-41
Correlation Matrix: General Motors
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
GMR	148	0.88750000	1.21610333	131.35000000	-2.00000000	6.75000000
GMPVXDT	148	1.01173602	0.15199506	149.73693080	0.80962224	1.48247354
GMPVXT1	148	0.02308414	0.03850561	3.41645211	3.583683324E-06	0.23278072
GMTMAT	148	2.62500000	0.82438489	388.50000000	1.21153846	4.03846154
GM2WKRET	148	0.00138759	0.04686974	0.20536355	-0.16622691	0.12452830
GMSCVLN	148	6.29455059	0.68677748	931.59348756	4.53259949	8.29329936
GMPRVLN	148	4.93576314	0.84461684	730.49294516	2.30258509	7.30854280

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 148

	GMR	GMPVXDT	GMPVXT1	GMTMAT	GM2WKRET	GMSCVLN	GMPRVLN
GMR	1.00000 0.0000	-0.23126 0.0047	-0.31410 0.0001	-0.13896 0.0921	-0.31176 0.0001	0.07201 0.3844	0.08154 0.3245
			0.80319 0.0001	-0.66833 0.0001	-0.19932 0.0152	-0.15718 0.0564	-0.03205 0.6990
				-0.58152 0.0001	-0.09300 0.2609	0.02177 0.7929	0.04956 0.5497
					0.10023 0.2255	-0.19760 0.0161	-0.24751 0.0024
						0.22166 0.0068	0.19700 0.0164
							0.47533 0.0001

Table A-42
Correlation Matrix: GTE
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
LDR	149	0.30117450	0.85399664	44.87500000	-2.62500000	3.00000000
LDPVXDT	149	0.63757798	0.08446432	94.99911905	0.48247564	0.86769772
LDPVXT1	149	0.13843606	0.05980585	20.62697306	0.01750389	0.26783146
LDTMAT	149	2.69230769	0.82993637	401.15384615	1.26923077	4.11538462
LD2WKRET	149	0.00871960	0.03933082	1.29922001	-0.10546875	0.10507246
LDSCVLN	149	7.18498110	0.78125729	1070.56218386	5.50125821	9.29972393
LDPRVLN	149	5.81411673	0.91469899	866.30339288	3.80666249	8.2925485

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 149

	LDR	LDPVXDT	LDPVXT1	LDTMAT	LD2WKRET	LDSCVLN	LDPRVLN
LDR	1.00000 0.0000	0.15579 0.0578	-0.16541 0.0438	-0.21351 0.0089	-0.32914 0.0001	-0.00674 0.9350	0.04146 0.6156
			-0.99037 0.0001	0.42643 0.0001	-0.04795 0.5614	-0.03508 0.6710	-0.01080 0.8960
				-0.37074 0.0001	0.06515 0.4299	0.06207 0.4521	0.02146 0.7950
					0.14442 0.0789	0.12829 0.1189	0.01186 0.8858
						0.05133 0.5341	0.00765 0.9262
							0.57128 0.0001

Table A-43
Correlation Matrix: Hewlett Packard
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
HLR	145	0.49051724	0.77813027	71.12500000	-2.37500000	2.50000000
HLPVXDT	145	1.57897937	0.45279933	228.95200810	1.05370874	2.85671075
HLPVXT1	145	0.53883036	0.81117618	78.13040251	0.00288463	3.44737482
HLTMAT	145	2.67307692	0.80773046	387.59615385	1.28846154	4.05769231
HL2WKRET	145	0.00021867	0.06359078	0.03170757	-0.19776119	0.22653722
HLSCVLN	145	6.04037486	0.96780490	875.85435437	3.21887582	8.02486215
HLPRVLN	145	4.67015950	1.25323600	677.17312689	0.69314718	7.47929964

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 145

	HLR	HLPVXDT	HLPVXT1	HLTMAT	HL2WKRET	HLSCVLN	HLPRVLN
HLR	1.00000	-0.28276	-0.32026	0.16985	-0.19183	0.32611	0.19469
	0.0000	0.0006	0.0001	0.0411	0.0208	0.0001	0.0189
			0.96456	-0.78948	-0.06651	0.09695	0.31546
			0.0001	0.0001	0.4267	0.2460	0.0001
				-0.66403	-0.08146	-0.01355	0.21382
				0.0001	0.3300	0.8715	0.0098
					-0.11512	-0.47033	-0.50279
					0.1680	0.0001	0.0001
						0.05880	0.08691
						0.4823	0.2986
							0.67312
							0.0001

Table A-44
Correlation Matrix: IBM
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
BZR	145	1.35517241	1.73903284	196.50000000	-1.62500000	7.00000000
BZPVXDT	145	1.45920296	0.18154182	211.58442974	1.16196115	1.78366678
BZPVXT1	145	0.24359750	0.16969217	35.32163766	0.02623141	0.61413362
BZTMAT	145	2.61538462	0.80773046	379.23076923	1.23076923	4.00000000
BZ2WKRET	145	0.00032917	0.04016537	0.04772906	-0.14952381	0.13410405
BZSCVLN	145	7.68663336	0.78377451	1114.56183764	5.97126184	9.71256915
BZPRVLN	145	5.82888518	0.70326574	845.18835115	3.87120101	8.52654929

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 145

	BZR	BZPVXDT	BZPVXT1	BZTMAT	BZ2WKRET	BZSCVLN	BZPRVLN
BZR	1.00000	0.26542	0.25920	0.12041	-0.19488	0.50254	0.27939
	0.0000	0.0013	0.0016	0.1491	0.0188	0.0001	0.0007
			0.98733	-0.77472	-0.12731	0.21914	0.21792
			0.0001	0.0001	0.1270	0.0081	0.0085
				-0.72318	-0.13888	0.17825	0.19187
				0.0001	0.0957	0.0319	0.0208
					-0.03069	-0.16974	-0.10033
					0.7140	0.0412	0.2299
						-0.03314	-0.10090
						0.6923	0.2272
							0.51527
							0.0001

Table A-45
Correlation Matrix: Johnson and Johnson
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
JNR	145	1.41465517	1.52323608	205.12500000	-2.25000000	6.50000000
JNPVXDT	145	0.78561812	0.18786663	113.91462768	0.38290676	1.08279210
JNPVXT1	145	0.08101005	0.11368113	11.74645783	0.00001241	0.38080407
JNTMAT	145	2.61539462	0.80773046	379.23076923	1.23076923	4.00000000
JN2WKRET	145	0.01268315	0.03922537	1.83905688	-0.08635579	0.14176829
JNSCVLN	145	6.13497082	1.23770434	889.57076908	2.19722458	8.73238521
JNPRVLN	145	4.58084380	1.06332826	664.22235106	2.30258509	6.86275791

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 145

	JNR	JNPVXDT	JNPVXT1	JNTMAT	JN2WKRET	JNSCVLN	JNPRVLN
JNR	1.00000	-0.40167	0.45595	-0.02773	-0.28767	0.06133	0.12934
	0.0000	0.0001	0.0001	0.7406	0.0005	0.4637	0.1210
			-0.94236	0.62672	-0.11071	-0.52370	-0.58655
			0.0001	0.0001	0.1850	0.0001	0.0001
				-0.37149	0.04800	0.27106	0.41265
				0.0001	0.5664	0.0010	0.0001
					-0.15060	-0.77513	-0.67574
					0.0706	0.0001	0.0001
						0.24414	0.20447
						0.0031	0.0136
							0.74658
							0.0001

Table A-46
Correlation Matrix: Merck
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
MKR	157	0.46636943	2.51662527	73.22000000	-19.50000000	10.00000000
MKPVXDT	157	0.75040198	0.08719390	117.81311143	0.56605685	0.96797210
MKPVXT1	157	0.06985352	0.04104237	10.96700286	0.00102579	0.18830666
MKTMAT	157	2.48076923	0.87434817	389.48076923	0.98076923	3.98076923
MK2WKRET	157	0.00930714	0.03922236	1.46122056	-0.08407080	0.10989933
MKSCVLN	157	6.24707314	0.96533369	980.79048229	3.89182030	8.20767442
MKPRVLN	157	4.81548482	1.11405320	756.03111748	1.60943791	7.24279792

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 157

	MKR	MKPVXDT	MKPVXT1	MKTMAT	MK2WKRET	MKSCVLN	MKPRVLN
MKR	1.00000	0.22320	-0.25707	0.13859	-0.28397	-0.10112	-0.02995
	0.0000	0.0050	0.0012	0.0834	0.0003	0.2076	0.7097
			-0.97448	0.79852	-0.25339	-0.55926	-0.49410
			0.0001	0.0001	0.0014	0.0001	0.0001
				-0.77761	0.26518	0.56853	0.50780
				0.0001	0.0008	0.0001	0.0001
					-0.07557	-0.76672	-0.67843
					0.3469	0.0001	0.0001
						0.13942	0.05450
						0.0816	0.4979
							0.76257
							0.0001

Table A-47
Correlation Matrix: Mobil
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
MBR	147	0.51020408	0.68893999	75.00000000	-0.87500000	3.87500000
MBPVXDT	147	0.86112329	0.06689652	126.58512364	0.73837698	1.02123277
MBPVXT1	147	0.02373144	0.01753096	3.48852185	0.00001516	0.06844660
MBTMAT	147	2.63461538	0.81883342	387.28846154	1.23076923	4.03846154
MB2WKRET	147	0.00571866	0.03504567	0.84064276	-0.10934394	0.09322034
MBSCVLN	147	6.43724481	1.04082048	946.27498744	3.93182563	9.29026000
MBPRVLN	147	4.87261391	0.96307495	716.27424460	2.39789527	6.95749737

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 147

	MBR	MBPVXDT	MBPVXT1	MBTMAT	MB2WKRET	MBSCVLN	MBPRVLN
MBR	1.00000 0.0000	-0.12238 0.1398	0.11003 0.1846	-0.11902 0.1510	-0.18259 0.0269	0.23683 0.0039	0.19761 0.0164
			-0.96646 0.0001	0.52923 0.0001	-0.23492 0.0042	-0.56166 0.0001	-0.45592 0.0001
				-0.46563 0.0001	0.22579 0.0060	0.49519 0.0001	0.43391 0.0001
					0.01251 0.8805	-0.53036 0.0001	-0.48896 0.0001
						0.19362 0.0188	0.13186 0.1114
							0.63245 0.0001

Table A-48
Correlation Matrix: Philip Morris
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
HMR	146	4.10704795	4.26436464	599.62900000	-9.50000000	18.00000000
HMPVXDT	146	0.59016178	0.14109549	86.16362002	0.35290237	0.92990223
HMPVXT1	146	0.18773895	0.10258281	27.40988650	0.00491370	0.41873534
HMTMAT	146	2.72115385	0.81328194	397.28846154	1.32692308	4.11538462
HM2WKRET	146	0.01701583	0.04224917	2.48431097	-0.11508951	0.14345992
HMSCVLN	146	6.90787746	0.93220697	1008.55010919	4.46590812	8.72388210
HMPRVLN	146	4.22854600	1.18754226	617.36771529	0.22314355	6.613048[illegible]9

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 146

	HMR	HMPVXDT	HMPVXT1	HMTMAT	HM2WKRET	HMSCVLN	HMPRVLN
HMR	1.00000 0.0000	-0.14383 0.0833	0.06066 0.4670	0.14653 0.0776	-0.24348 0.0031	0.34119 0.0001	-0.14214 0.0870
			-0.98171 0.0001	0.89741 0.0001	-0.14697 0.0767	-0.57257 0.0001	-0.41414 0.0001
				-0.91073 0.0001	0.17620 0.0334	0.50465 0.0001	0.42582 0.0001
					-0.06310 0.4492	-0.30084 0.0002	-0.50076 0.0001
						0.19478 0.0185	0.04476 0.5916
							0.40281 0.0001

Table A-49
Correlation Matrix: Proctor and Gamble
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
OGR	153	0.55310458	0.96449008	84.62500000	-1.75000000	3.50000000
OGPVXDT	153	0.71616678	0.15999023	109.57351732	0.49107734	1.03799839
OGPVXT1	153	0.10599087	0.07828636	16.21660337	0.00002564	0.25900228
OGTMAT	153	2.59615385	0.85214227	397.21153846	1.13461538	4.05769231
OG2WKRET	153	0.01079289	0.03918676	1.65131263	-0.10015649	0.09895833
OGSCVLN	153	5.42881140	1.03549236	830.60814364	1.79175947	7.29233718
OGPRVLN	153	3.58883639	1.29042424	549.09196733	0.00000000	6.18105131

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 153

	OGR	OGPVXDT	OGPVXT1	OGTMAT	OG2WKRET	OGSCVLN	OGPRVLN
OGR	1.00000 0.0000	0.06884 0.3978	-0.10684 0.1887	0.07739 0.3417	-0.24673 0.0021	0.01865 0.8190	0.02511 0.7580
			-0.96772 0.0001	0.93324 0.0001	-0.10394 0.2010	-0.67506 0.0001	-0.36569 0.0001
				-0.93594 0.0001	0.08301 0.3077	0.58515 0.0001	0.36682 0.0001
					0.01696 0.8352	-0.54510 0.0001	-0.28166 0.0004
						0.16732 0.0387	0.04128 0.6124
							0.47440 0.0001

Table A-50
Correlation Matrix: Sears
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
RSR	149	0.18162752	0.62026680	27.06250000	-2.25000000	2.62500000
RSPVXDT	149	1.09670888	0.38639841	163.40962374	0.68959258	2.01012430
RSPVXT1	149	0.15765430	0.24536476	23.49049119	2.631484407E-07	1.02035110
RSTMAT	149	2.67307692	0.82993637	398.28846154	1.25000000	4.09615385
RS2WKRET	149	0.00090213	0.04504422	0.13441775	-0.11153846	0.13675214
RSSCVLN	149	6.31995509	0.73771523	941.67330886	4.36944785	8.50895939
RSPRVLN	149	4.98700415	0.93502877	743.06361839	2.19722458	7.55903826

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 149

	RSR	RSPVXDT	RSPVXT1	RSTMAT	RS2WKRET	RSSCVLN	RSPRVLN
RSR	1.00000	-0.13574	-0.21418	0.02780	-0.24527	0.29460	0.15582
	0.0000	0.0988	0.0087	0.7365	0.0026	0.0003	0.0578
			0.87395	-0.85020	-0.07991	-0.30451	-0.03304
			0.0001	0.0001	0.3327	0.0002	0.6892
				-0.64352	-0.01582	-0.28919	-0.10429
				0.0001	0.8482	0.0003	0.2056
					0.07659	0.039[illegible]5	-0.08350
					0.3532	0.6[illegible]3	0.3113
						0.12501	0.06178
						0.1287	0.4542
							0.36504
							0.0001

Table A-51
Correlation Matrix: Union Pacific
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
UPR	153	0.57352941	0.82074879	87.75000000	-2.25000000	2.50000000
UPPVXDT	153	0.99440736	0.08212647	152.14432543	0.84279176	1.17146309
UPPVXT1	153	0.00673195	0.00711346	1.02998849	8.295568912E-08	0.02939959
UPTMAT	153	2.48076923	0.85214227	379.55769231	1.01923077	3.94230769
UP2WKRET	153	0.00195146	0.03618149	0.29857342	-0.08530806	0.11740042
UPSCVLN	153	5.19273619	0.80668612	794.48863734	2.77258872	6.98841318
UPPRVLN	153	3.71102691	1.37185011	567.78711763	0.00000000	6.11809720

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 153

	UPR	UPPVXDT	UPPVXT1	UPTMAT	UP2WKRET	UPSCVLN	UPPRVLN
UPR	1.00000	-0.41916	-0.13267	0.28991	-0.19266	0.06190	0.07811
	0.0000	0.0001	0.1021	0.0003	0.0170	0.4472	0.3372
			0.06845	-0.40341	-0.24910	-0.13570	-0.01602
			0.4005	0.0001	0.0019	0.0944	0.8441
				-0.25420	-0.01763	0.02759	-0.09005
				0.0015	0.8287	0.7350	0.2683
					0.00664	-0.29195	-0.26360
					0.9350	0.0003	0.0010
						0.17167	-0.06792
						0.0339	0.4041
							0.20406
							0.0114

Table A-52
Correlation Matrix: Xerox
Closing of Trust to March 29, 1991

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
XXR	147	0.51530612	0.80500999	75.75000000	-2.37500000	3.12500000
XXPVXDT	147	1.46779135	0.43348263	215.76532854	1.01553942	2.83585885
XXPVXT1	147	0.40545766	0.67489935	59.60227554	0.00024147	3.37037771
XXTMAT	147	2.67307692	0.81883342	392.94230769	1.26923077	4.07692308
XX2WKRET	147	0.00231093	0.05304573	0.33970659	-0.13015873	0.21107266
XXSCVLN	147	5.86099924	0.82070065	861.56688875	2.89037176	7.75276481
XXPRVLN	147	4.32511967	1.10125841	635.79259125	0.00000000	6.83410874

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 147

	XXR	XXPVXDT	XXPVXT1	XXTMAT	XX2WKRET	XXSCVLN	XXPRVLN
XXR	1.00000	-0.39673	-0.39298	0.13720	-0.28040	0.34949	0.06938
	0.0000	0.0001	0.0001	0.0975	0.0006	0.0001	0.4037
			0.95796	-0.75115	-0.08039	-0.15916	0.09260
			0.0001	0.0001	0.3331	0.0542	0.2646
				-0.63651	-0.08638	-0.13551	0.07701
				0.0001	0.2982	0.1017	0.3539
					-0.02424	-0.20284	-0.36437
					0.7707	0.0137	0.0001
						0.13445	0.16915
						0.1045	0.0406
							0.54027
							0.0001

APPENDIX B

INTERMEDIATE REGRESSIONS

This appendix contains the intermediate regressions that were run in order to obtain the results on Table 9a and Table 10. The trusts are listed in alphabetical order. The regressions for open trusts are shown first. The dependent variable for each regression in shown in the first column on the left.

Table B-1
Intermediate Regressions: American Express
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.126 (26.678)	.378 (17.943)			.870 (321.95)	50
Time to Maturity	4.587 (170.984)	- .884 (-7.409)	1.852 (2.265)		.561 (30.02)	
2 week Return	-.006 (-.563)	-.047 (-.941)	-.251 (-.743)	-.145 (-2.317)	.143 (2.45)	

Table B-2
Intermediate Regressions: American Home Products
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.027 (.000)	.055 (.000)			.000 (.000)	51
Time to Maturity	1.992 (0.000)	3.354 (0.000)	3.995 (2.769)		.146 (3.83)	
2 week Return	.001 (.000)	-.005 (-.000)	.862 (3.836)	.043 (1.673)	.307 (6.20)	

Table B-3
Intermediate Regressions: Amoco
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.013 (11.871)	-.069 (-6.353)			.447 (40.36)	51
Time to Maturity	4.490 (217.361)	-2.250 (-11.369)	10.665 (4.114)		.749 (73.09)	
2 week Return	-.004 (-.829)	-.055 (-1.069)	.677 (1.020)	-.144 (-3.792)	.272 (5.72)	

Table B-4
Intermediate Regressions: Atlantic Richfield
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.016 (8.230)	-.025 (-1.622)			.059 (2.63)	44
Time to Maturity	4.567 (188.744)	-1.048 (-5.426)	10.925 (5.603)		.597 (30.42)	
2 week Return	-.004 (-.524)	-.022 (-.376)	-.408 (-.674)	-.185 (-4.073)	.312 (5.76)	

Table B-5
Intermediate Regressions: Bristol Myers
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.050 (54.386)	-.311 (-28.622)			.953 (819.20)	40
Time to Maturity	4.586 (177.386)	-1.986 (-6.501)	-.495 (-.112)		.520 (21.14)	
2 week Return	-.009 (-1.202)	-.241 (-2.764)	3.183 (2.532)	-.026 (-.527)	.286 (4.81)	

Table B-6
Intermediate Regressions: Chevron
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.038 (9.789)	.122 (5.589)			.410 (31.24)	47
Time to Maturity	4.750 (250.242)	-.987 (-9.355)	5.475 (7.572)		.757 (72.43)	
2 week Return	-.009 (-1.122)	-.002 (-.049)	-.166 (-.564)	-.255 (-4.214)	.306 (6.01)	

Table B-7
Intermediate Regressions: Coca Cola
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.015 (11.186)	-.163 (-14.055)			.811 (197.54)	48
Time to Maturity	4.529 (243.180)	-1.986 (-12.440)	-4.473 (-2.211)		.780 (79.82)	
2 week Return	-.008 (-1.227)	-.007 (-.121)	-.017 (-.024)	-.136 (-2.513)	.132 (2.13)	

Table B-8
Intermediate Regressions: Dow Chemical
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.021 (14.239)	-.255 (-15.144)			.830 (229.33)	49
Time to Maturity	4.558 (126.741)	-1.193 (-2.915)	-5.819 (-1.643)		.196 (5.60)	
2 week Return	.004 (.355)	-.383 (-3.198)	-2.339 (-2.225)	-.070 (-1.520)	.294 (5.97)	

Table B-9
Intermediate Regressions: DuPont
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.097 (57.291)	-.429 (29.240)			.950 (854.99)	47
Time to Maturity	4.692 (162.182)	-1.171 (-4.689)	-9.921 (-3.913)		.459 (18.65)	
2 week Return	-.006 (-.619)	-.236 (-3.059)	1.777 (2.150)	.137 (2.763)	.361 (7.72)	

Table B-10
Intermediate Regressions: E. Kodak
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.053 (17.918)	-.285 (-15.023)			.822 (255.69)	51
Time to Maturity	4.461 (197.986)	-1.433 (-9.946)	-3.574 (-3.298)		.696 (54.90)	
2 week Return	-.008 (-.861)	-.123 (-1.964)	.235 (.496)	-.003 (-.045)	.084 (1.38)	

Table B-11
Intermediate Regressions: Exxon
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.062 (266.256)	-.500 (-78.619)			.993 (6180.95)	49
Time to Maturity	4.564 (179.873)	5.441 (7.851)	-43.160 (-2.713)		.600 (34.50)	
2 week Return	.010 (2.653)	-.316 (-3.022)	-.170 (-.072)	.043 (1.919)	.244 (4.62)	

Table B-12
Intermediate Regressions: Ford
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.048 (35.228)	-.374 (-29.600)			.950 (876.14)	48
Time to Maturity	4.606 (174.869)	-1.469 (-6.053)	12.867 (4.547)		.560 (28.66)	
2 week Return	.001 (.028)	-.107 (-1.240)	-.533 (-.521)	-.090 (-1.410)	.092 (1.42)	

Table B-13
Intermediate Regressions: General Electric
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.024 (8.673)	-.026 (-1.455)			.152 (2.12)	51
Time to Maturity	4.529 (220.622)	-1.442 (-10.831)	-4.585 (-4.296)		.743 (67.88)	
2 week Return	-.007 (-.776)	-.108 (-1.853)	.028 (.060)	-.035 (-.507)	.079 (1.26)	

Table B-14
Intermediate Regressions: General Motors
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.026 (8.207)	.074 (3.575)			.221 (12.78)	47
Time to Maturity	4.500 (200.500)	-.743 (-5.065)	8.544 (8.089)		.674 (45.54)	
2 week Return	-.004 (-.383)	-.042 (-.621)	-.351 (-.745)	-.137 (-1.870)	.103 (1.57)	

Table B-15
Intermediate Regressions: GTE
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.044 (69.199)	-.421 (-44.707)			.978 (1998.67)	48
Time to Maturity	4.586 (190.044)	-3.068 (-8.585)	-9.931 (-1.775)		.631 (38.43)	
2 week Return	-.004 (-.518)	-.221 (-2.157)	.476 (.294)	-.077 (-1.670)	.160 (2.66)	

Table B-16
Intermediate Regressions: Hewlett Packard
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.019 (6.930)	.162 (7.012)			.522 (49.17)	47
Time to Maturity	4.519 (151.383)	-.635 (-2.575)	8.078 (5.072)		.424 (16.18)	
2 week Return	-.001 (-.002)	-.294 (-2.736)	-.968 (-1.420)	.023 (.331)	.189 (3.19)	

Table B-17
Intermediate Regressions: IBM
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.069 (21.955)	.212 (12.575)			.775 (158.14)	48
Time to Maturity	4.471 (227.118)	-1.214 (-11.591)	-1.781 (-1.944)		.764 (69.07)	
2 week Return	-.013 (-1.691)	.017 (.389)	-.198 (.558)	-.170 (-2.917)	.175 (2.97)	

Table B-18
Intermediate Regressions: Johnson and Johnson
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.011 (7.257)	-.078 (-5.252)			.391 (27.59)	45
Time to Maturity	4.442 (165.481)	-1.696 (-6.663)	1.054 (.403)		.515 (22.28)	
2 week Return	-.011 (-1.185)	-.019 (-.203)	-1.804 (-1.947)	-.144 (-2.838)	.237 (4.04)	

Table B-19
Intermediate Regressions: Merck
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.043 (6.762)	-.779 (-16.418)			.841 (269.56)	52
Time to Maturity	4.496 (114.680)	-.250 (-.857)	-2.159 (-2.508)		.123 (3.51)	
2 week Return	.002 (.310)	.026 (.412)	-.421 (-2.550)	.007 (.265)	.126 (2.26)	

Table B-20
Intermediate Regressions: Mobil
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.016 (7.851)	-.104 (-5.742)			.412 (32.97)	48
Time to Maturity	4.519 (188.604)	-1.124 (-5.173)	13.142 (7.487)		.643 (41.41)	
2 week Return	-.005 (-.686)	-.041 (-.574)	-.388 (-.687)	-.092 (-2.00)	.102 (1.62)	

Table B-21
Intermediate Regressions: Philip Morris
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.042 (37.133)	-.455 (-38.113)			.971 (1452.56)	46
Time to Maturity	4.567 (244.989)	-2.197 (-11.145)	-11.220 (-4.510)		.771 (72.27)	
2 week Return	-.006 (-.676)	-.120 (-1.362)	.765 (.658)	-.092 (-1.297)	.092 (1.35)	

Table B-22
Intermediate Regressions: Proctor & Gamble
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.037 (40.500)	-.332 (-30.937)			.952 (957.11)	50
Time to Maturity	4.548 (234.242)	-2.803 (-12.352)	-6.639 (-2.172)		.770 (78.65)	
2 week Return	-.005 (-.718)	-.174 (-2.101)	.463 (.409)	-.093 (-1.517)	.140 (2.38)	

Table B-23
Intermediate Regressions: Sears
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.078 (42.968)	-.538 (-48.982)			.981 (2399.25)	48
Time to Maturity	4.567 (233.584)	-1.375 (-11.160)	-1.216 (-.735)		.735 (62.54)	
2 week Return	-.015 (-1.406	-.019 (-.291)	.245 (.284)	-.104 (-1.308)	.044 (0.64)	

Table B-24
Intermediate Regressions: Union Pacific
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.033 (13.370)	-.111 (-7.625)			.543 (58.14)	51
Time to Maturity	4.442 (180.751)	-1.159 (-8.059)	6.274 (4.440)		.638 (42.33)	
2 week Return	-.004 (-.430)	-.050 (-.825)	-.554 (-.950)	-.134 (-2.138)	.124 (2.13)	

Table B-25
Intermediate Regressions: Xerox
Trust Initiation to Closing

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	R^2	N
$(X/T-1)^2$	.049 (14.774)	.104 (5.714)			.432 (32.65)	45
Time to Maturity	4.519 (270.983)	-1.189 (-12.993)	-2.819 (-3.667)		.813 (91.14)	
2 week Return	-.015 (-1.458)	-.053 (-.916)	.034 (.072)	-.251 (-2.614)	.170 (2.66)	

Table B-26
Intermediate Regressions: American Express
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.261 (27.023)	1.128 (40.117)					.919 (1609.41)	144
Time to Maturity	2.721 (57.564)	-1.655 (-12.030)	.190 (.463)				.507 (72.47)	
Log of Score Vol.	6.801 (124.307)	-.337 (-2.117)	1.023 (2.153)	-.926 (-9.500)			.415 (33.12)	
Log of Prime Vol.	5.571 (87.627)	.026 (.142)	-1.003 (-1.816)	-.510 (-4.503)	.826 (8.407)		.404 (23.57)	
2 week Return	.002 (.486)	-.018 (-1.400)	.012 (.317)	-.009 (-1.138)	.008 (1.099)	-.012 (-2.074)	.060 (1.77)	

Table B-27
Intermediate Regressions: American Home Products
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.047 (134.838)	-.389 (-76.667)					.971 (5863.48)	172
Time to Maturity	2.365 (38.658)	7.224 (8.105)	51.126 (13.309)				.319 (4.22)	
Log of Score Vol.	5.565 (86.128)	-7.216 (-7.392)	-6.195 (- .392)	-.495 (-6.198)			.358 (31.128)	
Log of Prime Vol.	4.071 (47.690)	-2.433 (-1.859)	-27.192 (-1.294)	-.256 (-2.411)	.386 (3.772)		.129 (6.20)	
2 week Return	.006 (2.492)	-.122 (-3.057)	-.977 (-1.527)	.008 (2.534)	.010 (3.346)	.002 (.881)	.147 (5.70)	

Table B-28
Intermediate Regressions: AT&T
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.083 (130.862)	-.572 (-93.534)					.977 (8748.6)	209
Time to Maturity	2.873 (38.164)	.994 (1.362)	-46.236 (-5.575)				.188 (16.47)	
Log of Score Vol.	7.835 (163.693)	-2.635 (-5.680)	20.799 (3.945)	-.471 (-10.630)			.440 (53.60)	
Log of Prime Vol.	6.499 (137.193)	.083 (.181)	8.577 (1.644)	-.309 (-7.043)	.538 (7.788)		.356 (28.25)	
2 week Return	.004 (1.147)	-.076 (-2.523)	.047 (.138)	.605 (1.791)	.007 (1.554)	-.002 (-.404)	.056 (2.43)	

Table B-29
Intermediate Regressions: Amoco
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.015 (31.953)	-.162 (-27.329)					.828 (746.87)	157
Time to Maturity	2.481 (48.300)	7.043 (11.117)	27.677 (3.220)				.465 (66.98)	
Log of Score Vol.	5.603 (82.777)	-5.322 (-6.374)	-13.576 (-1.199)	-.276 (-2.602)			.242 (16.28)	
Log of Prime Vol.	3.487 (39.182)	-4.316 (-3.931)	-16.068 (-1.079)	-.844 (-6.043)	.281 (2.649)		.283 (15.04)	
2 week Return	.005 (2.027)	-.087 (-2.783)	.194 (.458)	.012 (2.961)	.010 (3.318)	.001 (.109)	.155 (5.55)	

Table B-30
Intermediate Regressions: Atlantic Richfield
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.024 (32.391)	-.218 (-27.345)						150
Time to Maturity	2.672 (78.206)	7.963 (21.317)	.558 (.1455)				.754 (227.21)	
Log of Score Vol.	5.264 (66.434)	-7.270 (-8.391)	-8.113 (-.913)	.149 (.783)			.328 (23.95)	
Log of Prime Vol.	3.445 (33.990)	-9.236 (-8.333)	-13.119 (-1.153)	-.251 (-1.031)	.484 (4.586)		.339 (23.22)	
2 week Return	.006 (2.324)	-.073 (-2.600)	-.021 (-.072)	.018 (2.984)	.002 (.706)	-.001 (-.138)	.100 (3.24)	

Table B-31
Intermediate Regressions: Bristol Myers
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.028 (40.861)	-.307 (-36.493)					.887 (1331.77)	172
Time to Maturity	2.528 (68.706)	10.088 (22.456)	1.153 (.281)				.749 (252.18)	
Log of Score Vol.	6.704 (129.391)	-13.507 (21.354)	-12.946 (-2.244)	-.875 (-8.082)			.758 (175.44)	
Log of Prime Vol.	5.294 (88.638)	-9.604 (-13.173)	16.988 (2.554)	-.824 (-6.598)	.790 (8.885)		.644 (75.63)	
2 week Return	.008 (3.280)	-.134 (-4.339)	-.015 (-.053)	.024 (4.582)	.003 (.869)	-.001 (-.083)	.196 (8.12)	

Table B-32
Intermediate Regressions: Chevron
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.013 (14.474)	-.012 (-1.486)					.015 (2.21)	151
Time to Maturity	2.679 (68.515)	6.323 (18.364)	-2.355 (-.703)				.695 (168.87)	
Log of Score Vol.	6.545 (103.938)	-7.327 (-13.213)	9.161 (1.699)	.247 (1.863)			.552 (60.31)	
Log of Prime Vol.	5.099 (61.893)	-8.258) (-11.383)	12.047 (1.707)	.251 (1.451)	.564 (5.225)		.525 (40.47)	
2 week Return	.009 (2.892)	-.075 (-2.726)	.061 (.227)	.022 (3.412)	.006 (1.431)	.001 (.155)	.128 (4.24)	

Table B-33
Intermediate Regressions: Coca Cola
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.129 (59.117)	-.500 (-38.993)					.913 (1520.47)	146
Time to Maturity	2.663 (134.875)	4.440 (38.206)	-6.844 (-9.060)				.915 (770.87)	
Log of Score Vol.	6.245 (123.358)	-1.735 (-5.823)	-10.813 (-5.583)	1.014 (4.728)			.381 (29.15)	
Log of Prime Vol.	4.903 (69.951)	.186 (.450)	-5.200 (-1.939)	.815 (2.747)	.593 (5.107)		.2105 (9.40)	
2 week Return	.015 (4.481)	-.025 (-1.257)	.028 (.215)	.058 (4.019)	.014 (2.466)	.001 (.303)	.146 (4.79)	

Table B-34
Intermediate Regressions: Dow Chemical
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.049 (16.728)	.333 (25.034)					.802 (626.70)	157
Time to Maturity	2.577 (51.448)	-2.733 (-12.050)	2.587 (1.890)				.491 (74.39)	
Log of Score Vol.	6.262 (104.617)	.375 (1.384)	1.728 (1.056)	-.817 (-8.482)			.329 (24.99)	
Log of Prime Vol.	4.341 (61.775)	-.098 (-.308)	.026 (.013)	-1.069 (-9.459)	.736 (7.755)		.496 (37.43)	
2 week Return	-.001 (-.215)	-.036 (-2.175)	.251 (2.513)	-.006 (-.979)	-.006 (-1.241)	-.011 (-2.586)	.118 (4.05)	

Table B-35
Intermediate Regressions: DuPont
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.029 (57.059)	-.289 (-51.464)					.9400 (2648.54)	171
Time to Maturity	2.596 (39.599)	3.141 (4.421)	45.800 (4.702)				.199 (20.83)	
Log of Score Vol.	6.260 (121.694)	-5.187 (-9.304)	3.901 (.5103)	.057 (.935)			.344 (29.23)	
Log of Prime Vol.	4.313 (50.474)	-.978 (-1.056)	-26.084 (-2.054)	-.294 (-2.927)	.586 (4.577)		.173 (8.67)	
2 week Return	.004 (1.484)	-.091 (-2.876)	-.712 (-1.646)	.009 (2.635)	.008 (1.948)	.001 (.207)	.116 (4.35)	

Table B-36
Intermediate Regressions: E. Kodak
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.043 (28.416)	.294 (31.545)					.868 (995.09)	154
Time to Maturity	2.490 (63.044)	-4.364 (-17.810)	-.825 (-.387)				.678 (158.68)	
Log of Score Vol.	6.335 (82.243)	1.761 (3.685)	-4.648 (-1.118)	-1.165 (-7.343)			.314 (22.92)	
Log of Prime Vol.	4.769 (61.059)	.880 (1.816)	-.535 (-.127)	-1.038 (-6.454)	.348 (4.201)		296 (15.65)	
2 week Return	.002 (.461)	-.041 (-1.909)	-.105 (-.562)	-.017 (-2.351)	-.001 (-.171)	.002 (.621)	.063 (1 98)	

Table B-37
Intermediate Regressions: Exxon
Closing of Trust to September, 1990*

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Mat.	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.180 (1162.20)	-.862 (-236.511)					.996 (55937.70)	213
Time to Maturity	2.039 (28.473)	-7.047 (-4.190)	213.689 (6.723)				.230 (31.38)	
Log of Score Vol.	6.138 (97.192)	-5.934 (-4.000)	67.669 (2.414)	.435 (7.142)			.258 (24.28)	
Log of Prime Vol.	4.494 (50.056)	-5.048 (-2.394)	150.064 (3.766)	.731 (8.451)	.378 (3.794)		.337 (26.43)	
2 week Return	.005 (2.107)	-.147 (-2.607)	-.666 (-.623)	.002 (.776)	.007 (2.547)	.002 (1.325)	.072 (3.21)	

* The trust for Exxon expired in September, 1990

Table B-38
Intermediate Regressions: Ford
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.087 (13.020)	.336 (15.840)					.624 (250.91)	153
Time to Maturity	2.756 (102.029)	-2.278 (-26.603)	3.936 (12.003)				.850 (425.91)	
Log of Score Vol.	5.806 (104.800)	.434 (2.469)	-1.753 (-2.606)	-.577 (-3.448)			.143 (8.25)	
Log of Prime Vol.	4.611 (65.783)	.525 (2.362)	-1.827 (-2.147)	-.447 (-2.111)	.781 (7.539)		.326 (17.87)	
2 week Return	-.003 (-.710)	-.018 (-1.525)	.065 (1.439)	-.011 (-1.010)	.008 (1.504)	-.008 (-1.955)	.073 (2.30)	

Table B-39
Intermediate Regressions: General Electric
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.016 (14.461)	.079 (8.648)					.327 (74.78)	156
Time to Maturity	2.529 (45.511)	4.000 (9.018)	11.476 (2.929)				.370 (44.96)	
Log of Score Vol.	6.751 (121.203)	-4.851 (-10.914)	-3.289 (-.838)	-.719 (-8.874)			.566 (66.18)	
Log of Prime Vol.	5.369 (85.534)	-6.496 (-12.969)	1.512 (.342)	-1.132 (-12.395)	.544 (5.957)		.703 (89.36)	
2 week Return	.007 (2.139)	-.066 (-2.435)	-.270 (-1.121)	.011 (2.176)	.004 (.918)	-.003 (.757)	.082 (2.67)	

Table B-40
Intermediate Regressions: General Motors
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.023 (12.201)	.203 (16.291)					.645 (265.39)	147
Time to Maturity	2.625 (51.986)	-3.625 (-10.875)	-2.698 (-1.222)				.452 (59.87)	
Log of Score Vol.	6.294 (126.066)	-.710 (-2.155)	7.439 (3.406)	-.432 (-5.260)			.234 (14.64)	
Log of Prime Vol.	4.936 (81.555)	-.178 (-.446)	4.654 (1.758)	-.485 (-4.876)	.488 (4.836)		.261 (12.61)	
2 week Return	.001 (.373)	-.061 (-2.500)	.230 (1.413)	-.002 (-.416)	.013 (2.144)	.008 (1.537)	.098 (3.08)	

Table B-41
Intermediate Regressions: GTE
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.138 (203.406)	-.701 (-86.735)					.981 (7522.89)	149
Time to Maturity	2.692 (47.717)	4.190 (6.251)	37.346 (5.462)				.321 (34.46)	
Log of Score Vol.	7.185 (113.844)	-.324 (-.433)	18.623 (2.435)	.097 (1.044)			.047 (2.40)	
Log of Prime Vol.	5.814 (93.681)	-.117 (-.159)	8.590 (1.412)	-.020 (-.223)	.684 (8.376)		.332 (17.88)	
2 week Return	.009 (2.714)	-.022 (-.585)	.606 (1.556)	.008 (1.737)	.001 (.155)	-.001 (-.118)	.039 (1.16)	

Table B-42
Intermediate Regressions: Hewlett Packard
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	(X/T-1)^2	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
(X/T-1)^2	.539 (30.210)	1.728 (43.716)					.930 (1911.05)	145
Time to Maturity	2.673 (80.739)	-1.408 (-19.194)	1.394 (8.982)				.760 (224.55)	
Log of Score Vol.	6.040 (97.790)	.207 (1.514)	-1.835 (-6.335)	-1.216 (-7.770)			.422 (34.27)	
Log of Prime Vol.	4.670 (64.309)	.873 (5.425)	-2.007 (-5.896)	-.821 (-4.459)	.838 (8.467)		.527 (38.94)	
2 week Return	.001 (.044)	-.009 (-.839)	-.019 (-.828)	-.047 (-3.692)	-.012 (-1.775)	.008 (1.445)	.127 (4.05)	

Table B-43
Intermediate Regressions: IBM
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.243 (108.574)	.923 (74.418)					.974 (5538.03)	145
Time to Maturity	2.615 (67.337)	-3.447 (-16.056)	7.892 (5.452)				.669 (143.75)	
Log of Score Vol.	7.687 (124.417)	.946 (2.770)	-6.994 (-3.037)	.185 (1.390)			.118 (6.28)	
Log of Prime Vol.	5.829 (117.281)	.844 (3.073,	-3.834 (-2.070)	.282 (2.627)	.419 (6.182)		.296 (14.71)	
2 week Return	.001 (.100)	-.028 (-1.549)	-.124 (-1.011)	-.016 (-2.275)	-.001 (-.060)	-.004 (-.701)	.061 (1.82)	

Table B-44
Intermediate Regressions: Johnson and Johnson
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.081 (25.556)	-.570 (-33.678)					.888 (1134.21)	145
Time to Maturity	2.615 (91.653)	2.694 (17.679)	13.904 (18.471)				.822 (326.85)	
Log of Score Vol.	6.135 (111.025)	-3.450 (-11.690)	-21.632 (-14.840)	-.099 (-.613)			.717 (119.08)	
Log of Prime Vol.	4.581 (82.433)	-3.320 (-11.185)	-11.703 (-7.983)	-.251 (-1.535)	.482 (5.694)		.615 (55.90)	
2 week Return	.013 (3.963)	-.023 (-1.352)	-.174 (-2.056)	.008 (.839)	.008 (1.748)	.003 (.627)	.068 (2.04)	

Table B-45
Intermediate Regressions: Merck
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.070 (94.696)	-.459 (-54.045)					.950 (2920.85)	157
Time to Maturity	2.481 (58.678)	8.007 (16.462)	.223 (.048)				.638 (135.49)	
Log of Score Vol.	6.247 (128.103)	-6.192 (-11.035)	10.989 (2.070)	-.976 (-10.502)			.607 (78 79)	
Log of Prime Vol.	4.815 (85.271)	-6.313 (-9.716)	14.170 (2.304)	-1.000 (-9.283)	.654 (6.986)		.607 (58.67)	
2 week Return	.009 (3.163)	-.114 (-3.367)	.346 (1.081)	.016 (2.794)	.010 (2.143)	-.003 (-.8111)	.144 (5.11)	

Table B-46
Intermediate Regressions: Mobil
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.024 (63.688)	-.253 (-45.315)					.934 (2053.41)	148
Time to Maturity	2.635 (46.706)	6.478 (7.656)	32.468 (2.583)				.312 (32.64)	
Log of Score Vol.	6.437 (96.453)	-8.739 (-8.729)	-42.876 (-2.883)	-.369 (-3.747)			.408 (32.85)	
Log of Prime Vol.	4.873 (81.373)	-6.564 (-7.308)	-5.598 (-.419)	-.415 (-4.696)	.470 (6.268)		.447 (28.73)	
2 week Return	.006 (2.050)	-.123 (-2.942)	-.038 (-.061)	.009 (2.079)	.006 (1.641)	.001 (.371)	.101 (3.16)	

Table B-47
Intermediate Regressions: Philip Morris
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.188 (115.748)	-.714 (-61.886)					.964 (3829.85)	146
Time to Maturity	2.721 (97.308)	5.173 (26.008)	-6.506 (-4.527)				.830 (348.45)	
Log of Score Vol.	6.908 (136.796)	-3.783 (-10.534)	-14.407 (-5.552)	1.116 (7.394)			.581 (65.49)	
Log of Prime Vol.	4.228 (58.901)	-3.486 (-6.827)	6.151 (1.667)	-.972 (-4.527)	.931 (7.803)		.481 (32.69)	
2 week Return	.017 (5.082)	-.044 (-1.848)	.363 (2.108)	.029 (2.895)	.007 (1.334)	-.001 (-.351)	.115 (3.63)	

Table B-48
Intermediate Regressions: Proctor & Gamble
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.106 (66.232)	-.473 (-47.186)					.936 (2226.55)	151
Time to Maturity	2.596 (111.811)	4.971 (34.138)	-5.627 (-4.765)				.888 (594.04)	
Log of Score Vol.	5.429 (95.800)	-4.369 (-12.295)	-14.187 (-4.923)	.538 (2.702)			.551 (60.90)	
Log of Prime Vol.	3.589 (39.884)	-2.949 (-5.227)	3.357 (.734)	.895 (2.830)	.588 (4.522)		.275 (14.08)	
2 week Return	.011 (3.577)	-.025 (-1.346)	-.138 (-.903)	.043 (4.055)	.003 (.614)	-.003 (-1.067)	.123 (4.12)	

Table B-49
Intermediate Regressions: Sears
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.158 (16.083)	.555 (21.802)					.764 (475.34)	149
Time to Maturity	2.673 (80.514)	-1.826 (-21.182)	1.425 (5.102)				.765 (237.35)	
Log of Score Vol.	6.320 (122.213)	-.581 (-4.329)	-.294 (-.675)	-.794 (-6.160)			.283 (19.05)	
Log of Prime Vol.	4.987 (70.014)	-.080 (-.432)	-1.217 (-2.030)	-.382 (-2.153)	.488 (4.268)		.159 (6.79)	
2 week Return	.001 (.244)	-.009 (-.972)	.042 (1.352)	-.003 (-.354)	.008 (1.341)	.002 (.473)	.033 (0.98)	

Table B-51
Intermediate Regressions: Union Pacific
Closing of Trusts to March 29, 1991

Variable	**Intercept**	**X/T**	**$(X/T-1)^2$**	**Time to Maturity**	**Log of Score Vol.**	**Log of Prime Vol.**	**R^2**	**N**
$(X/T-1)^2$	.007 (11.695)	.006 (.843)					.005 (.710)	153
Time to Maturity	2.481 (40.358)	-4.186 (-5.574)	-27.271 (-3.138)				.214 (20.46)	
Log of Score Vol.	5.193 (86.294)	-1.333 (-1.813)	4.201 (.494)	-.408 (-5.100)			.165 (9.85)	
Log of Prime Vol.	3.711 (35.260)	-.268 (-.208)	-17.235 (-1.158)	-.595 (-4.255)	.163 (1.140)		.123 (5.20)	
2 week Return	.002 (.692)	-.110 (-.3184)	-.003 (-.007)	-.005 (-1.355)	.005 (1.363)	-.008 (-1.584)	.100 (3.27)	

Table B-52
Intermediate Regressions: Xerox
Closing of Trust to March 29, 1991

Variable	Intercept	X/T	$(X/T-1)^2$	Time to Maturity	Log of Score Vol.	Log of Prime Vol.	R^2	N
$(X/T-1)^2$	.405 (25.301)	1.491 (40.207)					.918 (1616.61)	147
Time to Maturity	2.673 (66.256)	-1.418 (-15.193)	1.224 (5.856)				.648 (132.56)	
Log of Score Vol.	5.86 (106.805)	-.301 (-2.372)	.250 (.881)	-.967 (-8.529)			.356 (26.38)	
Log of Prime Vol.	4.325 (58.861)	.235 (1.383)	-.231 (-.609)	-1.081 (-7.125)	.592 (5.295)		.364 (20.27)	
2 week Return	.002 (.530)	-.009 (-.975)	-.009 (-.396)	-.014 (-1.536)	.005 (.772)	.007 (1.402)	.041 (1.21)	

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